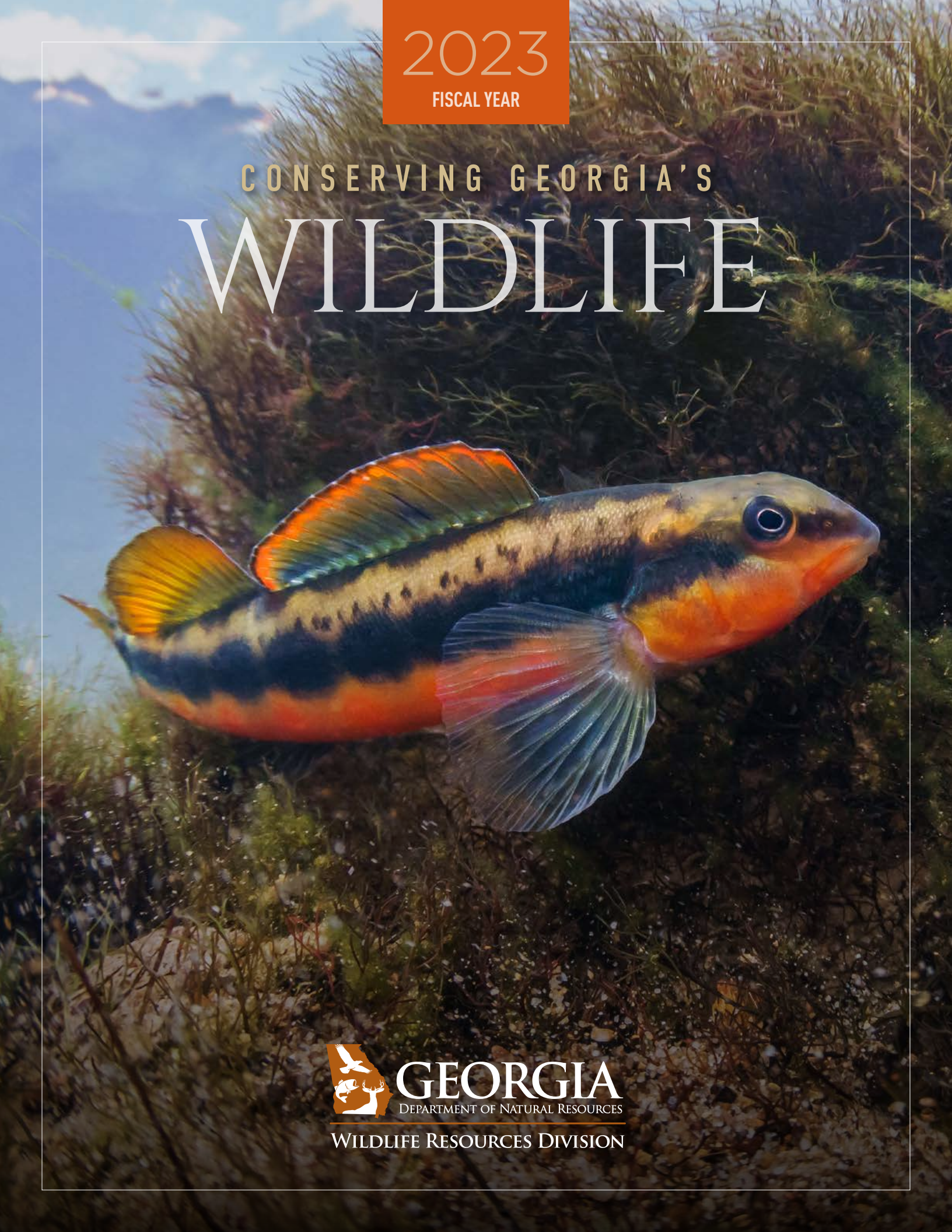
2023
FISCAL YEAR

CONSERVING GEORGIA'S WILDLIFE



GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

March 1, 2023, marked a huge change for Georgia DNR's Wildlife Conservation Section. For the first time in nearly 37 years, Dr. Jon Ambrose was no longer working for us.

Beyond his 10 years as section chief, Jon had been a leader for as long as he had been at DNR. It's impossible to overstate how much he did for the agency and how he shaped our future. Beyond this organization, he had a tremendous impact on wildlife conservation in this state and throughout the Southeast. I encourage you to open a copy of "The Natural Communities of Georgia" from UGA Press to see just a small sample of his work.

Before retiring, Jon often said that being chief of the Wildlife Conservation Section is the best job in Georgia state government. With that in mind, I am really happy to be here following in his footsteps. I spent my formative years in Georgia and became addicted to exploring our natural environments and native wildlife at a very young age. Being named chief is the culmination of a lifelong dream.

One of the themes in this 2023 report is aquatic conservation. Georgia ranks third in the nation in aquatic biodiversity, with a total of 265 species closely linked to aquatic ecosystems. These include the stunning, such as tangerine darters, and the unassuming, like the Altamaha arcmussel.

At Wildlife Conservation, we have an incredible freshwater biodiversity team that both monitors these species and collaborates with landowners, regulators and others to ensure we are successful in keeping them around.

Yet that is only part of our work, which ranges from surveying bald eagles and monitoring rare plants to protecting North Atlantic right whales and informing young and old about Georgia's amazing wildlife.

It's work that is worth our time, effort and even – for those fortunate to have the opportunity – our careers.

Sadly, less than seven months after he retired, Jon Ambrose passed away. But his legacy in conservation is woven into what we do at the Wildlife Conservation Section.

And as always, your support of that mission is critical to us and to all of Georgia's native wildlife.

Thank you,

Matt Elliott
Chief, DNR Wildlife Conservation Section

Wildlife Conservation Section Chief Matt Elliott with blackbanded and Etowah bridled darters sampled on Amicalola Creek (Paula Marcinek/DNR)

CONTENTS

CONSERVATION

EDUCATION AND OUTREACH

LAND ACQUISITION AND CONSERVATION EASEMENTS

CONSERVATION PLANNING

FINANCIAL AND ADMINISTRATION

BIRDS

Waterbirds

Georgia's barrier island beaches, salt marshes and coastal freshwater wetlands support 86 species of seabirds, shorebirds and wading birds. These species, collectively known as waterbirds, are the focus of DNR's Waterbird Conservation Initiative. This effort involves research, monitoring, management and education efforts within the Wildlife Conservation Section and working with a variety of partners.

Seabirds

As part of this initiative, the Wildlife Conservation Section works to protect important seabird nesting colonies by roping and posting colonies, working with "stewards" to educate beachgoers about the birds on public beaches and coordinating with DNR's Law Enforcement officers to enforce what's called the Bird Island Rule, which limits access at set sites to protect nesting birds. Staff also team with partners to educate the public, including ecotourism guides and boaters, through training classes, signage, brochures and booklets. Surveys to document the number of nesting pairs of priority species and estimate the number of chicks fledged also are conducted each year.

Royal tern colony on Bird Island (Tim Keyes/DNR)

The Brunswick Harbor Bird Island was the largest colony again in fiscal year 2023, with nesting species and totals including: black skimmers (159 nests), gull-billed terns (25), royal terns (6,970), sandwich terns (650), brown pelicans (250) and laughing gulls (477). Overall, black skimmers posted above-average productivity this year, with two large colonies producing more than 400 fledglings. Conversely, least terns failed because of overwash at almost all of their colonies.

In 2023, staff also coordinated the banding of more than 700 royal tern chicks in one day. Thirty-five volunteers from coastal organizations made this large-scale project possible. More than 40 of the banded chicks have since been spotted from south Florida to New Jersey. The effort also documented 70 royal terns banded in 2019 – the initial banding "blitz" at Bird Island – that had returned to the island to nest.

Due to the continued degradation of nesting habitat on Georgia's coast, staff worked with the U.S. Army Corps of Engineers to use dredge spoil to create new islands. Plans call for one of these to be built in fall 2023 on the Intracoastal Waterway near Cumberland Island National Seashore.

Red knots (Tim Keyes/DNR)

Shorebirds

The Wildlife Conservation Section and coastal partners continued to monitor approximately 120 pairs of nesting American oystercatchers in fiscal year 2023. Unfortunately, this year proved a poor one for oystercatchers because of a combination of threats, from flooding tides in the middle of nesting season to high losses to predators at several key nesting islands. Staff documented only five oystercatcher chicks fledging along Georgia's coast.

DNR received state and federal permits this year to enhance the elevations of six nesting shell rakes for American oystercatchers on Satilla Marsh and Stafford islands. These sites should be ready in time for the birds' 2024 breeding season.

Wildlife Conservation completed a fall resight season focused on the ecology of migrating red knots. In the previous two years, the species experienced declines of up to 80 percent at a primary stopover site in Delaware Bay. Georgia provides critical foraging and roosting habitat for red knots in spring, fall and winter, and during some falls supports up to 90 percent of what is called the species' Southeastern population.

The fall migration project centers on red knots cycling through Wolf Island National Wildlife Refuge and adjacent locations as well as the connectivity between Georgia and other key stopover sites in the region. The work also serves as an update to a benchmark population estimate in 2011. Staff trapped and radio-tagged 19 red knots using nanotags and Motus Wildlife Tracking System technology, applied leg flags to 45 red knots and installed a Motus receiver and antennae on Sapelo Island to gather tracking data. The agency compiled weekly resight data at Wolf National and Little Egg Island Bar from August to November and conducted International Shorebird Survey counts of the area during fall migration.

As part of the survey, staff observed a significant increase in Mulinia bivalves. These small clams, which red knots prey on, appear to be the main driver of knot habitat use and distribution in Georgia during fall migration. Sightings also suggested the number of birds in Georgia were not declining, countering the trend of steep drop-offs recorded outside the Southeast. DNR's work to help provide answers on the status of red knots will continue through at least spring 2024.

During the spring, horseshoe crab eggs are one of the most important foraging sources for red knots and many other shorebirds. Yet little is known about where or how many horseshoe crabs spawn in Georgia. Wildlife Conservation partnered with conservation groups in fiscal 2023 to establish the first broad-scale survey of horseshoe crab spawning in the state. Staff and volunteers visited key sites during the full and new moon tides in spring to document spawning, conducting a total of 66 surveys at 29 sites.

Wildlife Conservation's work with red knots was supported by a National Fish and Wildlife Foundation and Southern Co. grant.

During the spring field season, Wildlife Conservation staff and partners conducted night roost surveys along the Georgia coast between Daufuskie Island, S.C., and Little St. Simons Island. The surveys found several large roosts, including one with an estimated 3,620 whimbrels at Tomkins Island, S.C., in May. These surveys will help determine high-priority locations for protection and drive management at the sites. Wildlife Conservation played a key role, providing logistical and field support for the project.

Staff also set up a receiver designed to collect data from previously tagged whimbrels (none were detected during fiscal 2023) and, just after the fiscal year closed, helped train partners in attaching transmitters on whimbrels on the coast of Virginia. The plan is to deploy up to six transmitters in spring 2024. The goal of trapping and tagging birds in Georgia is to provide data and complement a larger tracking study led by the University of South Carolina and the South Carolina Department of Natural Resources.

DNR's Fletcher Smith and Sam Murray band red knots with Patricia Deveau of TERN (DNR)

Red-cockaded Woodpeckers

The red-cockaded woodpecker is the only woodpecker in the U.S. that excavates cavities in living pines. The drastic loss of mature pine forests over the past 200 years has been the primary cause of this species' decline. Suitable habitat now occurs primarily on some military bases, national forests and other public lands, although red-cockaded woodpeckers are still found on many private properties.

The birds were listed as endangered under the Endangered Species Act of 1969 and protected with the same status in passage of the Endangered Species Act in 1973. In September 2020, the U.S. Fish and Wildlife Service proposed downlisting the species to threatened. That change is still pending.

Twenty-two years ago, in 1999, DNR developed the nation's first statewide red-cockaded woodpecker Habitat Conservation Plan to provide management options for private landowners. The plan includes options for mitigated incidental take and for Safe Harbor. Safe Harbor focuses on landowners in southwest Georgia, where plantations managed for northern bobwhites also support a significant population of red-cockaded woodpeckers.

Safe Harbor involves a landowner's commitment to manage habitat beneficially for a site's "baseline" number of woodpecker families – those on the site when the agreement is made. A family group refers to the red-cockaded woodpeckers that occupy a cluster of cavity trees. These groups can vary from a single bird to a breeding pair and one to three helpers. Helpers are typically male offspring from previous years that help feed younger siblings. In exchange for maintaining the baseline number of family groups, the landowner's responsibility does not increase if the woodpecker population increases.

2023 proved busy for both Safe Harbor and red-cockaded woodpeckers in Georgia. Statewide, 193,348 acres are enrolled in Safe Harbor agreements that cover a combined 112 baseline groups of red-cockaded woodpeckers and support 55 surplus groups. (Surplus groups are additions to baseline populations.) Most of the properties are in the Red Hills region near Thomasville. The Red Hills supports the largest population of red-cockaded woodpeckers on private lands. Since the start of Safe Harbor in 2000, the Red Hills population has increased to approximately 220 groups and continues to grow.

The Wildlife Conservation Section worked with Safe Harbor participants and conservation partners in fiscal 2023 to conduct outreach and monitor woodpecker nesting and populations on cooperating properties. During the year, Wildlife Conservation Section acquired a U.S. Fish and Wildlife Service grant to buy materials to build 250 artificial cavity inserts for use on public and private lands. Under the grant, Wildlife Conservation is partnering with Tall Timbers to install inserts on Safe Harbor properties to boost red-cockaded woodpecker populations. Inserts have been installed on two Safe Harbor properties, with more in the works. Staff are also helping Tall Timbers with a Georgia Ornithological Society grant funding the construction and installation of artificial cavities on four significant properties in southwest Georgia. Staff built more than 150 inserts for this effort.

Red-cockaded woodpecker at a River Creek WMA nest (Joe Burnam/DNR)

Wildlife Conservation and partners surveyed and updated the cavity tree inventory on multiple Safe Harbor properties this year. During these surveys, more than 75 new cavity trees were found and mapped for monitoring and to ensure they are protected during land management activities. New family groups and territories also were discovered, the result of birds in the Red Hills moving into unoccupied habitat. During annual monitoring, staff and partner biologists discovered a new "pioneer" cluster on a property near Thomasville. This significant property is under a DNR-held conservation easement that promotes the management of red-cockaded woodpeckers and associated species. Pioneer clusters are groups of cavity trees created by the birds in an area where there were no previous cavity trees. These natural expansions happen infrequently and indicate a healthy population of woodpeckers and quality habitat. The Red Hills population of this species is the largest found on private lands. Staff also surveyed many other Safe Harbor properties to check the status of clusters, update property maps and mark cluster boundaries before timber harvests. Damaged cavity inserts were replaced on three southwest Georgia properties and new recruitment cluster sites added on properties in the region.

In partnership with Tall Timbers and The Jones Center at Ichauway, staff banded 128 nestlings on Safe Harbor properties, matching a record high set in 2022. Some of the banded nestlings will be captured and translocated – or moved – to boost populations on other Safe Harbor properties in the Red Hills. In fiscal 2023, the agency and conservation partners laid the groundwork for research aimed at improving genetic diversity in small red-cockaded woodpecker populations through cross-fostering nestlings. Cross-fostering involves the transfer of nestlings between populations and placing them in the nests of unrelated adult birds.

In spring 2023, staff and Tall Timbers biologists successfully cross-fostered eight nestlings between five properties in the Red

Hills, including River Creek, the Rolf and Alexandra Kauka Wildlife Management Area near Thomasville. These initial efforts were successful: All cross-fostered nestlings were accepted and thrived in their new homes. The birds will be monitored in the coming years to determine their role in the foster population and evaluate the potential of this practice for improving genetics in small woodpecker populations. Staff will expand the project to other properties in spring 2024.

Wildlife Conservation also worked with the Jones Center to restore the red-cockaded woodpecker population at Ichauway in Baker County. These 29,000 acres supported a single male in 1999. In part through translocating 75 young birds and installing recruitment clusters in suitable but unoccupied habitat, Ichauway now has 55 family groups.

In 2008, DNR acquired 8,400 acres near Bainbridge to create Silver Lake Wildlife Management Area, the first state-owned property with red-cockaded woodpeckers. Silver Lake has extensive stands of mature longleaf pine habitat with intact native groundcover. In October 2018, Hurricane Michael destroyed 56 percent of the woodpecker cavity trees on the WMA, along with hundreds of acres of habitat. With help from a National Fish and Wildlife Foundation grant, Wildlife Conservation quickly replaced cavities and contract crews cleared debris to allow the continued use of prescribed fire.

The red-cockaded woodpecker population at Silver Lake has rebounded and is still the largest on state-owned land. As of fiscal 2023, there are 42 family groups, with 40 potential breeding groups and two single-bird "groups." The latest count includes an additional two breeding groups since 2022, a substantial increase and further evidence of the positive impact of habitat work through regular prescribed fire, cavity management and installing recruitment clusters.

In recent years, staff expanded the Silver Lake red-cockaded woodpecker population onto adjacent U.S. Army Corps of Engineers properties managed by DNR as Lake Seminole Wildlife Management Area. Even more opportunity exists here as the birds begin to occupy all available habitat on Silver Lake. Wildlife Conservation monitored nesting in 40 clusters at Silver Lake and banded 57 young, another record number of banded chicks for the property. Despite the habitat loss and management challenges caused by Hurricane Michael in 2018, Silver Lake eventually will sustain about 45 family groups through continued prescribed fire, the installation of more recruitment clusters and careful forest management.

At Moody Forest Wildlife Management Area, Wildlife Conservation continued working with The Nature Conservancy to manage red-cockaded woodpeckers. As of spring 2023, the WMA near Baxley had nine potential breeding groups. Staff and The Nature Conservancy monitored 15 fledglings on the property. The population at Moody is only one breeding group shy of reaching the WMA's goal of 10 groups, a target the property is expected to reach in the near future. Habitat management and restoration, including timber thins and frequent prescribed fire, is improving and creating more red-cockaded woodpecker habitat at Moody Forest. Better habitat in conjunction with translocations and artificial cavity and recruitment cluster installations have resulted in rapid population growth on the WMA.

In 2017, DNR reintroduced red-cockaded woodpeckers to River Creek, the Rolf and Alexandra Kauka WMA by translocating woodpeckers from Apalachicola National Forest in Florida. The state acquired River Creek, which is on the periphery of the Red Hills region, in 2005 in part because of its intact longleaf pine habitat and potential for woodpecker reintroduction. In fiscal 2023, staff added or refurbished nine cavity inserts at River Creek to ensure that each of the eight cluster sites on the WMA had at least four suitable cavities. Since 2018, River Creek's woodpecker population increased from two single birds to seven family groups (six potential breeding groups and one single-bird group).

The WMA had a successful nesting season in spring 2023, with four nests producing six fledglings. The birds were also busy creating natural cavities and refreshing old, relict cavities. Two of this season's nests were in recently finished natural cavities. In spring 2022, an unbanded male, likely from the adjacent Red Hills population, showed up at River Creek. Staff captured and banded this solitary bird and paired him with a translocated female from Apalachicola National Forest in Florida. The matchmaking proved successful: The two are now a breeding pair. Natural dispersal and successful reproduction are positive trends for the rare birds at River Creek.

Multiple natural longleaf pine stands waiting to be thinned were burned after thinning at River Creek, further improving habitat conditions for the birds. With continued habitat management and prescribed fire, River Creek's red-cockaded woodpecker population is expected to increase, with hopes for up to 10 family groups.

In middle Georgia, efforts to prepare habitat for reintroducing red-cockaded woodpeckers reached milestones on two properties. At Jarrell Plantation near Juliette, a long-awaited timber thin marked the start of creating habitat for this species on the state historic site. Jarrell Plantation is surrounded by occupied clusters of red-cockaded woodpeckers in the Oconee National Forest and Piedmont National Wildlife Refuge, giving this project a high likelihood of success. Hardwood control was completed on 80 acres in June 2023. The first prescribed fire in decades is planned for fiscal 2024. Also that year, staff hope to install inserts in the park to attract red-cockaded woodpeckers dispersing from the adjacent population. The birds were seen on Jarrell Plantation in May 2023, following the timber thin.

Significant steps for the woodpeckers have also been taken at Sprewell Bluff Wildlife Management Area. Recent habitat evaluations by Wildlife Conservation biologists found much of the property near Thomaston trending toward suitable habitat, potentially allowing for reintroduction almost a decade earlier than expected. Funds from the National Fish and Wildlife Foundation, Knobloch Family Foundation and the Georgia Outdoor Stewardship Program, along with a unique partnership with CatchMark Timber Trust, helped achieve this habitat restoration. Staff reviewed the property with U.S. Fish and Wildlife Service biologists to plan the reintroduction. At its 2023 annual meeting, the Southern Range Translocation Cooperative approved Sprewell Bluff as a recipient population and authorized the transfer of three pairs of red-cockaded woodpeckers to the property in fall 2023. These birds once inhabited most of Pine Mountain and there are relict nest cavities on area

properties, including F.D. Roosevelt State Park and Sprewell Bluff Big Lazer wildlife management areas, plus many adjoining private tracts.

On the Georgia coast, Ceylon Wildlife Management Area in Camden County is another DNR property with the potential to support family groups of red-cockaded woodpeckers. Habitat restoration is in full swing on Ceylon. In fiscal 2023, staff mechanically removed the midstory from upland pine stands across 940 acres on the east side of the property. To further restore habitat for a range of high-priority wildlife species, staff also burned 1,752 acres on the WMA. With continued habitat restoration, prescribed fire and careful forest management, Ceylon will one day be the next state-owned property with red-cockaded woodpeckers.

Surveys and Habitat Restoration

Grassland Birds

The **Henslow's sparrow** is a small songbird that nests in grasslands of the Midwest and Northeast and winters in grassy areas of pine flatwoods, pitcherplant bogs and powerline corridors in the Southeast's Coastal Plain. Numbers of this species have declined precipitously over the last several decades, likely because of habitat loss at breeding and wintering grounds. This sparrow is a species of high conservation concern because of its small population size, greatly reduced habitats and other factors. Its secretive nature and small numbers make it difficult to survey and monitor. Little is known about the distribution and population of Henslow's sparrows across most of its range, including in Georgia.

From 2019-2021, a Georgia Southern University graduate student conducted radio-telemetry surveys and vegetation analysis at Moody Forest, Paulks Pasture and Townsend wildlife management areas as part of a contract with the Wildlife Conservation Section. During fiscal year 2023, a Virginia Tech University student used the telemetry data from this research as well as habitat and environmental data collected by Sentinel 2 satellites to develop habitat models that should be useful in predicting potential suitable habitat for Henslow's sparrows. (A paper summarizing the work has been submitted for publication.)

A similar effort to learn more about the distribution of Henslow's sparrows in powerline corridors began in 2018. Based on known Henslow's sites and a qualitative evaluation of potential habitat, a habitat predictor model was developed with the Georgia Cooperative Fish and Wildlife Research Unit to help identify potential sites. Georgia Power provided maps and access to the company's powerline corridors. Maps of potentially suitable habitat within these corridors were generated using remote sensing imagery. Testing and refining these models continues, with the hope of developing models with a high level of predictive ability in the near future. The models could then be used with other information to gauge the size of Georgia's Henslow's sparrow population.

For **southeastern American kestrels**, nest box numbers reached yet another record in 2023 with 78 boxes occupied, an 11 percent increase over the previous high of 70 boxes in 2022 and 42 boxes in 2019. The exceptional rebound from an unusually low occupancy rate in 2021 included numerous boxes that have never had kestrel nests before. Nest success rates also set a record with 146 chicks fledged, 26 percent more than the 116 fledglings in 2022.

The increases are rooted in 2016, when Wildlife Conservation partnered with a regional power distribution company to add 19 boxes high on the company's transmission line towers in a small section of Georgia's western sandhills. These boxes were about 100 feet above the ground, compared to 15-20 feet for boxes on wooden power poles (the latter are referred to as low boxes). Occupancy of these boxes has been much higher than that of the low boxes. Additionally, these boxes offer greater protection against predators and, therefore, yield improved nest success. Subsequent efforts to increase the number of high boxes has resulted in about 75 more installed statewide.

While many of the new high boxes have yet to be discovered by kestrel nesting pairs, fiscal 2023 saw the continued spread of these small falcons into new areas. In 2022, four of the five boxes near Chula, just north of Tifton, were occupied for the first time, indicating that the kestrel population is returning to portions of the state where the birds have likely been absent for decades. And in 2023, kestrels nested in several of the high boxes installed near Statesboro. The Statesboro-area results

Southeastern American kestrel chick (Hal Massie/DNR)

represent the kestrels recovering a part of their range they once occupied and offers new opportunities to introduce the species onto nearby conservation lands.

Bachman's Sparrows

From 2006-2008, the Wildlife Conservation Section initiated surveys for Bachman's sparrows on several wildlife management areas and a national wildlife refuge. The systematic survey effort was the first for this rare pine savanna bird on state lands in Georgia. Surveys were conducted in forest stands and other areas that either had suitable habitat or were going to be managed in ways that might create or restore habitat (through forest thinning, prescribed fire and restoring native groundcover). In 2018, these surveys were re-initiated at many of the WMAs and the wildlife refuge to determine the success of long-term restoration efforts and what else could be done to further improve the quality and quantity of habitat for this species.

Identical survey methodologies were used in 2006-2008 and from 2018 to present. Each six-minute count consisted of a two-minute passive listening period followed by two minutes of call playback and ending with two minutes of passive listening. This method provides an effective and efficient way to survey this secretive songbird.

The fiscal year 2023 surveys were conducted at nearly 200 points on Silver Lake, River Creek, Doerun, Chickasawhatchee, Di-Lane and Yuchi wildlife management areas and at Piedmont National Wildlife Refuge. In addition to tracking the population response of Bachman's sparrows to habitat management and restoration activities, the latest surveys provided data for developing mathematical models that will be used to predict Bachman's habitat suitability on other state, federal and private lands. This preliminary modeling was done under contract by a graduate student and a researcher at the Virginia Cooperative Fish and Wildlife Research Unit at Virginia Tech University. After developing the first models, the student refined and further developed them using data collected during field surveys from May-July 2022. More refinement will likely take place over the next few years. The student completed her master's thesis and publication of the results in one or more major ornithological journals is likely.

Prothonotary Warblers

The Wildlife Conservation Section continued surveying for prothonotary warblers in fiscal year 2023. Striking in looks, this bird is declining in numbers and considered a State Wildlife Action Plan high-priority species for conservation. Prothonotary warblers are found in flooded swamps and hardwood bottomlands along rivers and streams. They nest in cavities – the only warbler in the Southeast to do so – and often over water.

As part of a study exploring the bird's use of nesting habitat in riparian corridors in the region, Wildlife Conservation placed 45 nest boxes along the Ochlockonee and Alapaha rivers on Alapaha River Wildlife Management Area and River Creek, the Rolf and Alexandra Kauka WMA. Alapaha River WMA is near Ocilla; River Creek is near Thomasville. To better work with researchers across the warbler's range, staff joined the Prothonotary Warbler Working Group. This collaboration will enhance projects to better understand the species' status in Georgia.

In 2023, 12 artificial nesting boxes were installed to replace the oldest boxes at both sites. At Alapaha River WMA, an adult female and 14 chicks were color-banded to identify each bird. Also at Alapaha River, an adult male first captured and banded in 2018 was resighted again this year, revealing that the bird is at least 6 years old – and he continues to occupy the same territory he established in 2018. Other resighted birds included two nesting females and a male banded in 2022. All three were seen or captured on the same territories as in previous years, indicating the warblers' high degree of site fidelity.

For the first time since 2021, two nests were discovered at River Creek in 2023. Prothonotary warblers infrequently use nest boxes at this WMA, despite the birds being prevalent during point counts and staff seeing several adult pairs exhibiting nesting behaviors. However, prothonotary warblers at Alapaha River had a productive year, yielding four nests and multiple fledglings.

Point count surveys at 21 locations along the Ochlocknee and Alapaha rivers also were conducted three times during the 2023 breeding season. As Wildlife Conservation continues to band and monitor prothonotary warblers on these sites, the goal is to gain a greater understanding of the birds' site fidelity, nesting productivity, survival and habitat use in southern Georgia.

Wading Birds

The Wildlife Conservation Section's wading bird program focuses on the wood stork. This species was federally listed as endangered in 1984 following dramatic declines in breeding colonies in southern Florida.

Wood stork nests were first documented in Georgia in 1965. By the 1980s, increasing numbers of the birds were nesting in the state. Georgia now supports more than 20 percent of wood storks nesting in the U.S., a population that is approaching 10,000 breeding pairs.

The recovery plan for wood storks in Georgia includes monitoring the reproductive success of nesting colonies, identifying potential threats and collaborating with landowners and site managers to promote colony survival and longevity. In February 2023, the U.S. Fish and Wildlife Service proposed removing the wood stork from the Endangered Species List (the species was downlisted from endangered to threatened in 1984) based on the population's recovery and dramatic expansion of its range. Presuming careful ongoing monitoring, DNR supported the proposal, based on meeting recovery goals for the species.

Wildlife Conservation conducts aerial surveys each spring to find and monitor nesting colonies. Stork nesting effort, or the number of pairs that attempt to reproduce, fluctuates annually. Surveys in 2023 revealed a below-average year for nesting. Low-water levels in some usually large colonies in southwest Georgia led to those colonies supporting few to no nests, the primary reason for the drop-off.

Also in fiscal year 2023, DNR worked with a postdoctoral student at the University of Georgia on planning a Coastal Plain-wide wading bird survey for 2024. The work involved flying line transects to search for new colonies, checking old wading bird sites that had not been visited in years and requesting information on colonies from the public and across the agency via an online survey. Transects were flown over Burke, Screven and Jenkins counties, locating 12 mixed wading-bird colonies. DNR has not conducted a systematic survey of wading bird colonies since the mid-1990s.

Swallow-tailed Kites

The swallow-tailed kite has suffered a significant range reduction since the 1880s, when the species bred in 21 states. These elegant raptors are now found in seven Southeastern states, where they nest in bottomland forests along large rivers. Most nests in Georgia are on private land, specifically industrial timberlands. Data from years of late-summer communal roost sites in Florida seem to indicate a gradual increase in population in the southeastern U.S. since the late 1980s.

The Wildlife Conservation Section's efforts include finding and monitoring nests, advising the public about reporting sightings, protecting nests from predators where possible, working with private landowners to ensure habitat viability, supporting habitat management on protected lands where kites nest and searching for previously radio-tagged kites.

An estimated 150-200 pairs of swallow-tailed kites nest in Georgia each year. Most nests are on the lower stretches of the Satilla and Altamaha rivers, but nests are also scattered throughout other south Georgia river drainages that feed into the Atlantic – such as the Savannah, Ogeechee and St. Marys – and almost all rivers that drain into the Gulf of Mexico, including the Suwannee, Alapaha, Aucilla, Flint, Little Ochlockonee and Withlacoochee. While densities are highest in the lower stretches of these rivers, kites nest into the upper Coastal Plain on the Ocmulgee and Oconee rivers.

During the 2023 nesting season, Wildlife Conservation confirmed 19 active kite nests at 15 sites. Staff also assisted partners at Avian Research Conservation Institute to find, trap and satellite-tag kites. Data from one of the tagged birds resulted in finding the largest post-breeding roost ever seen in Georgia. This single large roost held more than 612 swallow-tailed kites.

Swallow-tailed kites flying over record roost on the Altamaha River (Tim Keyes/DNR)

Bald Eagles

Once common in Georgia, the bald eagle declined in abundance during the mid-20th century and was not nesting in the state by the early 1970s. However, populations have rebounded here and elsewhere, helped by a 1972 ban on DDT in the U.S., habitat improvements following enactment of the federal Clean Water and Clean Air acts, recovery of forest resources following extensive logging of old-growth trees during the late 19th and early 20th centuries, protection through the Endangered Species Act, increased public awareness, and restoration of local populations through release programs known as hacking.

Following federal delisting of the species in 2007, primary legal protection for eagles comes under the Bald and Golden Eagle Protection Act. Nest trees and associated primary and secondary buffer zones are conserved via recommendations of federally established bald eagle management guidelines. Georgia's ongoing conservation efforts include monitoring known eagle nests in January and March, collaborating with landowners and other agencies to protect nest sites, public education programs about eagle conservation and ecology, and rehabilitating injured eagles.

The Wildlife Conservation Section's 2022 survey was the first statewide assessment of eagle nests in five years. The survey documented 229 nest territories, exceeding the previous high of 218 in 2017. Unfortunately, not all news was good. A late-winter outbreak of highly pathogenic avian influenza substantially undercut eagle nest productivity in coastal counties, which are home to one-third of Georgia's nests. In that region, the nest success rate declined by about 30 percent compared to the mean of 78 percent from 2015-2021.

The 2023 survey included southwest Georgia, the coastal counties and barrier islands, the Oconee and Ocmulgee river corridors in north-central Georgia, and a few reservoirs southeast of Atlanta. Although survey flights this year covered less territory than the 2022 survey, they still recorded 198 nest territories. Of those, 150 were successful, fledging 232 eagles. Notably, overall nest success in the coastal counties fell within the normal long-term range, which was welcome news in the wake of the area's high nest-failure rate in 2022 during the avian influenza outbreak.

No influenza-positive cases were reported in bald eagles in Georgia since March 2022, before the start of fiscal year 2023, and no cases in other species have been reported since February 2023. In addition to nesting failures for coastal bald eagles, the virus also caused substantial die-offs at black vulture roosts in 2022. Vulture die-offs were not detected in the state in fiscal 2023.

Nest success rates charted in the 2023 survey rated from average in southwest Georgia (75 percent) and on the coast (73 percent) to above average (83 percent) in the area bounded by Athens to the northeast, Atlanta to the northwest and Macon to the south. The 232 eagles fledged, almost 1.6 young per nest, is slightly more than the state's long-term average. In comparison, the record 229 nest territories the previous year fledged 227 eagles from 146 successful nests.

On the coast, the 81 nest territories performed notably better than average. (The total in 2022 was 73 territories.) Nesting success rated average at 1.5 young per nest. But the 89 eaglets fledged from 59 coastal nests far exceeded the 50 eaglets fledged from only 34 successful nests the previous year. The survey also documented 92 nest territories in southwest Georgia, which is comparable to the 96 in 2022. Sixty-nine of this year's nests fledged young. The better-than-average 1.6 eaglets per nest (113 eaglets fledged) topped the 1.5 eaglets per nest from 62 successful nests in the region in 2022.

The nest success on the coast and in southwest Georgia serve as reminders of the importance of not overreacting to a poor nest success year. Severe weather in early to midwinter, viral outbreaks and other problems that might seem like calamities at the time can result in poor reproductive years. But eagles are resilient and have bounced back from far worse population-level challenges. Georgia appears to have maintained more than 200 occupied nest territories annually since 2015. As recently as 2000, there were fewer than 50 known occupied nest territories in the state. Although the 2023 survey results suggest the state's nesting population of bald eagles continues to increase, the growth rate has slowed substantially compared to 2007-2015, when nest totals nearly doubled from 114 to 210.

Eaglet harassed by a blue jay at Charlie Elliott Wildlife Center (Becky Cover/DNR)

As in previous years, Wildlife Conservation worked with landowners to conserve nesting habitats, minimize disturbances near nest trees during the nesting season, help explain federal permitting processes regarding development projects, capture injured eagles and deliver them to veterinary and rehabilitation facilities, and return rehabilitated eagles to the wild.

Peregrine Falcons

For the fifth consecutive year, peregrine falcons apparently did not nest on the cliff face at Tallulah Gorge State Park, the state's only known peregrine nest in a natural setting. Although at least one adult falcon was seen in the area during breeding season, no nest was found despite inspections of the gorge by DNR parks and Wildlife Resources Division staff.

Locating a specific nest site in Atlanta remains elusive, but a pair of adult falcons were again observed visiting ledges at the Four Seasons Hotel and neighboring high-rise buildings. Staff at the hotel and biologists with the Wildlife Conservation Section partnered on a project to install a falcon nest box on the hotel's 50th floor in January 2022. Peregrines have inspected the box but have not yet occupied it.

In fiscal year 2023, a suspected nest site was discovered on the 20th floor of the hotel in April, but biologists could not access the location. In mid-June, two fledglings were photographed at the hotel and an injured yearling found near Four Seasons was captured and delivered to veterinarian staff for treatment. The yearling's injuries appeared to be the result of a collision. The young bird will not be able to fly again, but fortunately was placed in an educational program where it will become an ambassador for the conservation of its species.

As usual, many peregrine falcon sightings were reported from the Georgia coast during fall migration in September and October. Most of those birds originated from territories in Canada and Greenland. In fiscal 2024, biologists will look for opportunities to install more nest boxes on high-rise buildings in Atlanta and are planning a large-scale survey of potential nest locations on cliff faces in north Georgia.

AMPHIBIANS AND REPTILES

DNR's Matt Goetz, right, and Sapelo Island's Neo Molopo steer a wandering sea turtle to the surf on Blackbeard Island (Mark Dodd/DNR)

Sea Turtles

Loggerhead sea turtles are found in Georgia's coastal waters year-round and nest on all barrier island beaches. In accordance with the National Oceanic and Atmospheric Administration/U.S. Fish and Wildlife Service recovery plan for this species, DNR management efforts focus on surveying and protecting loggerhead nests and managing nesting beach habitat. The Wildlife Conservation Section coordinates the Georgia Sea Turtle Cooperative, a group of volunteers, researchers and government employees who conduct nest protection and management activities on Georgia beaches.

Wildlife Conservation also manages the nesting projects on the state-owned islands of Sapelo and Ossabaw, including hiring and supervising seasonal technicians. Management activities designed to improve reproductive success include relocating nests to protect them from tidal inundation, installing predator screening and predator control.

LOGGERHEAD NESTING IN GEORGIA Annual nest totals since comprehensive surveys began in 1989

*2023 total expected to increase slightly, with nest analysis continuing after the fiscal year.

Cumberland Island sea turtle techs at a recently hatched nest (Mark Dodd/DNR)

Since comprehensive surveys were established in 1989, loggerhead nesting has been highly variable, with an average of 1,643 nests per year. In 2023, 3,467 loggerhead nests were documented on Georgia beaches. Nesting was over twice the 35-year average and exceeded the recovery goal of 2,800 nests a year, the target set in the National Marine Fisheries Service/U.S. Fish and Wildlife Service recovery plan of 2008. Overall, loggerheads have shown a 4 percent annual increase in nesting since 1989. Although Georgia reached its recovery goal in 2023, it's unlikely the Northern Recovery Unit, which includes loggerheads nesting in North Carolina, South Carolina and Georgia, will reach the unit goal of 14,000 nests. Nesting data indicates that the loggerhead sea turtle population in Georgia is making slow but steady progress toward recovery but is still short of all recovery goals for the species.

Other conservation activities conducted by Wildlife Conservation during the fiscal year included assisting with training and compliance checks involving turtle excluder devices (TEDs), monitoring beach renourishment projects, conducting lighting surveys on developed nesting beaches and monitoring the effects of harbor dredging projects on sea turtles. In addition, staff continued a study to assess the entrapment risk of sea turtles in poultry transport cages deployed as offshore artificial reef material.

To develop a comprehensive understanding of the number and relatedness of loggerheads nesting on Georgia beaches, DNR and the University of Georgia created a catalog of unique genetic profiles for Georgia's nesting female turtles. Dr. Brian Shamblin, working with DNR staff, identified an average of 680 loggerhead females using the Georgia coast annually from 2008-2022, with a range of 337 to 1,093 turtles per year. A genetic sample was collected from every known nest deposited in Georgia in 2023. The ongoing project is providing a better understanding of loggerhead nesting ecology and interpretation of nesting trends.

Sea Turtle Stranding and Salvage Network

The Wildlife Conservation Section monitors sea turtle mortality through the Sea Turtle Stranding and Salvage Network. Systematic patrols of barrier island beaches provide information on the number and species of dead turtles that wash up on the Georgia coast. When possible, necropsies of stranded turtles are done to evaluate causes of mortality. Sea turtle strandings are the primary index of threats to sea turtles in the state's coastal waters.

In fiscal year 2023, 66 dead or injured turtles were documented on Georgia beaches. That total is below the 30-year average of 178 strandings per year. Strandings have declined overall by approximately 2.4 percent annually over the last 40 years during a period of increasing sea turtle abundance. The use of TEDs in the shrimp trawl fishery is partially responsible for the decline. Results from necropsy examinations indicate that boat collisions and commercial fishery mortality are the leading sources of mortality, accounting for 29 and 20 percent of strandings respectively in fiscal 2022.

The public is encouraged to report stranded sea turtles in Georgia by contacting DNR at 800-2-SAVE-ME (800-272-8363). Stranding updates are available at seaturtle.org/strand/summary (pick Georgia from "Select a Program").

Loggerhead returns to the sea after nesting (DNR)

Gopher Tortoise Conservation Initiative

The Gopher Tortoise Conservation Initiative is a Georgia-based effort that has worked since 2015 to conserve gopher tortoises and help prevent Endangered Species Act listing of Georgia's state reptile in the eastern part of the species' range. Members include DNR, Georgia Forestry Commission, the U.S. Department of Defense, U.S. Fish and Wildlife Service, U.S. Department of Agriculture's Natural Resources Conservation Service, The Nature Conservancy, The Conservation Fund, Georgia Conservancy, Knobloch Family Foundation, Robert W. Woodruff Foundation, Bobolink Foundation, Georgia Chamber of Commerce, the Orianne Society and others.

Gopher tortoises are found in the Coastal Plain from eastern Louisiana to western South Carolina and southern Florida. Ecologically, the gopher tortoise is a keystone species. Tortoises dig deep, long burrows that are used by more than 300 different animal species. One, the eastern indigo snake, is federally listed as threatened. Others are being considered for federal listing, including the gopher frog, Florida pine snake and eastern diamond-backed rattlesnake.

The gopher tortoise is federally listed as threatened in Louisiana, Mississippi and western Alabama. Within the rest of its range, the tortoise was classified as a candidate species that warranted listing until October 2022. That month, the Fish and Wildlife Service announced that tortoise populations in the eastern range were "robust," negating the need to list the reptile in that area.

The federal agency said partnerships contributed to conserving gopher tortoises and even helped find and document populations. Although Georgia's populations did not warrant federal listing, the Fish and Wildlife Service and DNR emphasized that the species still faces major threats, such as habitat loss, and the need for continued protection and habitat conservation is critical.

As the Gopher Tortoise Initiative grew, partners realized they could be proactive and work to avoid listing gopher tortoises, or they could be reactive and face the consequences of increased federal regulation that could affect key parts of the state's economy, including commercial development, agriculture, forestry and military base activities.

Juvenile gopher tortoise at Canoochee Sandhills WMA (Matt Moore/DNR)

To help preclude the need for listing – a decision that members knew would not rest solely on efforts in Georgia – the initiative worked to permanently protect many of the state's gopher tortoise populations. Georgia has at least 125 known viable populations. A minimum viable population is defined by the Fish and Wildlife Service as 250 adult tortoises. Permanent protection of populations is being achieved through a combination of fee-simple land acquisitions and conservation easements.

When the effort started, Georgia had 36 permanently protected tortoise populations. At the close of fiscal year 2023, the total was 62. The goal of the Gopher Tortoise Initiative is to protect 65 populations, an effort that will require raising an estimated $150 million, with funding coming equally from three sources: state and federal funding and private donations. Other projects may bring the total to 65 protected populations by the end of fiscal year 2024.

The progress for gopher tortoises was achieved through range-wide surveys to identify tortoise-rich tracts, extensive coordination with landowners and nonprofits, strategic planning, and deep support, varying from foundations and federal grants to the U.S. Defense Department and the Georgia Outdoor Stewardship Program. Results include highlight acquisitions such as Ceylon and Alapaha River wildlife management areas, plus conservation easements on private lands

Gopher Tortoises and Eastern Indigo Snakes

Both the gopher tortoise and the eastern indigo snake, which is federally listed as threatened, are priority species in Georgia's State Wildlife Action Plan. During fiscal year 2023, the Wildlife Conservation Section's tortoise survey crew conducted line-transect distance surveys on three sites. The surveys are used to estimate tortoise density and abundance. Sites included Townsend and Lanahassee Creek wildlife management areas, near Ludowici and Preston, respectively, as well as the first resurvey of Alapaha River Wildlife Management Area near Ocilla. The crew also marked burrows before timber sales and habitat improvement projects at several WMAs and on private lands.

Wildlife Conservation began line-transect distance sampling for gopher tortoises in 2007. As of fiscal 2023, surveys had been completed on 123 sites statewide, public and private. Seventeen sites were resurveyed, with all but one showing the tortoise population is increasing or stable. The increases are likely because of improved habitat management or additions to the population by translocations, along with head-starting juvenile tortoises. Survey results are incorporated into conservation strategies aimed at precluding the need to federally list the tortoise under the Endangered Species Act.

As discussed in the Gopher Tortoise Conservation Initiative section, in coordination with the U.S. Fish and Wildlife Service, Georgia set a target of 65 viable populations permanently protected across 13 conservation units in the state. Since 2015, the initiative increased the total from 36 to 62. Conservation easements in the works could add three more in fiscal year 2024, raising the number to 65 protected populations and meeting the collaboration's goal.

In another study funded and supported by Wildlife Conservation, the Orianne Society continued occupancy monitoring of habitat for eastern indigo snakes to determine the overall prevalence of indigo snake populations across suitable habitat in southern Georgia.

In this region, indigos overwinter in xeric sandhill habitats, where they shelter in gopher tortoise burrows to escape potentially lethal temperatures. The study focuses on assessing site occupancy on suitable sandhill sites in the Altamaha, Alapaha and Satilla river drainages. Each survey season, a subset of sites is checked, with a total of approximately 60 sites surveyed over three years. During each survey season, sites are visited three times, and suitable habitats are walked by one or more observers who visually search for indigo snakes.

The Orianne Society, a nonprofit organization dedicated to conserving rare reptiles and amphibians, conducted surveys for indigo snakes at 19 sites in Georgia during fiscal 2023, including Canoochee Sandhills and Townsend wildlife management areas in southeast Georgia and several private properties, among others. Snakes were detected using visual encounter surveys for live snakes or recent sheds. Habitat management for indigo snakes included prescribed fire and longleaf pine restoration on these sites.

Concurrent with the Orianne Society's work, Wildlife Conservation conducted a sixth year of a mark-recapture study of indigos on other lands. In fiscal 2023, staff tagged 27 "new" indigos with PIT, or passive integrated transponder, tags and recaptured 25 individuals that had been tagged before. Mark-recapture data will be used to uniquely identify individual snakes and help assess population estimates and trends. Plans are to continue this effort in 2024.

The University of Georgia Marine Extension continued a telemetry study of indigos on state lands to investigate interactions between the snakes and a translocated population of gopher tortoises. Snakes were captured on sandhill sites near the translocated tortoise populations, and after data collection and a health inspection, fitted with external radio transmitters to monitor their movements. While transmitters are usually implanted in snakes, attaching them externally is a less invasive option that shows promise for use in tracking large, rare snakes, such as indigos. (To date, only one of these snakes has lost a transmitter: It was recaptured alive and healthy during a later survey.)

DNR's Matt Moore, right, with guests and an eastern indigo on a Weekend for Wildlife auction trip (Erin Cork/DNR)

Green Salamanders

The green salamander is a medium-sized lungless salamander found in the Appalachian Mountains, including the northern corners of Georgia in both the Cumberland Plateau and nearby Ridge and Valley, as well as along the Blue Ridge Escarpment. Green salamanders are uncommon to rare throughout their range, in part because of their specialized habitat preference for rocky outcrops and crevices in which to breed and overwinter.

During the warmer months, green salamanders are known to be partially arboreal in some areas. Populations in the Blue Ridge seem to be especially small and isolated.

Collaborating with partners at Kennesaw State University, the Wildlife Conservation Section conducted 80 surveys at 60 sites in the Blue Ridge and adjacent upper Piedmont ecoregions. Green salamanders were detected at nine sites, but they do not appear to be numerous at any location in the Georgia Blue Ridge. Genetic samples were collected via tail tips and combined with previously collected samples to assess genetic structure and diversity between populations. Deep genetic divides and isolation between some populations is suspected, but further study is needed.

Green salamander (John Jensen/DNR)

Gopher Frogs

State-listed as rare, gopher frogs depend on intact sandhill and longleaf pine habitats, where adults survive within the burrows of their namesake host, the gopher tortoise, as well as burned out stump holes and rodent burrows. These frogs also require nearby fishless, temporary wetlands to breed in, where their tadpoles can develop in an environment with fewer predators. Widespread upland and wetland habitat alteration throughout the species' range has greatly reduced populations. Gopher frogs are known at fewer than 10 sites in Georgia, with some populations 90 miles or more apart.

In 2007, the Wildlife Conservation Section began a project that involved collecting gopher frog eggs from healthy populations, rearing them to late-stage tadpoles or post-metamorphic froglets and releasing them at an unoccupied, potential habitat within the species' historical range. Partners including the University of Georgia, Warm Springs National Fish Hatchery, the Amphibian Foundation, the Gaskins Forest Education Center and Abraham Baldwin Agricultural College operate the project's rearing facilities.

To address difficulties with obtaining wild-produced gopher frog eggs, lab-reared gopher frogs were placed in mesocosms at the Amphibian Foundation in Atlanta. The hope is they will breed in captivity and provide reliable sources of eggs for future efforts. Some of these frogs have been observed calling during the winter-spring breeding season, indicating their potential interest in reproducing. Some captive-reared adults also are being maintained at UGA for artificial propagation, a backup if natural captive breeding is not successful.

Two reintroduction or augmentation sites collectively received over 2,500 head-started frogs in fiscal year 2023: two wetlands at Alapaha River Wildlife Management Area near Ocilla and two wetlands at Townsend Wildlife Management Area near Ludowici. The sites were selected and incorporated into a parallel multi-state experiment on wetland restoration techniques, including comparisons between the effects of prescribed fire, herbicide and mechanical treatments such as girdling undesirable hardwood trees.

An additional 500 Georgia gopher frogs were reared at the Amphibian Foundation for release in a newly constructed pond in Alabama as

Young gopher frog released in Alapaha River WMA wetland (Vanessa Lane/ABAC)

part of another cooperative project involving wetland hydrology restoration and gopher frog head-starting. Also, approximately 250 frogs and 200 head-started tadpoles were returned to the source pond where the eggs were collected to supplement that existing population. In all, more than 3,000 gopher frog metamorphs were reared in Georgia in fiscal 2023.

Flatwoods Salamanders and Striped Newts

Fiscal year 2023 updates regarding flatwoods salamanders and striped newts include:

- The Amphibian Foundation, an Atlanta nonprofit focused on conserving amphibians, maintained a captive population of striped newts, all of which are thriving and reproductively active. The breeding colony consists of nearly 20 adult newts from the state's sandhills habitats and a trio from south-central Georgia. The progeny will be used to restore sites in the wild. Striped newts are a candidate for federal listing.
- Striped newts were discovered at a new pond on Alapaha River Wildlife Management Area. The find doubled the number of known breeding wetlands on the WMA near Ocilla and significantly increased the number of known ponds in Georgia for this extremely rare species.
- The Amphibian Foundation also keeps a breeding colony of frosted flatwoods salamanders, a federally threatened species. The colony consists of more than 40 animals, a group that bred for the first time in captivity in winter 2021-2022. These larvae were raised to metamorphosis and distributed to other facilities to broaden the effort and safeguard them from catastrophic events.
- In surveying for reticulated flatwoods salamanders at Mayhaw Wildlife Management Area in March 2023, Wildlife Conservation detected larvae in two wetlands where the salamanders had been found before and discovered them for the first time in a nearby wetland. This site at the Miller County WMA is scheduled for prescribed burns to maintain and restore the grassy vegetation and other plants that flatwoods salamanders need in and around shallow fishless wetlands. Providing these areas for cover and breeding habitat is critical to the species' survival.

MAMMALS

North Atlantic Right Whales

North Atlantic right whales are a critically endangered species that numbers fewer than 350. The species was nearly driven to extinction by centuries of hunting. Recovery has been slow because of reduced genetic diversity, natural variability in food resources and high rates of mortality and injury from vessel collisions and entanglement in commercial fishing rope.

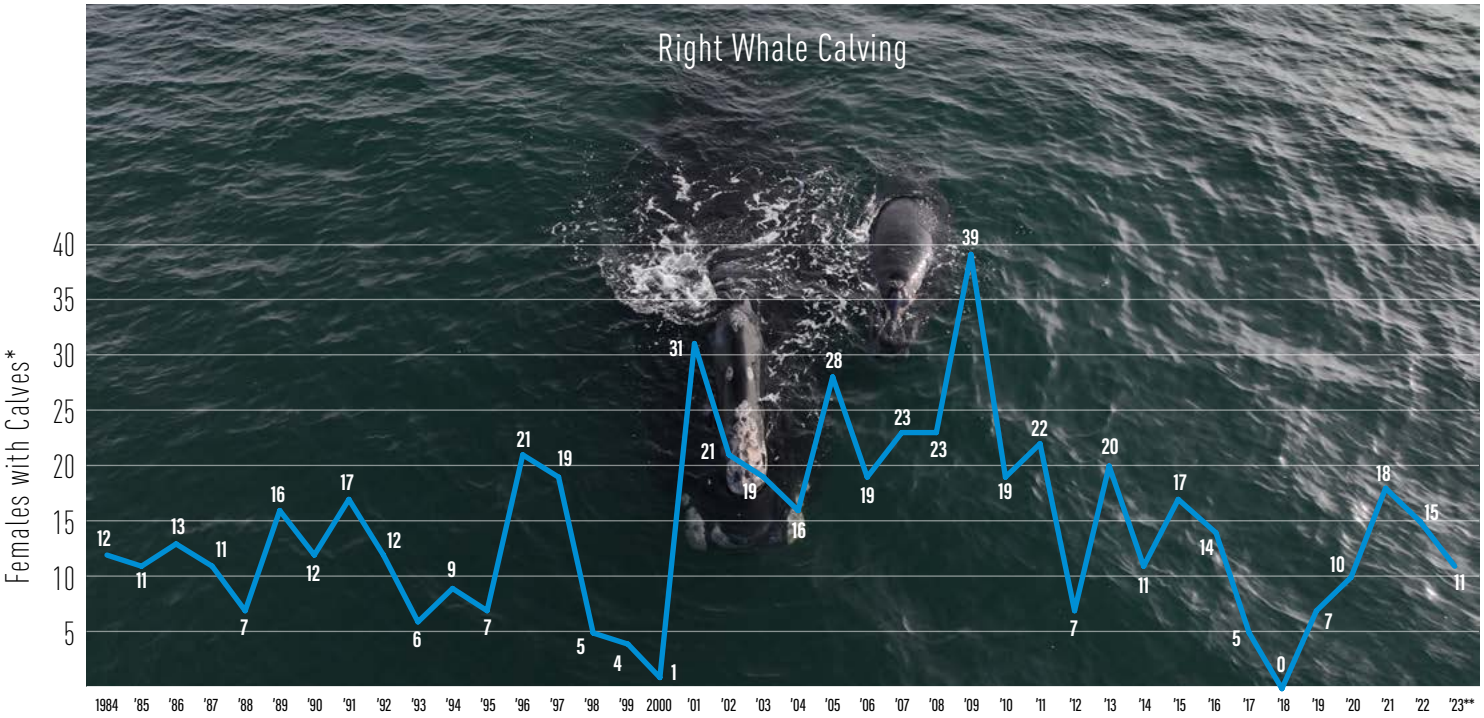
Right whales forage on zooplankton along the coast of New England and Canada. Each November through January, pregnant females migrate more than 1,000 miles to the coast of Georgia and northeast Florida, the species' only known calving grounds. Females nurse their calves for one to two months, until the calves are strong enough to migrate north during February and March. A variable number of non-calving right whales also migrate to the southeastern U.S. each winter. The migrant whales do not feed in southeastern waters, instead relying on energy stored in their thick blubber.

The North Atlantic right whale population increased by more than 40 percent during the 2000s, suggesting the species was beginning to recover. However, in 2010 calving rates began to drop in response to changes in zooplankton distribution in New England and Canada – changes apparently driven by warming ocean temperatures and associated shifts in ocean currents. At the same time, right whales began suffering unprecedented levels of mortality and injury. An estimated 133 whales died from 2010 to 2017. Necropsies show that almost all mortalities are caused by ship strikes and entanglement in commercial fishing gear. More than 80 percent of surviving whales bear scars from fishing rope entanglements.

Even worse, females are having fewer calves and are dying at faster rates than males, probably because of the added energy that calving demands. The species is declining rapidly, and its future is uncertain. Data from the North Atlantic Right Whale Consortium placed the species at 336 whales as of 2020, down from a peak of 480 in 2011. The last time there were fewer was in 2001. The National Oceanic and Atmospheric Administration estimates that 50 calves are needed each year for the species to recover at the current high levels of mortality, which is impossible given that there are only about 75 breeding females. The same population models predict the species could stabilize if vessel strikes and rope entanglement are curtailed sharply.

DNR collaborates with scientists and managers from NOAA, the Florida Fish and Wildlife Conservation Commission, Clearwater Marine Aquarium Research Institute and other North Atlantic Right Whale Consortium members to conserve right whales in the southeastern U.S. Each December through March, aerial and boat surveys are conducted to monitor the whale population. Biologists use modified crossbows to collect genetic samples from calves and digital cameras to photo-identify other whales. The data are used to estimate population size, growth rates and other parameters. DNR's Wildlife Conservation Section also documents entangled whales and removes fishing rope from them when possible.

Responders attach a tracking buoy and assess the entangled right whale Argo (CMARI/NOAA permit 24359)



North Atlantic right whale and calf (DNR/NOAA permit 20556)

*Including those documented outside the southeastern U.S. **A 12th newborn whale found dead was not seen with a mother.

DNR management and policy activities focus on reducing human-related mortality and protecting right whale habitat. Wildlife Conservation staff serve on the Right Whale Recovery and the Atlantic Large Whale Take Reduction teams, as well as the board of the North Atlantic Right Whale Consortium. Support also is provided by DNR's Coastal Resources and Law Enforcement divisions with education and outreach, policy efforts and enforcement of federal right whale protections. Most funding for DNR's right whale conservation efforts is provided by grants from NOAA.

During the 2023 calving season, survey teams identified 11 females with calves, nine adult females without calves, 12 adult males, two adults of unknown sex and 13 juvenile whales. One orphaned calf observed off North Carolina subsequently died.

Also during the season, two entangled whales were seen in the Southeast. The first was an adult male known as number 3812 and nicknamed Nimbus. The whale was first sighted 11 miles east of Jekyll Island with rope trailing out of both sides of his mouth. A multi-agency response was able to cut the rope on the left side of the body and remove 114 meters of it, leaving two roughly equal lengths on each side of the mouth. The whale was sighted later that spring off the New England coast free of all rope. An examination of the gear determined that it originated from the Canadian snow crab fishery in the Gulf of St. Lawrence.

The second entanglement involved whale number 1218, nicknamed Argo. He was spotted entangled off North Carolina, triggering a two-day multi-agency response led by DNR. The first day, responders attached a telemetry buoy to the entangling gear and collected helpful information about the entanglement. Argo was dragging two lobster pots, both trailing a short distance behind the flukes, and had heavy fishing rope wrapped multiple times around the base of his tail. On the second day, responders working from a small inflatable boat pulled up behind the whale's flukes and made a series of cuts to the ropes around the peduncle. After a final cut and force was applied, the ropes pulled free. The disentanglement crew pulled the lobster pots aboard. Drone footage showed two small segments of rope still trailing behind Argo's flukes; however, the hope was the whale would eventually shed those. Investigators determined that the gear came from the Canadian lobster fishery off the coast of Nova Scotia.

Entanglement in fishing rope is one of the two main threats to North Atlantic right whales. Disentangling these massive animals is a dangerous and last-ditch effort to save an individual and not an effective conservation strategy. More needs to be done to prevent entanglements

Marine Mammal Stranding Network

The The Georgia Marine Mammal Stranding Network was created in 1989 to coordinate marine mammal stranding responses in the state. The Wildlife Conservation Section coordinates the Georgia network with funding from the National Oceanic and Atmospheric Administration and help from other agencies and private organizations. Network goals include investigating human impacts on marine mammals, monitoring population health, providing rapid and humane response to live stranded marine mammals, contributing to marine mammal research, and educating the public about marine mammal conservation.

Since 2005, the network has documented an average of 34 stranded dolphins and whales per year. Bottlenose dolphins were the most commonly stranded species, making up 80 percent of strandings, followed by pygmy and dwarf sperm whales (9 percent combined). Other species stranded in Georgia historically

include Atlantic spotted dolphins, Atlantic white-sided dolphins, rough-toothed dolphins, Risso's dolphins, pygmy killer whales, false killer whales, short-finned pilot whales, humpback whales, North Atlantic right whales and multiple species of beaked whales.

The network documented 25 cetacean stranding events in calendar year 2022. This count included 21 bottlenose dolphins and two dwarf sperm whales. The cause of stranding could not be determined in the majority of the cases because carcasses were either too decomposed or could not be recovered. Of the remaining cases, two dolphins died from nonspecific findings (likely old age or disease), two dolphin calves died from natural perinatal complications and one dolphin was entangled in blue crab fishing gear.

The public is encouraged to report stranded marine mammals in Georgia by contacting DNR at 800-2-SAVE-ME (800-272-8363).

Florida Manatees

Florida manatees inhabit tidal rivers, estuaries and near-shore ocean waters throughout coastal Georgia during the warm months of the year. The Florida manatee population numbers fewer than 8,000, with about half of the population found along Florida's Gulf Coast and the remainder along the Atlantic Coast and the St. Johns River. Each spring and summer an unknown and variable number migrate into Georgia, returning to Florida in fall as water temperatures cool.

Formerly listed as endangered under the Endangered Species Act, manatees were downlisted in 2017 to threatened status thanks to sustained population growth throughout their U.S. range. But an ongoing die-off of manatees along Florida's Atlantic Coast since 2021 threatened that recovery. A collapse in seagrass resources in Brevard and nearby Florida counties led to nearly 1,000 manatees dying from a combination of starvation and cold stress during the winter of 2021-2022. Satellite tagging and photo-ID research conducted by the Wildlife Conservation Section and partners shows that the bulk of Georgia's manatees overwinter in the same areas affected by the seagrass collapse.

Deaths subsided during the summers of 2021, 2022 and 2023 as manatees were able to disperse and find food in other parts of Florida and Georgia, but biologists are concerned that mortalities will continue in coming winters until forage quality improves. Seagrasses have been impacted by persistent algal blooms, which are exacerbated by agricultural runoff, discharges from septic tanks and other human activities. The Wildlife Conservation Section is cooperating with the Florida Fish and Wildlife Conservation, the U.S. Fish and Wildlife Service and other partners to monitor the situation.

Manatee management in Georgia focuses on reducing human-related mortality and protecting habitat. Recovery tasks include documenting

Manatee being fitted with a transmitter and assessed before release (Monica Ross/CMARI/USFWS permit MA37808A-2)

causes of mortality and injury, rescuing injured and out-of-habitat manatees, monitoring distribution and habitat use, educating boaters about watercraft impacts and reviewing permits and policies that may affect manatees and their habitat.

Wildlife Conservation staff have documented an average of 4.8 manatee mortalities a year in Georgia waters since 2005, ranging from two to 11 carcasses annually. The leading causes of mortality are watercraft collisions (27 percent) and cold stress/hypothermia (16 percent). Less common causes include drowning in commercial fishing gear, entrapment and even gunshot, as with one case in 2005. Five manatee carcasses were found in Georgia during calendar year 2022. One manatee died from a watercraft collision. Cause of death could not be determined in the remaining cases due to decomposition and scavenging.

Small Mammals

The Wildlife Conservation Section is continuing to work with the U.S. Fish and Wildlife Service and the Georgia Department of Transportation to perform statewide surveys of transportation structures for bats. Environmental surveys conducted by DOT ecologists and consultants for DOT maintenance and improvement projects provide most of the data collected on bats' use of transportation structures in the state.

During fiscal year 2023, Wildlife Conservation launched the Georgia Bats in Bridges Survey123 form to streamline data collection. The database is now hosted through Esri's ArcGIS Online and is easily shared with partner agencies for coordination on DOT or research projects. Approximately 185 surveys of transportation structures for bats have been documented through the new app. In addition to managing survey documentation, Wildlife Conservation staff visited bridges and culverts for DOT to confirm species identification and check for colonies. Staff also relocated tricolored bats in a bridge replacement project.

Every year, Wildlife Conservation staff hold field training for DOT ecologists and consultant ecologists, as well as other government agency staff, focused on successful survey techniques for transportation structures. The agency held three courses in May 2023. The training ensures more survey coverage throughout the state by qualified staff and is highly valued by partner agencies. It also provides an avenue for DOT ecologists and consultants to meet Wildlife Conservation staff, which helps encourage them to reach out to DNR with questions regarding species identification and early coordination on minimizing project impacts on bats. The training is so popular that DOT requested an additional course this year, and several contractors and DOT staff from other Southeastern states attended.

Viviana Berdecia-Martinez with a red bat (Brian Romm/DNR)

This fiscal year, the Fish and Wildlife Service proposed the tricolored bat for listing under the Endangered Species Act due to the species' declines from habitat loss and white-nose syndrome. Wildlife Conservation staff concluded a research project analyzing the use of culverts by tricolored bats in Georgia. The work helped identify how frequently as well as when and where tricolored bats use transportation structures. This species, along with several other Georgia species of concern, use transportation corridors frequently enough that the Wildlife Conservation, Fish and Wildlife Service, and DOT are working with the Federal Highway Administration to draft a programmatic agreement focused on providing standard coordination and protections for bats on state roadway construction and improvement projects. Wildlife Conservation remains a leader in pioneering survey techniques, training and interagency coordination to protect bats.

Staff also continued coordination of the statewide Anabat surveys in fiscal 2023. Project volunteers drove 14 DNR mobile acoustic routes and nine North American Bat Monitoring Program route transects across the state collecting bat calls. DNR and U.S. Forest Service partners drove another 18 routes for the surveys. Most routes (detailed at georgiawildlife.com/AnabatProject) were run once or twice. Wildlife Conservation used software to analyze acoustic survey calls collected in calendar year 2022 and supplied the data to the North American Bat Monitoring Program to feed into range-wide monitoring for at-risk species.

Through additional analysis, biologists can determine most bat species and numbers per route. The routes have been run over multiple years to build a long-term set of call data to

help determine bat population trends across the state. Understanding changes in bat populations as white-nose syndrome spreads and measuring the magnitude of population declines to assess disease impacts is crucial for informing management decisions.

Every other year, Wildlife Conservation partners with the Fish and Wildlife Service to conduct emergence surveys in north and south Georgia to monitor summering populations of gray bat and southeastern myotis. In fiscal 2023, two caves in north Georgia and a cave in south Georgia were surveyed using new thermal infrared technology to capture bats emerging from the roosts at dusk. A recently identified roost of Brazilian free-tailed bats in an abandoned building was also observed to try to estimate the colony size. (Biologists believe it may be one of the largest bat colonies in Georgia.) At all these locations, thousands of bats were counted, and these populations were confirmed stable. The roosts will be monitored again in fiscal 2025.

A citizen-science program started in 2014 to monitor summer bat maternity roosts in the state continued in 2023. This outreach encourages the public to count bats at bat houses, barns and other roosts twice each summer. This effort mirrors programs in Pennsylvania and Wisconsin and allows the public to contribute to long-term monitoring of wildlife populations. Forty-five reports came in through the online survey, and DNR staff connected with volunteers who completed counts on public lands for the project. Information and annual reports can be found at georgiawildlife.com/bat-roost-monitoring.

Data from summer mist-netting in the state also showed declines for tricolored bats and Myotis bats, compared to pre-WNS summer mist-net surveys. In summer 2022, staff conducted mist-netting surveys at eight long-term monitoring sites across the state. These surveys detected some state-tracked species, including the hoary bat and northern yellow bat, but no WNS-affected species were captured during surveys. This monitoring provides biologists with data needed to analyze population trends.

As of winter 2023, Wildlife Conservation confirmed white-nose syndrome, a deadly disease to bats, in 15 north Georgia counties and detected Pseudogymnoascus destructans, or Pd, the causative agent for the disease, in eight more counties. Biologists documented a 90-percent decline in bat populations at known hibernacula in north Georgia.

DNR's Maggie Hunt conducts a cave emergence survey of bats (Emily Ferrall/DNR)

White-nose, or WNS, has killed millions of bats. According to the Fish and Wildlife Service, at the close of fiscal 2023 the disease had been documented in 40 states and eight Canadian provinces. Wildlife Conservation will keep monitoring sites in winter to document the spread of WNS and related mortality. Staff expanded monitoring to south Georgia. During surveys, bats are swabbed to check for Pd, the fungus that causes WNS.

This year, staff again checked culvert sites that are considered significant hibernacula for state-tracked species, such as the tricolored bat and southeastern myotis. Continued monitoring is important both for conservation decisions and DOT project consultation. In winter 2023, 10 road culverts were surveyed as a part of annual long-term monitoring of structures with significant bat populations. One culvert in Carroll County had 257 tricolored bats. No new counties tested Pd-positive this winter.

Wildlife Conservation biologists also are working with the public and the caving community to promote awareness of WNS and support for bat conservation. Staff conducted 19 bat education and outreach programs in fiscal 2023. The programs were given to school groups, master gardeners, volunteer groups and visitors at state parks and nature centers statewide.

Continuing research from a DNR-supported doctoral project with the University of Georgia's Warnell School of Forestry and Natural Resources, a new paper on the translocation of southeastern pocket gophers was accepted for publication this year. Wildlife Conservation biologist J.T. Pynne worked on completing the paper "Experimental Translocation for Restoration of an Ecosystem Engineer" (Restoration Ecology, 2023).

Tricolored bat (Maggie Hunt/DNR)

FRESHWATER AQUATIC SPECIES

River Basins and Priority Watersheds

River Basins
- Atlantic Slope
- Coosa-Tallapoosa
- Gulf Coast
- Tennessee

Priority Watersheds
- Highest
- High

The southeastern U.S. is a recognized hotspot globally for aquatic biological diversity and one of the temperate world's richest areas for freshwater crayfishes, fishes, mussels, snails and other aquatic groups. Georgia exemplifies this pattern, ranking among the top five states nationwide in native species of mussels (127), fishes (265), crayfishes (70) and aquatic snails (84).

Unfortunately, Georgia is also among the top states in imperiled freshwater aquatic species. The State Wildlife Action Plan recognizes 152 imperiled freshwater aquatic species in Georgia, more than half of which have a significant portion of their global range within the state's boundaries. Approximately 22 percent of Georgia's freshwater fishes, 28 percent of mollusks and 36 percent of crayfishes are rated as imperiled or critically imperiled in the state. Yet even these numbers understate the problem because they don't include an additional 48 species, most of them mollusks, considered historic or extirpated from Georgia.

Important populations of rare aquatic species are distributed throughout the state. However, certain areas support an exceptional number of common and rare species, and 165 are listed as high-priority watersheds in Georgia's State Wildlife Action Plan. Examples range from the Coosa River in northwest Georgia to the upper Toccoa River in northeast Georgia (home to the state's only population of tangerine darters) and Spring Creek in southwest Georgia. As part of the Wildlife Action Plan, experts prioritized Georgia watersheds based on their number of rare aquatic species and the global conservation importance of each species. The map at top shows Georgia's river drainages and the watersheds within each drainage with the most high-priority species. (Only watersheds rated first or second in priority – colored red and yellow, respectively – are included here.)

Joining with partners around the state, the Wildlife Conservation Section coordinates and carries out work to monitor and conserve Georgia's aquatic diversity. The effort, started with a single biologist covering the state in 1998, features a team of biologists, technicians and seasonal staff focused on priority watersheds and species identified in the Wildlife Action Plan. Formally organized into the section's Freshwater Biodiversity Program in fiscal year 2021, the team conducts surveys and long-term monitoring projects, participates in collaborative conservation partnerships, and promotes aquatic species conservation through educational outreach and environmental review. Projects and other highlights are explored in the regional summaries that follow.

Data from surveys and monitoring, including data submitted through the agency's scientific collecting permit program, are entered into the NatureServe Biotics database, a national inventory of rare species. Partnerships also are maintained with the Georgia Museum of Natural History and DNR's Stream Survey Team, increasing the amount of data available for environmental review and conservation planning. Aquatic species data, along with range maps, photographs and species profiles, are available to the public through the Georgia Biodiversity Data Portal at georgiabiodiversity.org.

DNR aquatics staff during a survey at Clear Creek in Gilmer County (DNR)

Coosa-Tallapoosa River Drainage

The Wildlife Conservation Section continued work in fiscal year 2023 with the University of Georgia's River Basin Center to monitor fishes and mussels annually in Holly Creek, a major tributary to the Conasauga River. Surveys were conducted at 10 sites this year. Several rare fish and mussel species were detected, including blue shiner, trispot darter, bridled darter, finelined pocketbook, Alabama creekmussel, Coosa creekshell and Alabama rainbow.

Ruth Stokes of the U.S. Forest Service releases Coosa moccasinshell mussels (Katie Owens/TNC)

These yearly surveys complement a larger suite of conservation actions implemented in the Holly Creek watershed by partners from The Nature Conservancy, the River Basin Center, Limestone Valley Resource Conservation and Development Council, and the U.S. Fish and Wildlife Service. The work is supported by a grant from the National Fish and Wildlife Foundation's Southeast Aquatics Fund, with additional funding from the U.S. Forest Service and the Fish and Wildlife Service.

Wildlife Conservation also contracts with UGA for long-term monitoring of fish in the Etowah and Conasauga rivers. These river systems are among the most diverse and imperiled in the southeastern U.S. Monitoring has been ongoing since 1998. Information from these studies is important for conservation planning, species status assessments and documenting relationships between fish populations and environmental stressors.

In fiscal 2023, staff continued a project centered on conserving the Coosa moccasinshell, a federally endangered mussel. Historically, this mussel could be found throughout the upper Coosa watershed in Alabama, Georgia and Tennessee. However, in the last few decades it has been found only in the Conasauga in Tennessee and Georgia's Holly Creek.

Wildlife Conservation coordinated with the Tennessee Wildlife Resources Agency and the Alabama Aquatic Biodiversity Center to design a project aimed at addressing recovery objectives for the Coosa moccasinshell. Partners from each agency searched for brood stock in the Tennessee portion of the Conasauga, and for the second straight year successfully collected females holding larvae. These mussels were taken to the Alabama Aquatic Biodiversity Center, where the larvae transformed into juveniles on the gills of bronze darters. Parasitism on fish is a necessary stage of a freshwater mussel's life cycle, which adds an extra layer of complexity for managers trying to propagate these rare animals.

The Aquatic Biodiversity Center raised year classes from fiscal 2021 and 2022. Some 400 juveniles from the 2021 class were reintroduced at two sites in Alabama in 2022. Wildlife Conservation is planning a small release of Coosa moccasinshells in Georgia for fiscal 2024. The agency also released a video highlighting mussel conservation in the Coosa basin, using the Coosa moccasinshell as an example.

Tennessee River Drainage

Despite its large size and unique dorsal fin shape, the sicklefin redhorse was not recognized as a distinct species until 1991. The fish has a limited range in the Little Tennessee and Hiwassee River systems in North Carolina and Georgia. The only Georgia population occurs in Brasstown Creek, yet this population is considered critical for conserving the species. Throughout the year, sicklefin redhorse use a variety of habitats in large creeks and rivers, varying from overwintering in pools and runs near Hiwassee Reservoir in North Carolina to spawning in the rocky upper reaches of Brasstown Creek in Georgia.

In 2016, DNR entered into a Candidate Conservation Agreement for sicklefin redhorse with the U.S. Fish and Wildlife Service, North Carolina Wildlife Resources Commission, Duke Energy, Tennessee Valley Authority and the Eastern Band of Cherokee Indians. (The Cherokee recognized and valued sicklefin redhorse as a food source long before modern ichthyologists recognized it as a species. The Cherokee name for the species is ᎤᎩᏓᏧ, pronounced U-gi-dátli and translated as "it has a feather.") Through the Candidate Conservation Agreement, or CCA, partners cooperate on actions that conserve, manage and improve sicklefin redhorse populations, with the goal of precluding the need to list the species under the Endangered Species Act. Based in part on this effort, the Fish and Wildlife Service decided in 2016 that listing sicklefin redhorse was not warranted.

The spawning population in Brasstown Creek has been monitored annually since 2014. Seines and fyke nets, which use side nets to funnel migrating fish into a central chamber (watch), are used to collect sicklefin redhorse during their spring migration. The fish are weighed, measured, assessed for health and reproductive condition, and released in their direction of travel. All are also injected with a passive integrated transponder (PIT) tag, which is used to track individual fish when they are recaptured

Sicklefin redhorse (Brett Albanese/DNR)

or detected swimming over a PIT antenna system installed in Brasstown Creek near the North Carolina border. The antenna system consists of a loop of wire buried in stream gravel and connected to a tag reader on the bank.

As of June 2023, 392 adult sicklefin redhorse have been tagged in Brasstown Creek since the study began. The Georgia Cooperative Wildlife Research Unit uses the data to estimate annual survival, recruitment and population size. The current model estimates that sicklefin redhorse exhibit high annual survival in the stream, with hundreds of adults migrating to upper Brasstown Creek each year. 2023 proved an exceptional year: Crews captured 54 adult sicklefin redhorse – the most caught since 2017 – through a combination of seining and fyke netting. Detections on the PIT antenna system also rated relatively high compared to past years, with 114 different individuals detected swimming over the antenna between April 1 and June 6.

Wildlife Conservation Section staff also participated in annual monitoring of South Chickamauga Creek, a tributary that begins in Georgia and enters the Tennessee River in Chattanooga. This stream contains Georgia's only known population of the snail darter, which was removed from the federal Endangered Species Act list in 2022 because of the species' recovery. Due to the fish's limited range in the state, the species is still protected under Georgia's Endangered Wildlife Act and remains a priority for monitoring. Wildlife Conservation's survey, conducted in collaboration with University of Georgia students enrolled in an ichthyology field course, documented more than 30 snail darters. The survey also found several other state-protected species, including a spawning aggregation of river redhorse, stargazing minnows and mountain madtoms.

Atlantic Slope Drainage

Like sicklefin redhorse, the robust redhorse is managed through a cooperative agreement between state agencies, hydropower companies and stakeholders. The Robust Redhorse Conservation Committee (robustredhorse.com) has directed research and recovery work since the early 1990s. Those efforts include rearing and stocking, monitoring, enhancing spawning habitat, and research studies. Despite these continued efforts, the robust redhorse remains an at-risk species. A determination by the U.S. Fish and Wildlife Service on whether to list robust redhorse under the Endangered Species Act is expected in January 2024. Wildlife Conservation Section staff helped the Fish and Wildlife Service in developing the robust redhorse Species Status Assessment in fiscal year 2023. The Species Status Assessment is a risk assessment used to inform Endangered Species Act policy decisions. As the resource agency tasked with monitoring and management, Wildlife Conservation staff provide critical data and knowledge through their ongoing research and partnerships.

In Georgia, the robust redhorse is known to occur in the Altamaha, Ocmulgee, Oconee, Ogeechee, Broad and Savannah rivers. Adults overwinter in the lower sections of rivers and migrate upstream to spawn in shoal and gravel-bar habitat. Weighing as much as 20 pounds or more and known to live nearly 30 years, the robust redhorse is the largest and longest-lived sucker in the Southeast.

In fiscal 2023, partners continued a long-term study of the robust redhorse's Savannah population. Eleven individuals were tagged and released in 2018 with surgically implanted acoustic transmitters. The acoustic transmitters emit sonic pings that are detected by receiver arrays stretching from the estuary to Augusta Shoals, the entire known range of the robust redhorse's Savannah population. This study is aimed at not only increasing understanding of the species' life history and population dynamics, but also providing insight into the efficacy of a pending fish passage at New Savannah Bluff Lock and Dam and highlighting areas of the river to prioritize for conservation.

Despite continuous high flows wreaking havoc on the stationary array system, notable detections this year included one determined fish that by-passed the New Savannah Bluff Lock and Dam and reached historical spawning habitat upstream in the Augusta Shoals. Partners with Georgia Southern University using a boat-mounted receiver detected another tagged fish on the spawning bar downstream of the Lock and Dam.

Also during the 2023 spawning season, the robust redhorse team and South Carolina completed an environmental DNA (eDNA) study in the Ogeechee River using mitigation funds from the Georgia Department of Transportation. The Ogeechee population was stocked over 20 years ago with hatchery-raised fish from Oconee River broodstock. Over the decades, the Ogeechee population had declined to levels undetectable by standard sampling methods; therefore, partners tried a newly developed eDNA tool for robust redhorse.

They collected water samples at 12 sites longitudinally stratified along the mainstem Ogeechee on two separate occasions during the presumed peak of spawning. Analysis showed positive results at three sites, indicating that remnants of the stocked population are persisting. Though the abundance of the population is still unknown, this information is important when considering potential impacts to the river or species.

In addition to robust redhorse, the Altamaha River basin is also well-known for its diversity of freshwater mussel species, including endemic forms such as the Altamaha spinymussel. In 2017, DNR entered into a Candidate Conservation Agreement for the basin's freshwater mollusks with Georgia Power and the Fish and Wildlife Service. The purpose: Implement conservation actions for mussels and snails occurring within or near Georgia Power's project areas in the Oconee, Ocmulgee and Altamaha rivers. The agreement provides a mechanism for funding critical surveys, monitoring and research, and will be a major focus of Wildlife Conservation's mussel biologist in coming years.

Taking a fin clip of a Savannah River robust redhorse for DNA analysis (Alan Cressler/USGS)

In fiscal 2023, Wildlife Conservation conducted surveys in the Altamaha basin to identify the distribution and abundance of four freshwater mussel species that could be listed under the Endangered Species Act. Staff surveyed portions of the Altamaha River and Lake Oconee at multiple depths using snorkeling and scuba. Species distribution and demographic data were collected, and sites identified for future monitoring. Over 700 mussels were collected at 13 sites on Oconee and more than 1,400 mussels from 10 sites on the main stem of the Altamaha. The latter included Altamaha arcmussels for the second straight year of the project (this work is in its fifth year). Wildlife Conservation submitted the five-year report to the Fish and Wildlife Service and Georgia Power. By the end of fiscal 2023, the project had sampled 189 sites in the Altamaha Basin and over 10,000 individual mussels.

Wildlife Conservation also managed contracted research involving federally endangered shortnose and Atlantic sturgeon. The work is conducted by researchers at UGA's Warnell School of Forestry and Natural Resources and funded by the National Marine Fisheries Service. The current project focuses on monitoring juvenile recruitment of these sturgeon in the lower Altamaha and estimating the number of adult Atlantic sturgeon migrating into Altamaha tributaries – the Oconee and Ocmulgee rivers – for spawning. The Altamaha and Savannah river populations of both species are among the largest within their overall ranges and significant for their recovery.

Gulf Coast Drainage

The Gulf Coast drainages of the Southeast also contain some of the most diverse and unique freshwater mussel faunas in the world. In Georgia, the Apalachicola-Chattahoochee-Flint System, or ACF, and the headwaters of the Ochlockonee and Suwannee rivers are predominant areas of mussel diversity. For example, the ACF drains a large portion of western Georgia, crossing both the Piedmont and Coastal Plain physiographic provinces, and is home to 33 extant species of mussels, five of which are endemic to the basin.

The Wildlife Conservation Section has been monitoring important populations of freshwater

mussels in southwest Georgia since the early 2000s. These populations face significant threats from streamflow depletion associated with extreme droughts and agricultural water withdrawals. In fiscal year 2023, biologists completed surveys of all five long-term monitoring sites in the lower Flint River and observed how prevailing conditions affected mussel assemblages.

Populations in these streams continued a positive trend first documented in 2020, with high numbers of listed species and strong evidence of recruitment. The working hypothesis is this increase resulted from several years without a significant drought event. All five long-term monitoring sites in the lower Flint River Basin were sampled in fiscal 2023, although Spring Creek was only partially sampled because a tropical storm hit the Gulf Coast during that work. The five sites continue to provide habitat for common and rare species and remain a priority for monitoring and conservation.

Staff played host for the second virtual meeting of the newly re-formed Apalachicola-Chattahoochee-Flint Freshwater Mussel Stakeholder Group. The meeting was well attended by members of academia, nonprofit and state and federal agencies from Florida, Georgia and Alabama. The group meets annually to share research and collaborate on conservation efforts in the ACF basin.

A staff biologist taught the annual Apalachicola-Chattahoochee-Flint Freshwater Mussel Identification Workshop at the Jones Center at Ichauway. The three-day classroom and field workshop is attended by students, state and federal natural resources agency staff, and private sector consultants to learn about freshwater mussel natural history, conservation, biology and identification in the basin.

Wildlife Conservation also provided technical support for the Georgia Flow Incentive Trust. This stakeholder-led group is implementing creative strategies to minimize the impact of future droughts on stream flows and mussel populations in the Lower Flint River Basin. Two grant proposals submitted would, if funded, allow the agency to dedicate a full-time mussel biologist to the project. Wildlife Conservation will continue to support this developing project.

Endangered shinyrayed pocketbook mussels (DNR)

DNR's Emilia Omerberg collects mussels for a mark-recapture study at Spring Creek (DNR)

PLANTS AND NATURAL HABITATS

DNR's Carlee Steppe surveys Tennessee yellow-eyed grass (Joe Kirsch/USFWS)

Rare Plant Conservation

Rare plant conservation in the Wildlife Conservation Section is led by the botany team. The public looks to DNR as a primary source of information on rare plants and their conservation, and the agency has a leadership role in plant conservation in the state and the Southeast, alongside primary partners of the Georgia Plant Conservation Alliance, or GPCA.

The botany team is pursuing five long-term topical goals.

- **Natural heritage:** Serve as the go-to source for conservation status information on Georgia's flora.
- **Adaptive management:** Monitor priority plants and habitats to inform conservation actions and management plans.
- **Stewardship:** maintain safeguarding and habitat restoration at priority rare-plant sites.
- **Networking:** Support and use the GPCA to share data, expertise and resources.
- **Promote plants:** Raise awareness of plant conservation, foster young botanists and build connections with landowners.

Systematically ranking the conservation priority of plant species is central to DNR's advisory role. A significant challenge is that Georgia has more than 4,500 plant species. Many are newly described, and no assessment of the conservation ranks for plant species has been made since the 2015 State Wildlife Action Plan. However, fiscal year 2023 brought an opportunity for scientific reassessment of these rankings with the initiation of a revision of the Wildlife Action Plan, a new project for recently hired botany staff. The botany team collaborated to develop and implement a transparent, repeatable methodology for the 2025 plant Species of Greatest Conservation Need list. Although not all states have that list of high-priority plants in their plans, by including them, Georgia will be eligible for federal plant conservation funds if Recovering America's Wildlife Act is passed and signed into law. (Under the current federal State Wildlife Grants Program, plant conservation is not eligible for funding.)

Another challenge that became urgent in fiscal 2023 was the poaching of rare plants and over-sharing of information about fragile habitats, both fed by exposure on social media and the internet at large. In response, the GPCA implemented strict protocols for accountability and to limit information shared about rare plant species. The alliance also helped facilitate communication

and standardize how sensitive data is shared with partners, while DNR took a step-by-step approach to implement new technologies and workflows in the agency and GPCA.

On another front, the botany team worked to create opportunities in conservation work for young professionals and increase job outreach to races and ethnicities under-represented in the conservation field. Staff took part in the Minorities in Resource Conservation Committee of the Southeastern Association of Fish and Wildlife Agencies and regularly attended student workshops to help the committee train students in networking for conservation jobs. In fiscal 2023, Wildlife Conservation received funding from the committee to start a summer internship program. Plans are to continue that internship with the support of the Southeastern Association of Fish and Wildlife Agencies and DNR.

Guided by Georgia's State Wildlife Action Plan, implementation of botany team goals to protect plant biodiversity requires a multipronged approach. Surveys and monitoring, rare species data management (Natural Heritage data), safeguarding genetic material, population and habitat restoration, and fostering partnerships are all important strategies for this effort.

Surveys and Monitoring

Periodic surveys and monitoring are important to determine trends in priority plant populations and detect critical declines before local extirpation occurs. Results provide important data to the U.S. Fish and Wildlife Service for formal species status assessments and update Georgia's rare species database – called Biotics – in partnership with NatureServe.

Consistent and strong support from Fish and Wildlife Service Endangered Species Act grants is critical to botanical surveys in Georgia and underscores why surveys often target plants that are either federally listed or petitioned for listing. A State Wildlife Grant supports surveys for high-priority plants on state conservation lands. Rare plants are also often found during environmental surveys for timber management proposals.

In fiscal year 2023, surveys and monitoring were conducted for federally protected Morefield's leatherflower *(Clematis morefieldii)*, Alabama leatherflower *(Clematis socialis)*, swamp pink *(Helonias bullata)*, pondberry *(Lindera melissifolia)*, Coosa *(or Mohr's)* Barbara's buttons *(Marshallia mohrii)*, Canby's dropwort *(Oxypolis canbyi)*, dwarf sumac *(Rhus michauxii)*, large-flowered skullcap *(Scutellaria montana)*, Georgia aster *(Symphyotrichum georgianum)*, persistent trillium *(Trillium persistens)*, relict trillium *(Trillium reliquum)* and Tennessee yellow-eyed grass *(Xyris tennesseensisi)*, as well as the at-risk species dwarf hatpins *(Eriocaulon koernickianum)*, hartwrightia *(Hartwrightia floridana)*, Boykin's lobelia *(Lobelia boykinii)* and bearded beakrush *(Rhynchospora crinipes)*.

Swamp pink is found in northeast Georgia mountain bogs and is most threatened by habitat degradation from changes in hydrology or disturbances. One wild population is known in Georgia, although plants have been introduced to four new bog complexes as part of recovery efforts. The wild population occurs on private land, where good relations with the landowners have allowed access for conservation groups. In May 2022, botanists from Atlanta Botanical Garden and DNR permitted at the site counted

Canby's dropwort (Lisa Kruse/DNR)

rosettes and flowering individuals – nine patches in all with flowering plants in two. In the previous survey in 2015, 10 patches were identified. Some microsites appear favorable to swamp pink: They are more open and have stable hydrology. Others, however, are being degraded by encroaching vegetation and stream bank erosion from offsite activities.

Known occurrences of federally endangered pondberry are being systematically visited to support partner efforts on behalf of the Recovery Challenge Grant. During fiscal 2023, staff and partners checked 11 occurrences in southwest and eight in southeast Georgia. Population estimates, qualitative and quantitative habitat characterization, threats, and conservation actions were described for each. DNA samples taken from the different populations were submitted to a DNA bank at Atlanta Botanical Garden. Results will be used to plan next steps for conserving the species. Efforts will include growing material from the most imperiled sites for population restoration on conservation lands.

Wildlife Conservation also led surveys for federally threatened Coosa Barbara's buttons. Much of the population is protected at Coosa Valley Prairies, a Floyd County preserve of The Nature Conservancy, but there had been no systematic surveys for this species since 2002. The findings from 2023 revised understanding of the species' populations. Previously, records indicated there were over 30 small populations scattered across the plant's Georgia range. It is now recognized that the small populations are interacting to form three larger, more stable populations. Seed collection for a long-term seed bank at Atlanta Botanical Garden is planned at each population over the next three years.

Radford's mint (Marylou Horan/DNR)

Canby's dropwort populations are monitored regularly at high-priority sites. In fiscal 2023, two sites where the federally endangered plants recently reappeared after long disappearance were carefully monitored. At the Lee County McAfee Church site, part of the state-owned Neyami Tract, only 20 plants were detected. High levels of ponding have persisted here since 2013 and may be associated with the widening of U.S. Highway 19, which runs nearby. Plants were not detectable from 2015-2021. With continuous flooding, the plants' seeds and roots are likely to rot, and botanists fear that Canby's dropwort will be extirpated from the site. The small number of dropworts represents a sharp loss for the species: This population previously ranked as one of Georgia's largest, with hundreds of plants.

Canby's dropwort also reappeared at The Nature Conservancy's Oakbin Pond Preserve in 2020 after not being seen at the Dooly County tract since 2008. Habitat restoration from 2016 to 2018 improved conditions for the dropworts here. Since 2020, the population has remained stable at about 200 stems. Severe hog rutting undercut the plants in early 2022. However, following increased rains in midsummer, hog damage to the dropwort habitat eased. The population showed seasonal recovery in fiscal 2023, with possibly as many as 50 percent of the plants flowering.

Two other Dooly County ponds were surveyed during the year, both on private property and both of which featured about 10-100 stems in 2015-2017. In the latest surveys, no stems were found at one site, while the other had increased to more than 1,500 stems. The first pond is ditched and is slowly being forested. The latter stays wet and experienced a wildfire in 2012 that eradicated the shrub canopy. These are dominant factors behind the differences in the populations.

Monitoring of endangered dwarf sumac includes stem counts annually at all known occurrences, typically in the fall. The state has six outplantings and one natural population. An outplanting in Newton County had 14 stems in May 2023, up from four in 2021. Installed in 2010, this site crashed following a prescribed fire and a soggy spring in 2020. The stressed rhizomes may have rotted. In June 2022, checks at an outplanting on Chattahoochee River National Recreation Area in Sandy Springs revealed that only one of three protective enclosures had living plants. The 25 stems included four flowering males. Originally outplanted with males in 2017 and females in 2018, this site – called Gold Branch – had 39 stems in 2021.

As of September 2022, stem counts at the state's sole natural population, on Lower Broad River Wildlife Management Area near Elberton, had declined slightly to about 1,437 stems and with only a single flowering female, compared to 1,762 stems in 2021 and 1,504 in 2020. A prescribed fire in March 2022 followed by a drought that June may be responsible for the falloff. Conversely, stem counts at Panola Mountain State Park near Stockbridge continued to increase following a burn in April 2022. In all, 477 stems were counted in the park's upper location, compared to 293 in 2021, and 1,074 stems in the lower location, up from 789 in 2021.

At Beech Hollow Farms in Lexington, an outplanting in 2020 increased to 31 plants this past year, compared to eight in 2021. However, many of these plants are growing in the highway right of way, with underground rhizomes moving under a fence at Beech Hollow. The state's newest outplanting, completed in April 2021, introduced 10-15 male and female plants each to Charlie Elliott Wildlife Center near Mansfield.

Tennessee yellow-eyed grass is not a grass but rather a wetland obligate plant primarily found on private property in northwest Georgia. From 2021 into fiscal 2023, DNR teamed with staff from the Fish and Wildlife Service and Chattahoochee Nature Center to assess sites and collect seeds at seven of the 14 known occurrences of the endangered species in Georgia. Five of these populations are extirpated due to urbanization, and DNR was unable to reach the landowner on two other populations.

The agency also surveyed for Tennessee yellow-eyed grass in other areas along several streams, discovering new plant locations that connected three separate occurrences across two miles into one population.

Overall, the populations appear stable yet are not likely expanding. DNR botanists observed that the overall amount of disturbance varies highly between sites, a topic that will require further study concerning what is optimal for the plants. Examples of disturbances include damming by beavers, prescribed fire, grazing by cattle and mowing. Overall, some disturbance seems to benefit the species: The plants seem to move readily into newly disturbed sites that lack competition from woody or invasive species.

Privately owned timberlands in the Fall Line near Columbus hold unexplored hardwood ravine forests with unexpected plant diversity. Too steep for timber harvest, slopes along stream drains can have areas of rich soils atypical for Georgia exposed by geologic processes. In fiscal 2023, DNR partnered with the timber companies PotlatchDeltic Corp. and Weyerhaeuser, the U.S. Fish and Wildlife Service, and contracting biologist Dr. Joyce Klaus on a hunt for undocumented areas of federally endangered fringed campion, a species that depends on these unusual forest remnants. Using as clues a 1998 botanical survey by botanists Steve Bowling and Tom Govus, the group found thousands of fringed campion, connecting older records to uncover one vigorous population complex. Equally important, the habitat is extensive and the mature hardwood forest diverse.

In addition to federally listed species, surveys of state-protected plants and species that are rare but have no protection status also are important. During the fiscal year, Wildlife Conservation visited the state's largest population of hartwrightia, which is under Georgia Power transmission lines southeast of Waycross. Unfortunately, this population experienced a devastating loss in 2023 due to inappropriate herbicide treatment. At least 80 percent of the population was affected. Staff collaborated with Georgia Power to install new "no mow, no spray" signs to help prevent the area from being sprayed again. DNR will also work to reduce the encroachment of woody plants. Plants grown from seed collected from this population are thriving in a managed bog at Laura S. Walker State Park near Waycross. DNR has, in turn, propagated plants from seed from the park and plans to use about 45 of them to help rebuild the population at the Georgia Power site.

While helping the Fish and Wildlife Service on a site visit to Ga. 40 just east of Kingsland, DNR confirmed an extensive population of at-risk ciliate-leaf tickseed (Coreopsis integrifolia). Staff will be working with the federal agency to expand this population and mitigate potential future impacts. This species is petitioned for listing under the Endangered Species Act.

Cutleaf beardtongue *(Penstemon dissectus)* is known only from the Coastal Plain in Georgia. The plant grows in wiregrass uplands and on Altamaha grit outcrops. In fiscal 2023, staff began to update the species' status, as most populations had not been surveyed for nearly 20 years. Starting on protected properties in the heart of Altamaha grit range, eight occurrences were visited at places such as Flat Tub Wildlife Management Area near Denton, The Nature Conservancy's Broxton Rocks Preserve in Coffee County and the Orianne Society's Longleaf Stewardship Center near Lumber City. Most were flourishing and had expanded since previous surveys.

Witch-alder, or Fothergilla species, have been re-classified as four species, up from two. Georgia has all four, and surveying is required to understand where each occurs in the state so that conservation can be planned accordingly. In fiscal 2023, botanists visited all 11 known sites for the mountain species large witch-alder *(Fothergilla major)* but found plants at only three. Surveys for state-threatened Alabama snow-wreath *(Neviusia alabamensis)* found populations stable at Crockford-Pigeon Mountain Wildlife Management Area in Walker County.

Staff also continued yearly population monitoring of Radford's mint *(Dicerandra radfordiana)*, a state-endangered species known to exist in only two locations along the north side of the Altamaha River in Georgia. This year's totals at Townsend Wildlife Management Area in Long and McIntosh counties, which has natural and outplanted populations, revealed a steep decline – from a record count of 7,544 individuals in calendar year 2021 to 538 in fiscal 2023. Hot, dry weather at the end of summer 2022 and more

competition from other vegetation in the Radford mint plots likely played a part.

Wildlife Conservation continued work, as well, with the Georgia Department of Transportation and the Fish and Wildlife Service to mitigate potential impacts to Camden County populations of Florida corkwood *(Leitnaria floridana)* in the footprint of roadwork on Ga. 40. In February 2023, staff collected dormant suckers to test methods for safeguarding plant materials. As construction plans are finalized, staff also will help draft mitigation plans for plant populations facing direct impacts from the construction.

In a similar situation in Chatham County, the agency teamed with the same agencies to mitigate roadwork effects on coastal bishopweed *(Ptilimnium ahlessii)* along Ga. 25. Seeds were collected from the site at the end of fiscal 2022 and the start of fiscal 2023. Staff are safeguarding this material until the construction is completed and plants or seeds can be returned to the site.

Natural Heritage Data

DNR is regularly adding to the knowledge base of which wild plant species occur in Georgia, where they are and how they are doing. This information is compiled by surveying habitats and species, collecting and identifying herbarium specimens, updating the Biotics database, assigning species rarity ranks, and using those ranks to set priorities for conservation actions. Staff work with Natural Heritage Network partners at NatureServe (www.natureserve.org) to keep skills sharp and communications up to date.

The two highlights for botanical Natural Heritage work in fiscal year 2023 were staff participation in the development of a prioritized list of Regional Species of Greatest Conservation Need for the southeastern U.S. and development of the Georgia vascular plant checklist.

Former Wildlife Conservation Section Chief Dr. Jon Ambrose, who retired during the fiscal year, considered the section's help in creating regional Species of Greatest Conservation Need lists for plants and animals as a primary goal. The purpose of the list for plants is to identify plant taxa of highest conservation concern, where responsibility for their conservation is centered in the Southeast. The list serves to focus conservation actions for species, foster interstate collaborations, provide justification for conservation funding and provide a foundation for states to develop their state-based lineup of plant Species of Greatest Conservation Needs. In particular, Recovering America's Wildlife Act, if passed and signed into law, would provide funding specifically for plant conservation in states that include the plants list in their State Wildlife Action Plan.

Development of the list for the Southeast was conducted by the Southeastern Plant Conservation Alliance and led by Atlanta Botanical Garden, NatureServe, Dr. Alan Weakley at the University of North Carolina Chapel Hill and Terwilliger Consulting Inc. For each candidate species, conservation concern was determined primarily by global and state conservation ranks developed by Natural Heritage and NatureServe biologists. Together with botanists from across the region, Wildlife Conservation submitted information on over 1,800 plant taxa for prioritization on the Regional Species of Greatest Conservation Need list. The agency's lead botanist, Lisa Kruse, served as the Georgia representative on the technical team focused on the list. Wildlife Conservation botanists also attended a three-day workshop with other state Natural Heritage botanists to rank species. Participants compared state data on species with outdated global ranks, considering and revising as needed those ranks for 71 species.

Updating Georgia's vascular flora checklist is an essential first step in understanding and prioritizing Georgia's diverse plant taxa for conservation actions. Although no such list for the state has been published since 1981, the checklist is the authoritative list of all vascular plant taxa (excluding mosses, liverworts and other non-vascular species) in the state. It is used as a baseline to calculate species conservation status ranks, inform which species will be tracked in Biotics and develop the Species of Greatest Conservation Need list for Georgia. In fiscal years 2022 and 2023, Wildlife Conservation's Natural Heritage botanist used "Flora of the Southeastern United States" and Biotics to create a new iteration of the checklist. Some taxa are inevitably questionable as to whether they occur in Georgia. Working with botanical contractors, staff searched references such as specimens in herbaria and taxonomic publications to determine those species status. This effort resulted in the addition of about 100 species to Biotics' list of tracked plants.

Also, in January 2023, Wildlife Conservation's botany team launched a digital tracked plants form so that members of the Georgia Plant Conservation Alliance and public can submit rare plant locations. Since then, the ArcGIS Survey 123 form has been used to update over 100 locations of rare plants in the state.

Safeguarding

For the most imperiled rare plants, safeguarding genetic material, augmenting populations and introducing populations are critical conservation actions. Safeguarding involves propagation by cuttings, seed or plants to ensure that Georgia-native genotypes are available to enhance natural populations or establish new ones in appropriate habitat in a species' historic range. Much of this work in the state involves the Georgia Plant Conservation Alliance, or GPCA, a vital conservation network.

A highlight in fiscal year 2022 was the awarding of nearly $780,000 for a Wildlife Conservation Section-led partnership to safeguard 14 imperiled plant species in Georgia. The U.S. Fish and Wildlife Service Recovery Challenge grant is boosting capacity for plant conservation at the State Botanical Garden of Georgia in Athens, Atlanta Botanical Garden and the Chattahoochee Nature Center in Roswell, as well as supporting the spread of their horticultural expertise and support to the members of GPCA. The overarching goal for the five years of grant-funded work is to develop genetically sound plant collections – living and seed-banked – in botanical gardens and in the wild, and to increase the GPCA's safeguarding capacity to better conserve these and other priority plants identified in Georgia's State Wildlife Action Plan.

In fiscal 2023, which included the second year of the grant, specific objectives were set for all 14 species. Needs recognized in the first year were addressed, especially regarding the need for data to develop safeguarding strategies that are more realistic for the biology and landscape context of the species. For example, occurrence status surveys were carried out for pondberry and Coosa (or Mohr's) Barbara's buttons to determine the highest-priority populations for propagule collection. Overall during the year, propagule collection objectives were developed for 12 species and carried out for 11.

Because of this project, GPCA collaboration continues to grow. The State Botanical Garden

led initiatives in fiscal 2023 to bring on new partners. New collections were established with three new partners: Trees Atlanta, Atlanta History Center and the Georgia Southern Botanic Garden in Statesboro. Outreach for potential safeguarding partners is ongoing with eight additional organizations, with a focus on increased communication with diverse partners in urban areas and south Georgia.

As part of their commitment to this effort, the state and Atlanta botanical gardens, Chattahoochee Nature Center, and DNR led or took part in over 29 training and coordination meetings specific to the project, sharing references and protocols throughout GPCA. Partners also worked toward consensus on standardizing safeguarding protocols. A critical goal is to develop best practices for using the internationally recognized Center for Plant Conservation guidelines in plant conservation. The work of these GPCA coordinators yielded an updated organization-wide meeting structure, new workflows and implementation of new technologies to share data.

As for safeguarding work involving specific species, the goal for hairy rattleweed – found globally in only two counties in coastal Georgia – is to collect and grow seeds from each of the plant's known occurrences. In fiscal 2023, DNR, State Botanical Garden and volunteers collected seed from three sites. One collection repeated an effort the previous year because the site is on industrial timberland and considered at risk. Seeds were added to long-term seed banks at the Atlanta and state botanical gardens. Unfortunately, all plants grown from seed collected in fiscal 2022 perished that next winter during an intense December cold front. Yet because an abundance of seed was collected from the timberland site, seeds from this location were re-sown in May 2023. As those plants increase, they will be shared for safekeeping with the Coastal Georgia Botanical Gardens, part of the University of Georgia in Savannah, and the Botanic Garden at Georgia Southern, and eventually planted onto state conservation lands.

Safeguarding for dwarf sumac in fiscal 2023 widened this species' horizons. The stable natural population at Lower Broad River Wildlife Management Area near Elberton was expanded by transplanting plants into an area where years of woody shrub removal by GPCA members opened the habitat. From this site, 12 male stems also were transplanted to Beech Hollow Farms, a native plant nursery in Lexington and Scottdale that has been safeguarding female dwarf sumac since 2021. If the males survive, they may successfully cross pollinate with the females and set seed. New GPCA member Trees Atlanta planted dwarf sumac on the Atlanta BeltLine in habitat managed as a meadow for native plants. These dwarf sumac will serve both as a public demonstration of conservation and a plant source for additional population restoration.

Wildlife Conservation and Atlanta Botanical Garden botanists visited nine sites with federally endangered black-spored and mat-forming quillworts. These long-lived, spore-reproducing perennials are extremely specialized organisms adapted to dramatically harsh environments. Living in pools on exposed granite outcrops, the plants are submerged through the winter and early spring and desiccate to a crisp on the dry, frying-pan-hot rock by May. At each occurrence, the biologists collected plants from various pools to keep live plants in safeguarding (at Atlanta Botanical Garden) and to analyze the genetic and morphologic diversity of the genus' pool-dwelling members in Georgia (via DNR collections). The genus *Isoetes* reaches the height of its diversity in Georgia, with copious hybridization. Taxonomy of the genus is far from settled. This work will allow scientists to better understand which quillworts live in Georgia, where they occur, how they are doing and how to tell them apart.

Federally threatened smooth coneflower *(Echinacea laevigata)* grows readily from seed and can be maintained in ex-situ collections at botanical gardens. For the Recovery Challenge grant, in fiscal 2023 the State Botanical Garden created seed collections from two occurrences and has the seeds in cultivation. Seeds also were sent to Atlanta Botanical Garden. One of these occurrences was thought to be extirpated until Georgia Power Co. biologist Jim Ozier rediscovered the population this year – with 15 mother plants considered vigorous enough to collect their seed.

As noted in the Surveys and Monitoring section, swamp pink in Georgia occurs naturally only at

Bee on smooth purple coneflower (USFWS)

a privately owned mountain bog. The landowner allowed Atlanta Botanical Garden to collect seed there in fiscal 2023. The garden's botanists also collected seed from four well-established, introduced populations of the plant, all of which originated from the single natural site. Ex-situ safeguarding for this species is optimal as a seed bank rather than using living collections.

Seed from all known occurrences of Tennessee yellow-eyed grass were collected in fiscal 2022. This past fiscal year, Atlanta Botanical Garden and Chattahoochee Nature Center worked on storing seed and creating living collections. The garden received seed from 102 mother plants at four different occurrences, with testing of the seed's viability revealing a 76 percent germination rate. The rest of the seeds were placed in long-term storage. The nature center will house the living collections. In 2023, staff there established about 11 plants derived from five sites.

For Virginia spirea, Chattahoochee Nature Center and Wildlife Conservation botanists worked with the Lula Lake Land Trust to survey and collect cuttings for propagation on the trust's property in northwest Georgia. In an unexpected but welcomed find, this federally threatened plant is locally common and flourishing at the private site. Reproduction by seed has not been documented for this species in Georgia; therefore, cuttings must be made in spring to propagate and increase populations in botanical gardens. The collections from fiscal 2023, plus those made the previous year at Cloudland Canyon State Park near Rising Fawn, are kept at Chattahoochee Nature Center and Atlanta Botanical Garden. In late spring 2023, a survey explored sites where the species could be introduced. The U.S. Fish and Wildlife Service requires that the species must be introduced into suitable habitat within its known natural range.

Endangered Canby's dropwort does not grow well in artificial collections, and GPCA partners have failed to keep this plant alive in botanical gardens. To safeguard genetic material, Wildlife Conservation botanists are collecting seed from wild populations in the species' cypress savanna habitat for a long-term seed bank at Atlanta Botanical Garden. In fiscal 2023, staff added seed from three populations in southwest Georgia.

Unfortunately, federally listed Clematis species (Morefield's leatherflower and Alabama leatherflower) have not yet produced seed in the wild during work supported by the Recovery Challenge grant. The goal for safeguarding these species also is to collect cuttings and increase the number of stems in botanical gardens. This has been done for Alabama leatherflower, with 48 of 50 cuttings surviving in fiscal 2023. However, cuttings from Morefield's leatherflower made in 2021 and 2022 had low survival rates, with only one plant remaining as of 2023. That effort continues, though. Chattahoochee Nature Center, which has expertise in Clematis species, is growing both.

Another pivotal safeguarding project is the introduction of multiple rare wetland plant species at Ohoopee Dunes Wildlife Management Area in Emanuel County. Populations are being restored in pitcherplant bog seeps, depression ponds and Ohoopee River floodplain swamps, all funded by a U.S. Fish and Wildlife Service Coastal Program grant. During fiscal 2023, the botany team led the final outplanting for the Ohoopee Dunes Safeguarding Project. This effort focused on four species of pitcherplants: purple *(Sarracenia purpurea var. venosa)*, yellow *(Sarracenia flava)*, hooded *(Sarracenia minor)* and parrot *(Sarracenia psittacine)*. About 300 total were provided by Atlanta Botanical Garden, which also helped with the planting, as did staff from the Fish and Wildlife Service, Wildlife Conservation, DNR State Parks and Historic Sites, and the southeast Georgia and parks prescribed fire crews.

Wildlife Conservation also worked to protect pineland lily, also commonly called sandhills lily *(Lilium pyrophilum)*. This GPCA priority plant is rare in Georgia, with only three known populations. Pineland lily grows along the ecotones of fire-maintained uplands and blackwater stream floodplains. Staff and volunteers have installed cages around the lilies at The Nature Conservancy's Broxton Rocks Preserve in Coffee County. The cages protect the plants from deer browsing, in hopes they survive to flower and produce seed. DNR, The Nature Conservancy and volunteers have been caging the lilies at Broxton Rocks for five years. Coupled with prescribed fire management in the adjacent uplands, the work has led to an increase in the population.

Plant Habitat Restoration

Imperiled rare-plant populations often require targeted stewardship to achieve recovery needs that are finer than broad-scale prescribed fire or timber management programs can address. These approaches include localized control of woody or invasive vegetation, excluding herbivores and small-scale controlled burning and hydrologic repairs. In fiscal year 2023, the Wildlife Conservation Section used this approach to help restore habitat for federally endangered Alabama leatherflower, dwarf sumac, Canby's dropwort, turkey beard and pineland, or sandhills, lily.

Georgia's only known natural population of Alabama leatherflower occurs at a state-owned site in Floyd County managed in partnership by DNR and the Georgia Department of Transportation. The primary threats to Alabama leatherflower are deer herbivory and the loss of open woodland habitat to encroaching trees and shrubs. Browsing by deer poses a significant threat at this site: It has prevented any leatherflower from setting fruit in the more than 10 years DOT has owned the property. Yet in fiscal 2023, deer fencing installed around the entire site (funded through a collaborative effort of DNR and DOT) allowed the population to triple in size, and hopefully will lead to fruit being set in fall 2023.

In late summer 2022, Wildlife Conservation implemented vegetation management at Woodward Canby's Dropwort Preserve near Vienna. Maples and gums were re-treated with a hack-and-squirt herbicide application. Work done by a contractor in 2019 failed because of the contractor's inexperience with treating wetland hardwoods. The preserve is a DNR-held conservation easement on private property, where DNR and the landowners regularly monitor the status of the dropwort and the cypress savanna habitat.

Staff helped with landowner outreach to advance a Wetland Restoration Enhancement Partnership with the Natural Resources Conservation Service to protect Canby's dropwort wetlands in Lee County. Legal issues involving the ownership of target properties have caused multi-year delays. The outreach objective: Maintain communication with landowners during the conservation easement acquisition process. That process is

Alabama leatherflower (Alan Cressler)

again moving forward and expected to close in fiscal 2024. Habitat restoration is also progressing at Neyami Savanna, a complex of cypress-savanna wetlands. DNR worked with Natural Resources Conservation Service foresters to initiate a timber thin to restore the site. Drought in fall 2022 dried the wetlands sufficiently to use logging equipment without affecting the sensitive wetland hydrology. Timber thinning is a milestone because dense, mature loblolly pine had turned the natural cypress savanna into a pine forest. Harvesting the pines was a goal for DNR and the landowners even before the federal agency became involved in 2017.

While only a single wild population of dwarf sumac remains, there have been several introductions to conservation lands over the years, all requiring monitoring and maintenance. At small sites where prescribed fire is not feasible, work by hand to maintain suitable conditions for the plant are required. Wildlife Conservation teams with GPCA to recruit volunteers. In fiscal 2023, maintenance continued at all safeguarding sites, including the Georgia Wildlife Federation's Alcovy Conservation Center in Newton County, Charlie Elliott Wildlife Center near Mansfield, the Gold Branch site on Chattahoochee National Recreation Area in Sandy Springs and Zoo Atlanta. The Zoo Atlanta plants are on a green roof at the Zoo's education facility. Recent work by a dedicated Zoo Atlanta horticulture specialist to revitalize the safeguarding site demonstrated how it remains a vigorous source of dwarf sumac for conservation. Other management included two prescribed fires in spring 2022, at Lower Broad River WMA and Panola Mountain State Park near Stockbridge.

In spring 2023, Wildlife Conservation's botany team coordinated a prescribed burn for state-protected turkey beard and open-oak woodlands on Dawson Forest Wildlife Management Area near Dawsonville. This burn by the Interagency Burn Team rated critical, and a number of people helped, including The Nature Conservancy's fire management officer, a U.S. Forest Service hotshot crew and a meteorologist from the National Oceanic and Atmospheric Administration.

Pitcherplant bogs, a rare Southeastern habitat, are also a focus of plant habitat stewardship. Wildlife Conservation works in mountain and Coastal Plain bogs, habitats different in origin and ecology.

Mountain Pitcherplant Bogs

Mountain bogs are one of the Southern Appalachians' rarest habitats. These wetlands are typically small, from a half-acre to 5 acres, and usually associated with seeps, springs and small creeks. However, they support a variety of unique flora and fauna, including the federally threatened bog turtle and swamp pink, possibly the state's rarest reptile and plant species, respectively. Endangered green pitcherplants also occupy wet meadows in the seeps. Other rare and state-protected mountain bog plants include mountain purple pitcherplant (petitioned for federal listing), broadleaf white meadowsweet, Carolina bog laurel, Canada burnet, Cuthbert's turtlehead, marsh bellflower and various orchid species.

Work to restore and maintain mountain bogs is spearheaded by Atlanta Botanical Garden, on behalf of the Georgia Plant Conservation Alliance. Target sites include eight mountain bogs – and one upper-Piedmont prairie/woodland site – in northeast and north-central Georgia. Activities vary from habitat mapping, rare plant monitoring and seed collecting to on-site planning meetings and management of priority habitats containing sensitive plants and animals. This work includes monitoring feral hogs and planning mitigation following hog damage at sites, as well as general habitat enhancements through removing invasive species and restoration activities. In calendar year 2022, which included half of fiscal 2023, GPCA held 25 workdays totaling 153 days of labor by partners and volunteers.

Coastal Plain Pitcherplant Bogs

Georgia's Coastal Plain herbaceous bogs are small but rare jewels, remnants of wide expanses of seepage slopes and savannas that once spanned the landscape. These bogs face threats such as hydrologic disturbance, fire suppression and land development. Many species of Southeastern Coastal Plain bogs, including pitcherplant and orchid species, are safeguarded by Georgia Plant Conservation Alliance partners.

Inventorying high-quality bog sites in the Coastal Plain has been ongoing since 2018. The aim is to prioritize bogs for habitat restoration and permanent protection, resulting in the recovery of multiple high-priority plant and animal species.

A database of 58 Coastal Plain pitcherplant bog sites was developed using the NatureServe Biotics database (which the Wildlife Conservation Section manages in Georgia), the Southeastern Regional Network of Expertise and Collections, and the knowledge of GPCA partners. The database is a reference to prioritize bogs for conservation. Planned actions include detailed species inventory, searches for high-priority animals, description and classification of the plant communities, landowner outreach, and habitat restoration.

Prescribed fire is a critical tool for restoring Coastal Plain bogs, primarily because the wetland plants cannot tolerate heavy shading from woody species. The Interagency Burn Team is an essential resource. The team's flexibility and expertise is crucial for the technical burns required at these small but significant sites.

As part of this work, a flagship long-term project is conserving the state's only known site for Coastal Plain purple pitcherplant, a bog complex in southeast Georgia. The bogs are home to five other protected plant species, and they also feature gopher tortoises, Georgia's state reptile. The bogs are in adjacent drains owned by five landowners. The Wildlife Conservation Section coordinates with each landowner to monitor and restore the bogs along a powerline right of way.

Work at the site began in 2006, and the results demonstrate the effectiveness of partnerships and consistent landowner outreach in concert with the Interagency Burn Team, GPCA, Atlanta Botanical Garden, Georgia Power Co., Georgia Botanical Society and the Georgia Native Plant Society. In fiscal year 2023, a spring prescribed burn was conducted by the southeast Georgia fire crew and Wildlife Conservation staff at a site where several hundred purple and trumpet pitcherplants were outplanted in 2019. This burn marked the second conducted at the site, which is not formally protected. Instead, the site is conserved by agreement with the landowners, who have killed their planted pines on about 10 acres to contribute to the restoration. The burn was successful at minimizing scorch on the adjacent timber trees while killing back shrubs to open the wetland habitat below.

Yellow pitcherplants in a Coastal Plain bog (Alan Cressler)

Also in fiscal 2023, Wildlife Conservation continued work with the Georgia State Parks and Historic Sites Division to monitor and steward a critically important bog at Jack Hill State Park in Reidsville. The bog is significant for its vigorous population of sweet pitcherplant, the largest population in Georgia's southeastern Coastal Plain. Most protected sites for sweet pitcherplant are in the western Fall Line sandhills region of the state. Infrastructure for prescribed fire was planned and installed, but lack of parks staff to conduct the burn postponed it.

In the same southeast Georgia region, Wildlife Conservation began restoration of a second seepage bog with sweet pitcherplant and a critically imperiled witch-alder (Fothergilla species) on private property. The landowner is working to restore adjacent longleaf-pine sandhills, but the pitcherplant habitat had not been burned for over 20 years. In an Interagency Burn Team effort, the Orianne Society and Wildlife Conservation conducted a prescribed burn in the wetlands, which were overgrown with dense titi and other shrubs.

Since fall 2020, DNR has collaborated with Chemours Co. and the University of Georgia Marine Extension and Georgia Sea Grant Coastal Ecology Lab to mitigate potential impacts of Chemours' Mission Mine in Charlton and Brantley counties on parrot and hooded pitcherplant populations. Most of the more than 500 pitcherplants rescued from the site in 2020 and cared for by volunteers Amy Heidt and Paul Sumner were replanted – 200 at DNR's Baptisia Tract in Wayne County, 150 in a bog at Laura S. Walker State Park in Ware County, 30 at General Coffee State Park near Douglas, 20 in the formal garden at Altama Plantation Wildlife Management Area in Glynn County and 150 back at the Mission mine. There are plans to plant the remainder in managed roadside seepage bogs along the entrance drive to Okefenokee Swamp Park.

Partnerships for Protection

Georgia Plant Conservation Alliance

The Georgia Plant Conservation Alliance, or GPCA, is an innovative network of 60 public gardens, government agencies, academic institutions, utility companies and environmental organizations committed to preserving Georgia's endangered flora. Formed in 1995 with the Wildlife Conservation Section as a charter member, the GPCA initiates and coordinates efforts to protect natural habitats and endangered species through biodiversity management, public education and rare plant propagation and outplanting (i.e., safeguarding).

Member organizations are engaged in recovery projects involving 114 imperiled plant species. All are state-listed, 25 are federally listed and 13 are under federal review. Seventy-nine of the species are critically imperiled in the state (each has an S1 ranking), reflecting GPCA's standard of prioritizing the recovery of Georgia's imperiled populations. As of fiscal year 2023, 100 are in safeguarding programs at botanical gardens, arboreta and seed banks, and 55 have been successfully reintroduced into the wild. GPCA has 11 safeguarding partner institutions that hold and manage ex-situ collections for recovery and study.

As in fiscal 2022, the Recovery Challenge Grant from the U.S. Fish and Wildlife proved a primary support for GPCA coordination in 2023. Each spring GPCA has five regional meetings, led in part by the Wildlife Conservation Section's botany team. Project planning for the 2023 field season reviewed how the GPCA prioritizes species projects, submits annual project updates and how member field reports are integrated into Biotics, Georgia's rare species database. Twenty-seven years of GPCA field notes have been transcribed into spreadsheet format. The coordination support via the grant provides for better data sharing, meeting planning, volunteer coordination and resource allocation, increasing GPCA's productivity in fiscal 2023.

This year, these meetings to discuss goals involving 114 species for the upcoming field season took place in person in each region and were hosted by the U.S. Fish and Wildlife Service, Atlanta Botanical Garden, Chattahoochee Nature Center, the State Botanic Garden of Georgia and by DNR (at Wildlife Resources Division headquarters in Social Circle). DNR facilitated the meetings. A virtual option allowed GPCA members throughout the state to join.

DNR staff collect Georgia alder fruits with Georgia Power's Jim Ozier (Mincy Moffett/USFWS)

Jennifer Ceska, State Botanical Garden conservation coordinator, worked with partners less familiar with safeguarding living collections, providing materials and consultation to Kennesaw State University's Georgia Department of Transportation Research Station and the University of North Georgia's botany greenhouse on the school's Gainesville campus. Ceska helped the university select species for safeguarding, set up raised beds and establish tracking and monitoring protocols, bringing them into the fold as GPCA horticulture conservation partners. Another milestone was recruiting the Botanic Garden at Georgia Southern to partner with GPCA in safeguarding hairy rattleweed and host GPCA's first regional training workshop for horticulture partners newer to plant conservation. We are building training and capacity for safeguarding indexed collections in Georgia. GPCA partners in attendance included Kennesaw State, Beech Hollow Farms and the Jones Center at Ichuaway. GPCA partners serving as instructors included staff from Atlanta Botanical Garden, State Botanical Garden and Chattahoochee Nature Center.

Via GPCA, DNR is an active and key collaborator in the local and regional professional plant conservation community. Wildlife Conservation botanists help coordinate GPCA – one serves as assistant to the network's lead coordinator – and take part in GPCA meetings.

Throughout fiscal 2023, DNR and many other GPCA partners worked with Georgia Public Broadcasting to create a video showcasing their joint conservation efforts in the state. In spring 2023, Wildlife Conservation staff joined Georgia Power Co. staff at the only known location of Georgia alder (*Alnus maritima ssp georgiensis*) and provided on-camera interviews about the importance of safeguarding species. The video "Save a Plant" was released in summer 2023 and serves as a helpful resource that showcases GPCA's work.

Roughly during the fiscal 2023 timeframe, the network added 31 new volunteers and compiled over 600 hours of plant conservation. Workday sites encompassed an array of places, from Zoo Atlanta to Resaca Battlefield in northwest Georgia and Ohoopee Dunes Wildlife Management Area near Swainsboro in the Coastal Plain. Actions for priority species that are not listed included surveys for historic plants such as Porter's goldenrod (*Solidago porteri*) and

finding new populations of critically imperiled Smith's sunflower (*Helianthus smithii*). The shared knowledge gained from these networking groups brings on-the-ground conservation experience to DNR, which, in turn, supports the review and establishment of priority conservation actions for Georgia's listed, at-risk and imperiled plant species.

GPCA innovations in fiscal 2023 included:

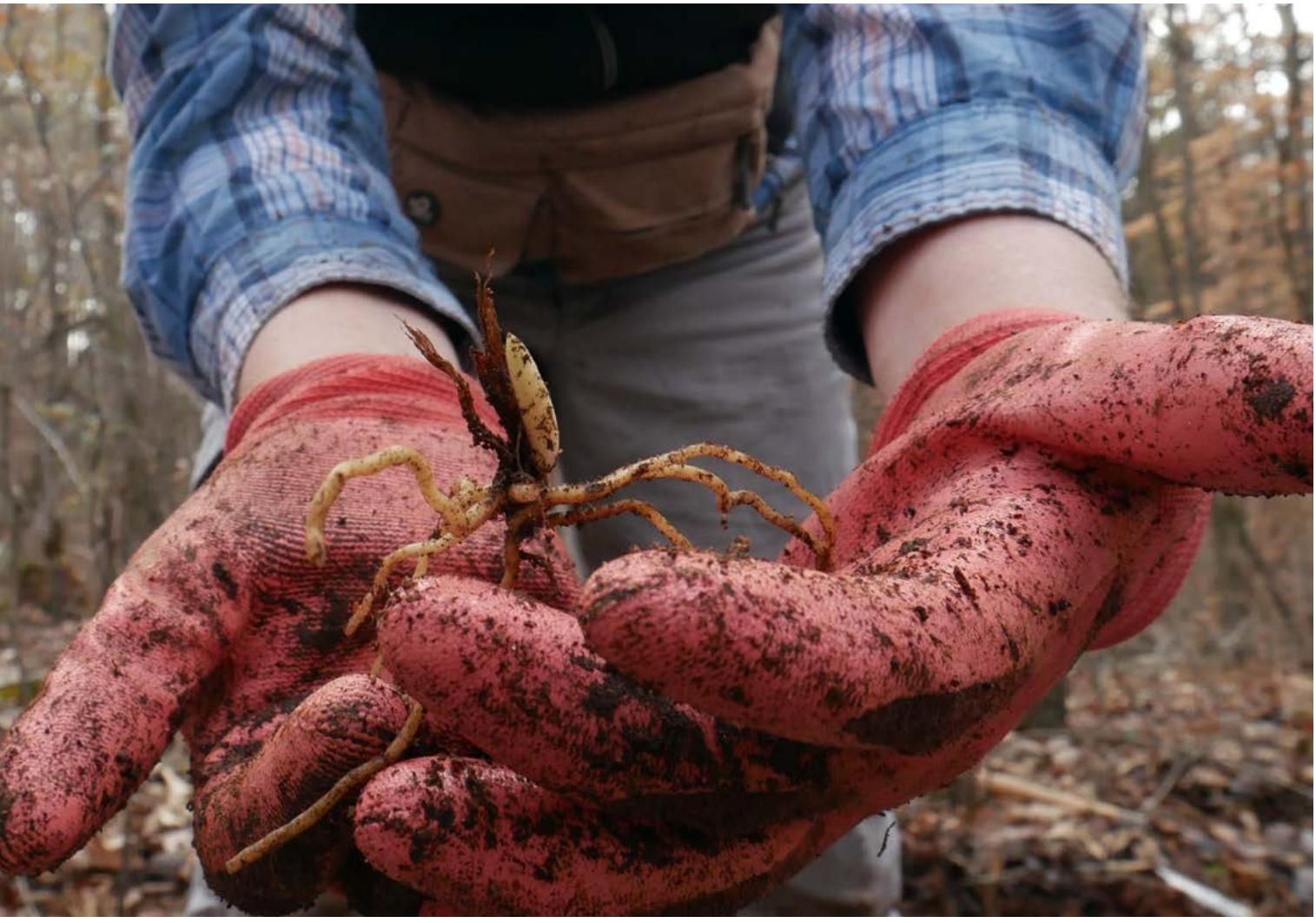
- A travel scholarship to the annual GPCA conference, funded by partner organizations to allow non-professional members to attend without financial restraints.
- The first in-person GPCA symposium since the outbreak of COVID-19, held in Brunswick and hosted by DNR.
- Development of an anti-poaching protocol to reduce the risks of sensitive-data sharing and address plant poaching.

Agency Partnerships

Public-private partnerships are critical to conservation because most land in Georgia is privately owned. The Wildlife Conservation Section works with landowners who have high-quality and critically imperiled rare-plant communities. Through federal Endangered Species Act grants, DNR provides crucial support to landowners with federally listed and at-risk plant species.

In fiscal year 2023, botanists presented on Tennessee yellow-eyed grass and its associated rare habitat at Tellus Science Museum's Lunch and Learn program. DNR is working to develop a relationship with the Cartersville museum to serve as a safeguarding site for a nearby population of the endangered species that has been significantly changed by highway construction. Also this year, Wildlife Conservation botanists, U.S. Fish and Wildlife Service biologists and Georgia Plant Conservation Alliance volunteers worked with landowners at two sites for at-risk Georgia indigo bush (Amorpha georgiana var. georgiana). One site was discovered in 2021. Both have since been treated with prescribed fire specifically to restore habitat for the species. For Canby's dropwort, restoration of cypress savanna habitat is ongoing at the recently protected Woodward Canby's Dropwort Preserve, a private site with a DNR-held conservation easement in Vienna.

Another critical plant conservation focus is utility and highway rights of way, where remnant rare habitats persist in the opened areas. Communication with partners such as Georgia Power and the Georgia Department of Transportation is critical to protecting these sites. Maintenance that is not well-planned or coordinated regarding plants and habitats can have negative impacts. DNR and DOT have renewed



Transplanting pink lady's slipper orchids (Ethan Hatchett/DNR)

their emphasis on improving data collection and communications regarding such sites.

One focus of DNR's collaboration with DOT is protecting and managing designated Environmentally Sensitive Areas in DOT rights of way. Standard management of roadside rights of way can affect or extirpate protected plant populations. Communicating and providing protection for rare plants in these sensitive areas is challenging, in part because of the many levels of staff between management planning and DOT staff or contractors who do the work in the field. DOT has strengthened efforts to improve coordinating the management of environmentally sensitive areas, leading to effective communication with DNR and positive results for rare plants. DNR biologists, including botanists, have collaborated with DOT in this effort. The botany team provides plant survey data and recommendations for managing protected plants at these sites.

DNR also is leading on stewardship of high priority conservation properties owned by DOT. Wildlife Conservation botanists have a long-term collaboration with DOT on habitat restoration for Tennessee yellow-eyed grass. Outplantings were done at Interstate Hypericum Springs, a site highly impacted at an Interstate 75 exit in Bartow County. In fiscal 2023, the agencies co-led four workdays targeting removal of woody plants. Initial results were successful with hundreds of germinants counted. Unfortunately, the increase in light had the unforeseen side effect of expanding the exotic invasive plant Japanese stiltgrass. DNR and DOT plan to target the stiltgrass using a combination of hand pulling and herbicide.

DOT also coordinates with DNR when protected plants will be affected by construction projects. DNR consults on the determination of plant relocation methods and frequently works at sites with DOT ecologists or contractors to help ensure that relocation protocols, which can be complicated for sensitive species, are understood.

DOT relocations for pink lady's slipper orchid are frequent in the Piedmont because this species is relatively common in that area compared to other protected plant species. As DOT projects expand around metro Atlanta, impacts on the orchid are increasing. In 2022 and 2023, DNR led a large pink lady's relocation project for DOT. The project is exceptional because all of one of Georgia's largest populations and its habitat will be affected by Ga. 400 construction in Alpharetta. One of the last patches of intact woods in the area contained over 1,000 plants. Because the impact rated so significant, possibly affecting the species' status statewide, DOT paid DNR a mitigation fee and turned over responsibility of the relocation to the agency. Wildlife Conservation collaborated with orchid experts at Atlanta Botanical Garden, the North American Orchid Conservation Center and Longwood Gardens in Kennett Square, Penn., to research methods for determining relocation sites and methods.

These orchids have a critical relationship with soil mycorhhrizal fungi that must be preserved during transplanting. Their soil fungi are relatively common in Georgia's Piedmont and mountain regions, giving the orchids a good chance for succeeding in their new homes at Dawson Forest Wildlife Management Area near Dawsonville and Chattahoochee Bend State Park near Newnan.

In November 2022, DNR completed phase two of this pivotal relocation, moving the last 175 of the 1,000 plants in the largest known effort for pink lady's slipper in Georgia. The work was done under the leadership of Ron Determann, retired conservation horticulturist from Atlanta Botanical Garden, and DNR's botany team. For the final phase, DNR worked with the Chattahoochee Nature Center and staff at the University of North Georgia in Dahlonega. Instead of being planted on state properties, these plants will be on display in suitable habitat at the Roswell nature center and on a biological research property at the university. UNG ecology professors also will engage students to monitor the plantings at both the school and at Dawson Forest WMA, adding to the rescue and recovery story of these pink lady's slippers.

In 2021, DNR and DOT began exploring avenues for the Georgia Native Plant Society to help with rescues of high-priority unprotected species. DOT ecologists have diligently worked through liability and coordination concerns and DNR has networked with the Native Plant Society. Fiscal 2023 was the second year of relocations following these new protocols. Georgia Botanical Society has joined the partnership and led two rescues — one for hooded pitcherplants and one for Simpson's rain lily on the coast near Brunswick. The Native Plant Society helped plan a large hooded pitcherplant relocation that will take place in fall 2023 on a highway right of way near Valdosta.

DNR's formal partnership with the U.S. Fish and Wildlife Service since 1985 enabled Wildlife Conservation to receive federal grants to conduct conservation actions for federally listed and at-risk species. The grants provide critical funding for plant conservation. DNR botanists are currently assisting the Fish and Wildlife Service with surveys and status review of three at-risk species: sunfacing coneflower *(Rudbeckia heliopsidis)*, cilate-leaf tickseed *(Coreopsis integrifolia)* and ten-lobe purple foxglove *(Agalinis decemloba)*.

The federal Natural Resource Conservation Service is a critical partner in outreach to private landowners for conservation. As referenced in other sections, Wildlife Conservation botanists are working with the federal agency to protect wetland habitats of endangered Canby's dropwort. In the past decade, two wetlands were protected through this partnership under the agency's Wetland Reserve Easements program. Another project started in 2018 and still ongoing is aimed at protecting and restoring 800 acres of privately owned wetlands around the state's Neyami Canby's Dropwort Tract, which DOT bought in 2000 to protect Canby's dropwort. Complex real estate issues halved the total acreage initially targeted, but closure on conservation easements is expected in fiscal 2024.

Also during fiscal 2023, DNR and the U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program started a collaborative project to conserve habitat for Tennessee yellow-eyed grass on private property. Project goals are to protect the species' sensitive wetland habitat from cattle and exotic invasive plants. Steps taken this year included a survey of private sites with suitable habitat and initial contacts with landowners.

Milkweeds and Migratory Butterflies

Wildlife Conservation Section staff completed the final year of the five-year migratory butterfly monitoring project with partners in the Butterflies of the Atlantic Flyway Alliance. Long-term monitoring plots were checked weekly from mid-August to mid-November to quantify the number of monarchs, Gulf fritillaries and cloudless sulphur butterflies migrating through habitats at Altama Plantation Wildlife Management Area near Brunswick. Data was also gathered on nectar behavior to document butterfly plant interactions, centering on monarchs, Gulf fritillaries, cloudless sulphurs, painted ladies, long-tailed skippers and buckeye butterflies. This work is part of a larger, multisite data-collection effort on the coast to determine which coastal habitats and places are the most important for these migratory species.

Little is known about the relative importance of the Atlantic Flyway for migratory butterflies, especially monarchs, a species considered for listing under the Endangered Species Act. This project will help inform management activities to conserve migratory butterflies. As part of the effort, staff created and maintained an online data entry portal used by project partners to submit weekly data.

Unanswered questions about monarchs that remain in Georgia and other Southeastern states during winter also prompted research. Wildlife Conservation partnered with other organizations studying monarchs – the University of Georgia Odum School of Ecology, Monarchs Across Georgia and Journey North – to explore why some monarchs do not migrate to Mexico. The group asked the public to report observations from December through March. In response, thousands of reports and photographs were submitted throughout the Southeast. As in the past year, some marked winter breeding sites, most of which had tropical milkweed growing.

DNR continued to survey for monarch overwintering sites. This effort involved working with wildlife management area staff to address best practices for overwintering monarchs, as well as during the rest of the year.

Monarch butterflies (Alan Cressler)

Ginseng Management

The export of American ginseng is regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, an international agreement administered in America by the U.S. Fish and Wildlife Service. In Georgia, ginseng exports are authorized by that agency in concert with the Georgia Ginseng Protection Act of 1979.

In order to have a legal ginseng trade in Georgia, the Fish and Wildlife Service requires the state to maintain a ginseng management program that ensures compliance with federal and state regulations. The objective is to prevent this perennial forest herb from becoming endangered because of trade. Demand for ginseng is high in natural medicinal markets and in Asian medicine. The Wildlife Conservation Section administers the Georgia Ginseng Management Program, which monitors the harvest and sale of ginseng. Staff work with ginseng dealers, growers, the DNR Wildlife Resources Division's Game Management Section and DNR's Law Enforcement Division to make ginseng regulations, and meeting those regulations, transparent and simple.

In calendar year 2022, the dealer-reported wild ginseng harvest in Georgia totaled slightly more than 118 pounds dry weight. This amount is 40 percent lower than the 2021 harvest of about 196 pounds. On average, dealers paid $725 a pound for Georgia-harvested ginseng in 2022.

Populations of wild ginseng face pressures including legal harvest, poaching, consumption by deer and habitat degradation. Knowing how these populations are faring will help determine the sustainability of Georgia's ginseng trade. Results indicate that ginseng is likely declining in the state.

Due to declining American ginseng populations across the Southeast, starting in 2023 the U.S. Forest Service will no longer allow any harvest of American ginseng in the entire Southeastern region. However, Native American tribes are still allowed to request a collection permit on National Forest lands.

The cultivated ginseng trade is not significant in Georgia overall, but cultivated ginseng is encouraged in the state as one strategy to relieve pressure on wild populations. Most of the ginseng harvested in the U.S. is exported to China, although local interest in Georgia ginseng

for personal use has increased. Georgia is at the southern edge of the plant's distribution, and the trade is much smaller here than in states like North Carolina and Kentucky, where annual ginseng exports total millions of dollars.

Habitat Conservation and Monitoring

Wildlife Conservation Section botanists play a critical role in habitat conservation through habitat mapping for land protection and management planning, often providing guidance in prioritizing areas for conservation and establishing habitat management guidelines. Staff also conduct vegetation monitoring to track changes resulting from DNR Wildlife Resources Division habitat restoration projects.

Habitat Conservation

In fiscal year 2022, the Wildlife Conservation Section began work with Forest Investment Associates on a DNR Forestry for Wildlife Partnership project that will benefit Chapman's fringed orchid in Camden County. This rare species, a high priority in Georgia's State Wildlife Action Plan, is known from only a few small, roadside populations in the southeast Georgia county. Forest Investment Associates, or FIA, manages 18,000 acres in the heart of the plant's range, and surveys in 2021 discovered a population of 20 flowering plants in a loblolly pine stand in the tract's interior.

The company has partnered with DNR and Jacksonville (Fla.) Zoo and Gardens to improve habitat for the orchid on the tract and an adjacent roadside, where there is another small population. In fiscal 2023, FIA coordinated with Wildlife Conservation on a timber harvest that returned sunlight to the roadside plants and expanded the orchid management area. The company will use mowing, thinning and prescribed fire to benefit the species at both populations.

Fiscal 2023 also proved a big year for habitat conservation on Canoochee Sandhills Wildlife Management Area near Pembroke. This WMA in Bulloch and Bryan counties supports populations of gopher tortoises and federally listed eastern indigo snakes, as well as other rare species such as hooded pitcher plants, which were discovered there in 2022.

Wildlife Conservation Section hired a wildlife technician to manage the area in fiscal 2022. This staff member, who is primarily responsible for habitat management, made significant headway in reintroducing prescribed fire to the WMA, including 628 acres of first-entry burns in 2022 and 2,355 acres in fiscal 2023. The hurdles to applying prescribed fire on a new property are numerous, from surveying proposed burn units, planning burns, installing fire breaks, rehabilitating plowed breaks and developing relationships with adjacent landowners. In only the second year with staff on site, the goal of annually managing at least a third of Canoochee's burnable acres with fire was achieved in 2023

Habitat Monitoring

Monitoring is key to tracking changes in habitats and measuring biological diversity and habitat suitability for rare wildlife species. Quantifying the changes resulting from DNR's rare species and habitat restoration efforts helps gauge the impact of the work and guide future management. A critical component of monitoring restoration efforts is documenting biodiversity and habitat suitability before and after. This comparison applied in wetland restoration efforts in south Georgia allowed biologists and land managers to evaluate and critique different restoration techniques to determine which were the most cost effective and efficient. The overall answer depended heavily on initial wetland conditions.

Wetlands across three conservation properties in south Georgia were selected to restore suitable habitat for the state-rare gopher frog, but restoration also will benefit amphibian communities as a whole. Wetlands favoring a diverse amphibian community support a rich understory of grasses and herbaceous forbs, providing structure that facilitates amphibian movement in and out of wetlands, provides vertical substrate for egg masses, and supports a diverse insect community for food.

Work included measuring the habitat structure in 2019, then monitoring conditions in 2022 following one of three restoration treatments: prescribed fire or treating canopy hardwood trees with either herbicides or mechanical removal.

Wetlands that demonstrated favorable responses showed reduced canopy tree cover, increased light availability to the understory, and a shift favoring a more grass-dominated wetland basin. Before and after comparisons revealed that chemical treatments were the most successful in achieving this habitat structure, followed by mechanical then prescribed fire activities. Ultimately, wetlands with dense canopy tree or shrub layers will need more aggressive treatments such as chemical applications to reduce shaded conditions. In less closed canopy conditions, mechanical or prescribed fire are more cost-effective tools in achieving similar habitat openness. This comparison helps land managers select a restoration technique based on restoration goals and initial wetland conditions. Restored wetland habitat structure can then be maintained with routine prescribed fire.

Monitoring can also be a long-term objective and provides the ability to apply an adaptive management approach to land management. In a multistate sandhills and upland longleaf pine ecological restoration project, DNR evaluates the effectiveness of various restoration and management tools and methods over time. A diverse understory is critical in the restoration process: Herbaceous groundcover dominated by grasses, legumes and other forbs helps carry fire through this fire-maintained habitat, favors pine seedling regeneration and provides forage and structure beneficial for wildlife. With all properties at various stages of restoration, long-term monitoring helps tailor management decisions based on individual properties responses and speed of recovery.

Measured on a three-year rotation, fall 2021 marked the fifth round of sandhills sampling. Data collected across the years indicate that tree canopy density is easy to restore through thinning, but the diversity of the understory can be slow to respond. Recent analyses demonstrated some sites requiring additional thinning to favor understory growth, with others in recovery with increasing understory diversity with every sampling event. Some achieved a restored state and understory structure that is strongly linked to the time since the most recent fire. Cyclical long-term monitoring also can highlight shortcomings, such as in some sites where the canopy was reduced but the understory is not responding as expected. In these cases, adaptive management approaches should be considered, either with a more aggressive fire management plan or supplemental seeding and outplants.

Ceylon WMA photo plot shows before and after improvements from prescribed fire (DNR)

Photo monitoring points provide a less time-consuming, yet powerful monitoring tool that provides visual progress of management activities. Using the ¨a picture is worth a thousand words¨ approach, photo monitoring provides a quick and easily digestible visual, not bogged down by numbers, figures and a strict resampling protocol. This monitoring technique has promoted the benefits of restoring and managing lands with prescribed fire in the Fire Photo Monitoring Project, ongoing since 2009.

Thousands of photos taken before and after prescribed fire events captured the opening of the canopy, the positive response of the understory community and the increase in biodiversity. These responses are documented across all regions in Georgia. No monitoring effort could more effectively document the importance of good fire management in the state. In fiscal 2023, staff at Ceylon Wildlife Management Area in Camden County installed monitoring plots to join this project and record baseline data for the relatively new WMA.

Sandhills Conservation

Four competitive State Wildlife Grants in Georgia and other states benefited sandhill and upland longleaf pine habitats that support gopher tortoises and other priority species. Efforts supported by the fourth grant were completed on June 30, 2022.

DNR received the first grant, for $1 million, in 2009 to work with Alabama, Florida and South Carolina on restoring high-priority sandhills. DNR and state wildlife agencies in Florida, Alabama, Mississippi and Louisiana were awarded a $981,000 State Wildlife Grant in 2011 for additional habitat restoration on the targeted habitats. In fall 2015, Georgia, Florida, Alabama, South Carolina, Mississippi and Louisiana began phase three with the award of another competitive State Wildlife Grant for $500,000. And in late 2018, Georgia, Alabama, Louisiana and South Carolina received a $407,500 grant for phase four.

In the first phase, all states exceeded their project goals and nearly tripled the original goal for overall acreage treated (95,000 acres treated vs. the 38,600 acres proposed). Restoration goals were again exceeded in phase two, with 76,666 acres treated versus the goal of 51,575. This work is expected to yield significant habitat benefits – largely through improvements in herbaceous understory coverage – for priority species such as the gopher tortoise and northern bobwhite. Phase three, covering three years, restored or enhanced 50,653 acres of sandhill or upland longleaf habitat across the six states in the gopher tortoise's range. This exceeded the project goal of 33,000 acres. Achievements in Georgia included prescribed burning on 9,878 acres and replanting longleaf pine on 1,084 acres.

For phase four, the states treated more than 20,000 acres with prescribed fire, restoring more than 100 acres of native groundcover, controlling hardwoods and invasive species on 691 acres, and planting 385 acres of longleaf pine. Habitat monitoring work and summaries are being compiled for a final report.

Native Groundcover Restoration

While benefiting all wildlife, restoring native groundcover can be vital to restoring rare species and the habitats they require. As part of that effort, in fiscal year 2023 the Wildlife Conservation Section harvested southern wiregrass seed from Moody Forest Wildlife Management Area near Baxley and private land in Wheeler County. Staff

also harvested wiregrass seed from a naturally occurring stand at Ceylon Wildlife Management Area near Woodbine, marking the first harvest from a state coastal property and including not only wiregrass but also other obligate species such as blazing star, goldenrod, dropseed and Florida toothache grass. This seed, along with the seed from Moody Forest WMA and the Wheeler County site, was returned to Ceylon and used in wiregrass restoration efforts near the harvest site. Some of the Ceylon wiregrass seed also was sown in the former airstrip on Altama Plantation Wildlife Management Area in Glynn County. Staff distributed the seed using a hay blower DNR recently acquired through funds from the Georgia Outdoor Stewardship Program.

The Nature Conservancy, a key conservation partner, harvested approximately 80 pounds of native groundcover seed (primarily wiregrass) at Moody Forest from previous wiregrass restoration areas in the powerline right of way and forested areas. This seed will be used to further improve native groundcover restoration in old fields and pastures across the WMA.

As part of a long-term coastal groundcover restoration project on Altama, Wildlife Conservation and Game Management Section staff planted about 58,000 wiregrass plugs in 12 acres of old airstrip and former garden areas in 2020. The plants came from Moody Forest WMA. Wildlife Conservation is managing the sites to reduce the presence of bahiagrass and transition them to prescribed burning. In ideal conditions, viable seed could be harvested in three to four years. In April 2022, an additional 10,000 wiregrass plugs were planted in a managed pine stand at Altama.

Also at Altama, staff are converting a former 5-acre vegetable garden into a native groundcover nursery. The seeds of more than 40 different native forbs, legumes and grasses were collected locally. The focus is on seed from areas in the South Atlantic Coastal Plain plant-transfer zone, with a priority placed on collections in the Altamaha Conservation Corridor. A shade house serves as the propagation area for target species. Drift fencing was installed around the perimeter to reduce impacts to and from wildlife. New main irrigation lines and risers also have been installed. Private donations proved crucial to funding the shade house and the irrigation updates.

Seeds collected are grown in plugs, then transplanted into planting rows. Using a large crew of volunteers with the Georgia Plant Conservation Alliance, planting began in fall 2022. The mix of species was selected for flowering throughout the growing season, offering cover and food for northern bobwhites and gopher tortoises as well as nectar and host material for pollinators. Once established, seeds will be harvested and provided to DNR and partner conservation lands in the Altamaha Conservation Corridor, where the diversity of groundcover is low.

Grants from The Environmental Resources Network, or TERN, friends group of Wildlife Conservation, along with support from private donors and the Georgia Outdoor Stewardship Program are funding additional needs such as a storage shed, drip irrigation, biodegradable mulch film, seed harvesting and planting supplies.

In southwest Georgia, Wildlife Conservation collected 120 seeds from a sundial lupine patch on Silver Lake Wildlife Management Area near Bainbridge. Sundial lupine (Lupinus perennis) is the host plant for the imperiled frosted elfin butterfly. In partnership with Tall Timbers biologists, staff replanted the seeds in five plots on the WMA. The hope is to establish substantial patches of sundial lupine so that frosted elfins can be reintroduced to Silver Lake.

Staff use a hay blower to sow wiregrass seed at Ceylon WMA (Marylou Horan/DNR)

Prescribed Fire

Prescribed fire is one of the best, most cost-effective tools for conserving and restoring fire-adapted habitats. Burns mimic lightning-set fires and help numerous species of conservation concern. Prescribed fire is used in conjunction with other land-management techniques – such as removing invasive species, planting native species and thinning timber – to improve natural habitats on public and private lands. It is a safe way to apply a natural process, ensure ecosystem health and reduce the risk of wildfire.

The resiliency of ecosystems and air quality issues proved hot topics in fiscal year 2023. Wildlife Conservation Section fire leaders were heavily involved in discussions through the Georgia Prescribed Fire Council, the Interagency Burn Team, the Longleaf Conservation Partnership and the Prescribed Fire Working Group of the Southeast Regional Partnership for Planning and Sustainability. The agency remained engaged as a stakeholder in the proposed lowering of the national air quality PM2.5 standard for fire-related emissions, which could have significant impacts on the ability to conduct prescribed burning. Wildlife Conservation advocated for prescribed burning in the EPA's review, participated in air quality forums and educated DNR burn bosses about smoke management and air quality monitors, which included developing a new GIS tool.

Staff also helped other states develop collaborations through a Southern Fire Exchange webinar on building a successful memorandum of understanding based on the Georgia Interagency Burn Team. Wildlife Conservation helped organize the two Georgia Prescribed Fire Council meetings and record presentations for posting online. The agency's prescribed fire webpage was revamped to make resources easily available to landowners and land managers.

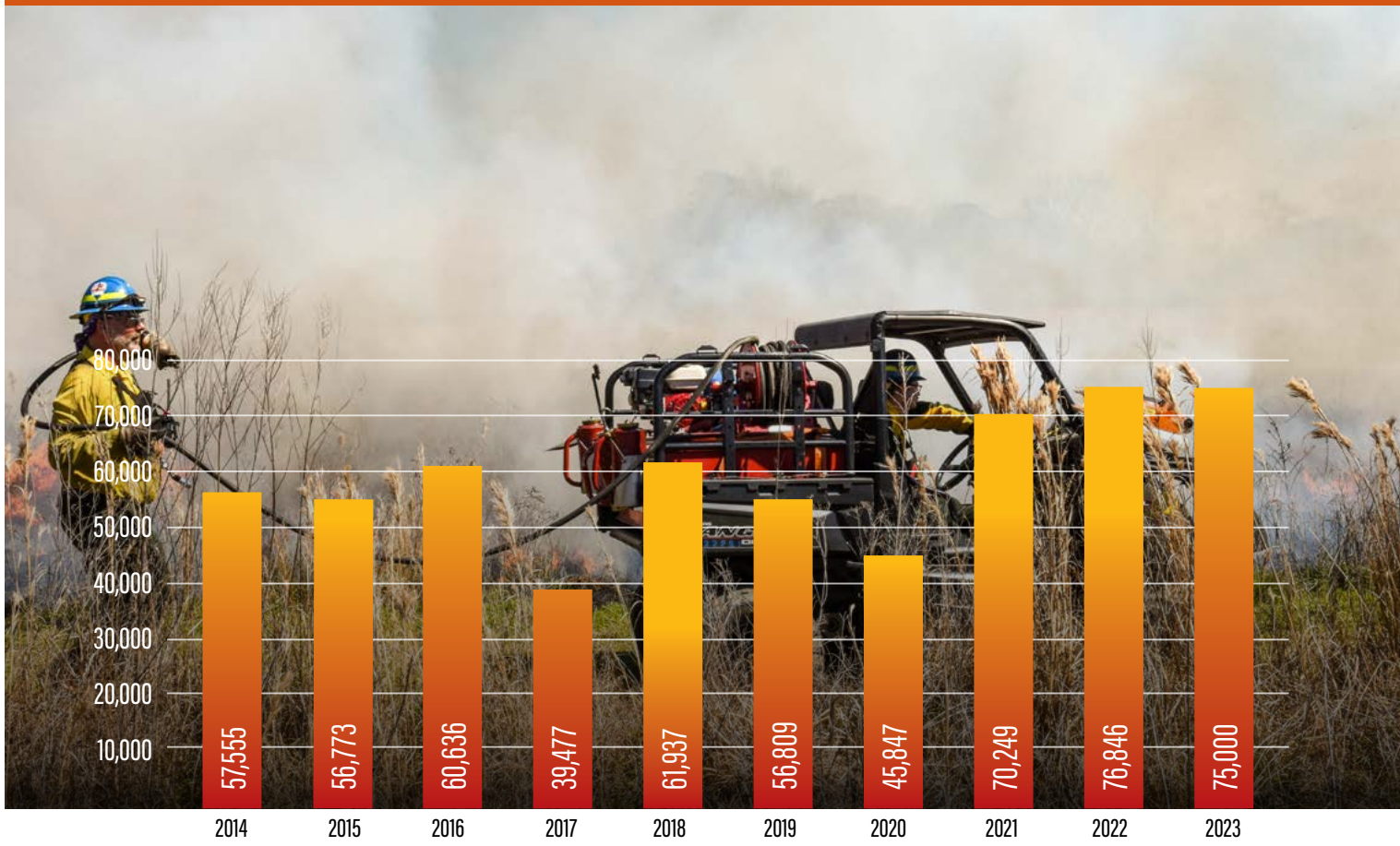
In the field, DNR's Wildlife Resources Division recorded yet another significant year, burning 75,000 acres in fiscal 2023. The total came near the record high of 76,846 acres set the previous year. The new goal is to break 80,000 acres, but that number will continue to grow as more properties that need fire management are acquired.

Wildlife Conservation also supports the prescribed fire efforts of DNR's Georgia State Parks and Historic Sites Division. Staff helped develop parks' Resource Management Unit for over two decades through direct assistance, equipment, training and mentoring. Parks now has a seasonal burn crew, and 26 staff members helped on burns this season. In 2023, the parks division burned 2,202 acres on state parks and 3,718 acres on partner lands, including those managed by Wildlife Resources and the U.S. Forest Service. Parks staff joined 39 burn operations, employed 12 ecovolunteers (volunteers trained to National Wildlife Coordinating Group standards) and proved a significant contributor to the Interagency Burn Team, providing meeting and fire training venues.

The Interagency Burn Team also posted another strong year. And thanks to funding from the Georgia Outdoor Stewardship Program, seasonal fire crews from The Nature Conservancy and

Prescribed fire on Sandhills WMA (Hal Massie/DNR)

DNR-MANAGED ACRES BURNED 2014 - 2023 *Totals by fiscal year*



Burn at Panola Mountain State Park (Hal Massie/DNR)

Orianne Society helped burn on priority wildlife management areas in southeast Georgia. The WMAs included Alligator Creek just north of Lumber City, Ceylon in Camden County, Flat Tub in Jeff Davis County, Moody Forest in Appling County, Ohoopee Dunes near Swainsboro and Sansavilla near Hortense. The Nature Conservancy helped burn 4,809 acres; Orianne Society, 3,708 acres. These partners also helped with burns on Chattahoochee Fall Line Wildlife Management Area tracts in west Georgia and on a large aerial operation on Tuckahoe Wildlife Management Area in Screven County.

In one highlight, Wildlife Conservation teamed with Orianne Society on a high-priority private conservation site near the Canoochee River in Emanuel County. This longleaf pine/turkey oak sandhill has a number of rare species and a landowner passionate about conservation. A portion of the property had not been burned in over 20 years and held a high fuel load that required a careful ignition strategy. The result was a well-planned and successful burn.

Burning sandhills habitat on private land (Ash Curtis/DNR)

Seasonal Fire Crews

Since 2009, seasonal fire crews have conducted the bulk of the Wildlife Conservation Section's prescribed fires. In fiscal year 2023, the number of crews increased from three to four, each always on call and working statewide.

- The southeast Georgia crew worked out of Altama Plantation Wildlife Management Area near Brunswick. The team was funded by Pittman-Robertson Wildlife Restoration funds.
- The west-central Georgia crew, based at Sandhills Wildlife Management Area East near Butler, was funded by a Knobloch Family Foundation grant, a National Fish and Wildlife Foundation grant, and a State Wildlife Grant.
- The gopher tortoise crew, supported by Wildlife Conservation's gopher tortoise State Wildlife Grant, was housed at Harris Neck National Wildlife Refuge near Townsend.
- The Ceylon Wildlife Management Area burn crew, newest of the four groups, is based at the recently acquired WMA in Camden County. It is funded by a Readiness and Environmental Protection Integration Program grant from the U.S. Navy.

West-central Georgia crew member Jasmine Little at Sandhills WMA East (Hal Massie/DNR)

These crews typically worked independently of each other, with the west-central crew focusing on the Fall Line sandhills and Pine Mountain regions, the southeast Georgia crew on the Fort Stewart-lower Altamaha River area, the tortoise crew on properties across Georgia's Coastal Plain, and the Ceylon crew on the same-named WMA.

In fiscal 2023, the southeast Georgia crew conducted 58 burn operations in 44 days, covering 6,868 acres. This total included 5,907 acres on wildlife management areas, 375 acres on state parks and historic sites, and 586 acres on private lands rated a high priority for conservation. The crew helped conduct burns on WMAs across the region as well as at high-priority state parks in the Coastal Plain. Sites included Altama Plantation, Canoochee Sandhills, Ceylon, Moody Forest, Ohoopee Dunes, Penholoway Swamp, Sansavilla, Sapelo Island and Tuckahoe WMAs, as well as George L. Smith and Kolomoki Mounds state parks and Wormsloe State Historic Site. Staff also took part in prescribed fires on key private lands such as The Nature Conservancy's Fifteenmile Creek easement in Candler County and the Orianne Society's Longleaf Stewardship Center (previously called the Indigo Snake Preserve) near Lumber City. Wildlife Conservation also provided mentorship for Orianne Society's new fire crew.

The southeast Georgia crew also took part in training and, when weather was not conducive for prescribed fire, other management activities. Members helped with a Basic Wildland Firefighter Academy, a Firefighter Type 1 course and a Wildland Chainsaw course. They also participated in bird and plant surveys, outplanting rare plants, invasive species removal and outreach events.

The west-central Georgia crew burned 4,870 acres, including 952 on private lands, over 21 burn days. Most units are burned on a two-year rotation, with other habitat management such as timber thins and hardwood control also increasing the amount of sunlight that reaches the forest floor. Many stands are becoming open and grassy with documented increases in rare species such as Bachman's sparrows, southeastern American kestrels and gopher tortoises.

A unique aspect of the west-central Georgia crew is that they pursue many other ecological restoration activities besides prescribed fire. Members logged 16 days removing invasive plants at Montezuma Bluffs Wildlife Management Area in Macon County, Sandhills WMA in Taylor County and Joe Kurz WMA near Gay, as well as at Flat Creek Public Fishing Area near Perry. The work mostly involved removing Chinese privet, laurel cherry, musk thistle, English ivy and even feral hogs. Montezuma Bluffs was the focal point, with staff applying herbicide on the bottom-most portion of the bark on hundreds of acres of dense Chinese privet. The invasive plants threatened the WMA's large population of federally endangered relict trillium, the plant Montezuma Bluffs WMA is best known for. Using funds from a TERN grant, the crew completed work on a two-mile nature trail, including a footbridge, benches and an interpretive kiosk so the public can enjoy the public property.

Members also spent 291 hours restoring groundcover, including planting forbs and native grass plugs and collecting grass seed adapted to the droughty conditions of the Georgia sandhills. Grass seed collected previously from the area was shipped to Roundstone Native Seed Co. in Kentucky, which grows the plants and ships them back to DNR for planting. As in fiscal 2022, the west-central Georgia crew also grew and outplanted forbs, intended to help pollinator populations. All seed sources used were local, which is key since most species are highly adapted to the severe conditions found in sandhills. The crew also spent 102 hours picking up trash along roads and at illegal dump sites.

In its third season of operation, the gopher tortoise crew burned 8,725 acres and took part in 51 prescribed fire operations, both new highs for the group. Burns were done on wildlife management areas and state parks with high-priority gopher tortoise habitat. Those sites included Alapaha River, Alligator Creek, Bullard Creek, Canoochee Sandhills, Chattahoochee Fall Line Almo and Hilliard Plantation tracts, Doerun Pitcherplant Bog, Lanahassee Creek, Ohoopee Dunes, and Townsend WMAs, as well as Reed Bingham, Seminole and Kolomoki Mounds state parks. The crew also helped with prescribed fires on lands owned and managed by Interagency Burn Team partners, including The Nature

Conservancy (Moody Forest, Broxton Rocks Preserve, Fifteenmile Creek easement and Chattahoochee Fall Line WMA's Blackjack Crossing Area) and Orianne Society, at the organization's Longleaf Stewardship Center, and on several priority tracts within its private lands network.

Wildlife Conservation cooperated with the Wildlife Resources Division's Game Management Section on more than 5,000 acres of controlled burns on southwest Georgia WMAs. The majority were conducted during the growing season. The work benefited red-cockaded woodpecker groups on Silver Lake and Lake Seminole wildlife management areas near Bainbridge and at River Creek, the Rolf and Alexandra Kauka WMA near Thomasville. These growing-season fires set the stage for collecting native grass seed for habitat restoration projects across the region. Most growing-season burns in the region targeted longleaf pine stands with extensive native groundcover and high-priority plant and animal species. At Doerun Pitcherplant Bog WMA Area in Colquitt County, 187 acres of longleaf forest were burned during the growing season, including several of the site's most significant bogs.

During its first year, the Ceylon fire crew burned 1,752 acres over 14 burn days on the WMA alone. In addition to one seasonal tech, the crew now includes three full-time positions – one biologist and two technicians – responsible for managing and monitoring the WMA near St. Marys. The crew also helped with prescribed fire operations on Canoochee Sandhills, Alligator Creek, Sansavilla, Altama Plantation and Sapelo Island wildlife management areas, as well as on Laura S. Walker and George L. Smith state parks near Waycross and Twin City, respectively. These burns added an additional 1,626 acres and 17 burn days to the crew's fiscal 2023 total. The goal is to hire a larger crew and annually burn at least 30 percent of the uplands on Ceylon, or about 3,000 acres a year.

A workshop with bunk housing is planned on the WMA to house a larger burn crew. The U.S. Forest Service also graciously gifted the Ceylon crew with a type-6 fire engine, which the Forest Service was replacing. The Ceylon fire engine has been well-used and will be an asset on future burns.

Training and Outreach

The Wildlife Conservation Section continues to be a leader in fire training for the Interagency Burn Team. Staff developed training materials, revitalized traditional material and set up training across the state. These efforts resulted in training staff from DNR Wildlife Resources Division's Wildlife Conservation and Game Management sections, DNR's State Parks and Historic Sites Division, other Interagency Burn Team partners and volunteers. Wildlife Conservation led six RT-130 Annual Fire Safety refreshers for the interagency team, training 230 people. Important topics covered include lessons learned from the fireline and appropriate use of drones and all-terrain vehicles in fire management. The agency also ran seven pack tests for 151 people, allowing them to burn with all Interagency Burn Team partners. (National Wildfire Coordinating Group certification requires a work capacity test.)

Staff hosted two FFT2 Basic Wildland Fire Academies as well, training 65 students, including students from Ogeechee Technical and Abraham Baldwin Agricultural colleges as well as seasonal fire crews from DNR, The Nature Conservancy, Orianne Society and Quail Forever. Wildland power saws and ATV safety training were offered as needed to seasonal fire crew members. Wildlife Conservation fire leaders also held FFT1 Firefighter Type 1 training and initiated 10 task books, while mentoring young wildland firefighters throughout the season. Some seasonal fire crew members went on to find summer employment involving fire.

Wildlife Conservation joined with the Wildlife Resource Division's Private Lands Program and The Longleaf Alliance to host a Learn and Burn program at Moody Forest Wildlife Management Area for private landowners and Natural Resources Conservation Service agents. This hands-on workshop near Baxley reached over 20 people. More advanced Learn and Burns are planned to address topics such as strategies for growing-season burning.

Using a drone to light a prescribed fire, a topic covered in fire safety training (Hal Massie/DNR)

INVASIVE SPECIES

Georgia's State Wildlife Action Plan emphasizes increasing efforts to detect, monitor and control invasive species to conserve native wildlife and their habitats. Invasive species are non-native animals and plants that cause environmental or economic harm after being introduced, intentionally or accidentally, into areas outside their natural ranges. Invasives have negative impacts on native wildlife and represent one of the greatest threats to biodiversity. Controlling and treating these species can yield positive, cascading effects for native wildlife and for the benefits people derive from ecosystems.

Following completion of the Georgia Invasive Species Strategy in 2009, the Wildlife Conservation Section sought State Wildlife Grants to implement invasive species assessment and management programs, with a focus on the coastal region. The current project is aimed at enhancing methods for assessing and controlling invasive non-native species on public and other conservation lands. Objectives also include providing land managers with better technical and informational resources to help control invasives, along with promoting the appropriate use of native plant species by public and private land managers.

On a related front, Wildlife Conservation led efforts in fiscal year 2023 to update Georgia's list of wild animals regulated by state law. The rule changes, approved by the Board of Natural Resources in October 2022, added species that pose a threat to native wildlife or to people and synced species scientific names with the latest versions. The wild animal list (Georgia code 27-5-5) had not been updated since 1994.

The animals added varied from apple snails and invasive crayfish – such as the gray speckled crayfish – to Burmese pythons and Argentine black and white tegus. In proposing the changes, DNR biologists reviewed invasive species documented in Georgia and nearby states, as well as scientific publications assessing ecological risks and any inherent danger to humans. Recently published taxonomic classifications were followed in updating scientific names. Wildlife Conservation also worked with DNR's Law Enforcement Division, which handles wild-animal licensing and permitting.

The proposed changes were explained in a Facebook meeting and at board meetings, and comments were collected online, by email, in person and by phone. Following the board's approval, the changes took effect in December 2022. Georgians with pet reptiles newly added to the wild animal list were given a 12-month grace period to register and tag their pets or find an appropriate home for them. Owners of aquarium species now regulated by law also were given a year to comply with the changes. DNR posted complete details at georgiawildlife.com/wild-animal-rules.

In addition to this and the following work, during fiscal 2023 staff gave talks to groups

Large Argentine black and white tegu found running loose in Athens (Rick Lavender/DNR)

DNR's James Hunt checks a stand of invasive sweet tanglehead on River Creek WMA (DNR)

varying from garden clubs and Audubon chapters to forestry experts and local colleges about identifying invasive species, emerging threats and native plant alternatives. Staff also worked to control and eradicate sweet tanglehead, a non-native grass that is invasive in at least the Southeast, on River Creek, the Rolf and Alexandra Kauka Wildlife Management Area near Thomasville. Sweet tanglehead grows 6-8 feet tall, can take over forest stands and fields, and bears seeds with barbs and sharp bristles that can burrow into the skin and even the nasal passages of animals.

Coastal Georgia

During fiscal year 2023 in coastal Georgia, Wildlife Conservation staff:

- Continued a multiyear project to eradicate common reed from the Altamaha River delta, a roadside site in Camden County and near DNR's Coastal Regional Headquarters in Brunswick.
- As in years past, led the Coastal Georgia Cooperative Invasive Species Management Area. Formed in 2012, this alliance of federal, state, nonprofit and private groups is focused on managing invasive species in the 11-county coastal area. The steering committee includes representatives from Wildlife Conservation, DNR's Fisheries Management Section and Coastal Resources and State Parks and Historic Sites divisions, The Nature Conservancy, U.S. Fish and Wildlife Service, National Park Service, Sapelo Island National Estuarine Research Reserve, Georgia Power, Georgia Department of Transportation, Georgia Ports Authority, Little St. Simons Island, Jekyll Island Authority, Georgia Forestry Commission, and the University of Georgia's Cooperative and Marine extensions.
- Using seasonal Student Conservation Association interns, treated invasive species on state conservation lands. The crew, also shared with staff in middle Georgia, treated Japanese climbing fern on properties including Clayhole Swamp and Altama Plantation wildlife management areas, both in Glynn County, and the Altamaha Connector Tract. They also treated Chinese tallow on Sapelo Island, Ossabaw Island WMA and Ceylon WMA, the latter in Camden County, plus periwinkle and Asian wisteria at Altama. The hope for fiscal 2024 is to hire a larger crew sooner and for longer to build on invasive species control efforts. Maintaining capacity to revisit and re-treat infestations is key to achieving management goals and improving habitat.
- The SCA interns also worked on a project with the coastal Cooperative Invasive Species Management Area to update the invasive species playing cards. The first 1,000 decks of playing cards, created for educational outreach in fiscal year 2020, proved popular and were distributed quickly. The latest version of the cards should be available for use in fiscal 2024.
- Worked with the Coastal Resources Division to conduct, via drone technology, an annual post-treatment assessment of areas in the mouth of the Altamaha River treated for salt cedar. Annual flights help track progress and determine if other management is needed.
- Continued a multiyear effort to manage habitat for one of the world's two known populations of Radford's mint through management of invasive sand pine. Wildlife Conservation staff and volunteers removed sand pine seedlings invading this site.
- During the 2023 National Invasive Species Awareness week, staff created daily educational content posted to the Coastal Cooperative Invasive Species Management Area Facebook page.

Chinese tallow (Alabama Extension)

- Further improved a native plant pollinator garden in a restored 1930s-era formal garden at Altama WMA. The garden is treasured by many locals and helps promote native plants as alternatives to invasive species.
- Worked with the Cannon's Point Conservation Task Force to manage invasive species according to the management plan for the St. Simons Island preserve.
- Continued participating in the Coastal Georgia Pest Risk Committee, the Georgia Exotic Pest Plant Council and the Georgia Invasive Species Task Force.
- Coordinated with the First Coast Invasive Working Group in northeast Florida to stay abreast of novel invasive species in the north Florida and south Georgia coastal region. .

Middle Georgia

For invasive species activities in middle Georgia:

- Wildlife Conservation Section crews spent another year battling musk thistle, Vaseygrass and Johnsongrass in native grasslands at Panola Mountain State Park near Stockbridge, Joe Kurz Wildlife Management Area near Gay and Flat Creek Public Fishing Area near Perry. This year, however, a new tactic was tried. Contractors broadcast-sprayed soil-active herbicides, and the Wildlife Conservation Section's seasonal crew followed up with spot spraying. Considering that the approach could save labor and make control efforts more effective, staff hope to do more such operations in fiscal year 2024.
- Staff again spot-treated Japanese climbing fern, beefsteak plant, Chinaberry and tree of heaven at many spots on Sprewell Bluff Wildlife Management Area near Thomaston. The introduction of most of the Japanese climbing fern at Sprewell Bluff apparently involved logging equipment or vehicles. If caught early, the fern is easily controlled. Once populations are established, eradication is nearly impossible.
- At Sandhills Wildlife Management Area near Butler, staff finished the 10th year of herbicide work to control showy rattlebox. The WMA has two tracts, East and West. Crews previously eradicated showy rattlebox from Sandhills West, but a new population was found in 2020. (Those plants were sprayed but the location is not monitored annually.) Sandhills East is being monitored and treated as needed.
- In fiscal years 2022 and 2023, after unsuccessful efforts to control or eradicate beefsteak plant on about 10 acres at Sprewell Bluff WMA, Wildlife Conservation focused on aggressively controlling minor infestations of the plant at Sprewell Bluff and Camp Thunder Voluntary Public Access area near Molena. The plant escaped control on Camp Thunder and has spread rapidly through natural habitats. Beefsteak plant is an emerging threat in Georgia and shows signs of becoming a significant conservation problem. It is now widespread on many county roads and, beyond Sprewell Bluff, has infested portions of Panola Mountain State Park in Stockbridge and Joe Kurz Wildlife Management Area near Gay.

Argentine Black and White Tegus

Argentine black and white tegus are an invasive species that poses threats to native Georgia wildlife, including gopher tortoises, Georgia's state reptile. Native to Brazil, Paraguay, Argentina and Uruguay, this tegu species has been documented eating young gopher tortoises and the eggs of alligators. The eggs of gopher tortoises and ground-nesting birds, including northern bobwhites and wild turkeys, are susceptible to predation. Tegus also eat fruit, vegetables, plants, pet food and chicken eggs. An additional concern is that tegus could cause bacterial contamination of crops and spread exotic parasites to native wildlife.

Since summer 2018, the Wildlife Resources Division has been working to assess and eradicate Argentine black and white tegus in the wild in eastern Toombs and western Tattnall counties. A partnership with the U.S. Geological Survey and Georgia Southern University resulted in the capture of nearly 20 adult tegus from the area, and the investigation or capture of numerous reported presumed escaped or released pet tegus across the state. Although no hatchlings or nests were found as of fiscal year 2023, the analysis of animals caught or provided and the number and distribution of credible reports point to a reproducing population of the invasive lizards in this rural corner of Toombs and Tattnall counties.

The response grew from a Game Management wildlife technician supervisor trapping tegus in spring 2019 to the Geological Survey's Invasive Species Task Force teaming with DNR and Georgia Southern University on a large-scale trapping effort using contracted students from Georgia Southern in summer 2020 and for most of summer 2021, all promoted by Wildlife Conservation outreach efforts.

Funding changes in fiscal year 2022 spurred coordinators to focus on engaging landowners

to help with trapping following verified sightings and by offering loaner traps. The region's wildlife tech supervisor is again serving as the primary local contact, with Wildlife Conservation's senior herpetologist providing coordination as needed and Georgia Southern continuing to offer support.

As part of this effort, Wildlife Conservation raised awareness of tegus with residents through emails, direct mail, flyers, news releases, social media and advertising campaigns. In fiscal 2023, outreach included:

- Conducting an email and social media ad campaign in April 2023 to inform local residents and encourage the reporting of sightings. The two Facebook ads – one static and one a video – reached an estimated 15,860 and nearly 56,000 people, respectively, in the area.
- Sending an e-mail blast to more than 31,000 hunting/fishing license holders and boat registrants in the area encouraging recipients to watch for and report tegus.
- Supplying tegu flyers and cards to project partners and local outlets, including University of Georgia Extension offices. (A radio public service announcement also was repeated on a Lyons radio station.)
- Emailing an online survey invitation to about 14,000 residents in 15 ZIP codes in the Toombs/Tattnall area. Nine-out-of-10 respondents – the survey fielded 299 respondents – who had seen DNR communications or news coverage about tegus said they were extremely to somewhat likely to contact DNR if they saw a tegu. More than 90 percent also said that after those communications and coverage, they were more likely to agree that tegus pose a threat to native wildlife, DNR should work to eradicate or control them in the wild and reporting tegus seen in the wild is crucial to that effort.
- Coordinating media response to interest in the tegu situation.

Year-round, staff and project partners monitor and respond to sightings reported via gainvasives@dnr.ga.gov and gainvasives.org/tegus, the EDDMapS system managed by UGA's Center for Invasive Species and Ecosystem Health.

Japanese climbing fern (Chris Evans/Bugwood.org)

Swallow-tailed kite (Brian Mitchell)

PRIVATE LANDS

With more than 90 percent of Georgia lands in private ownership, conservation on private land is crucial to wildlife and natural communities in the state. The Wildlife Conservation Section collaborated with landowners throughout Georgia in fiscal year 2023 (also see: Land Acquisitions and Conservation Easements).

Staff answered landowner questions and visited sites to share management advice, conduct surveys for high-priority species and help with other elements of conservation planning. Landowners were advised of cost-share, technical assistance and grant opportunities and guided through procedures for using programs such as the Natural Resources Conservation Service's Environmental Quality Incentives Program, Working Lands for Wildlife, Conservation Stewardship Program and Wetlands Reserve Easements Program, as well as technical and financial assistance programs available through Georgia Forestry Commission, The Longleaf Alliance and Regional Conservation Partnership Programs. Staff partnered with the Sustainable Forestry Initiative to develop new training programs and products for Master Timber Harvesters and independent forestry companies. These programs will inform loggers and foresters about many of Georgia's high priority wildlife species and communities and provide guidance about protecting or enhancing habitat for federally listed species during timber harvests.

Staff also took part in several regional conservation planning efforts, including strategic plan development for the Fort Stewart/Altamaha Longleaf Restoration Partnership in southeast Georgia. In southwest Georgia, DNR's Wildlife Conservation staff collaborated with Florida Fish and Wildlife Conservation Commission, Tall Timbers Research Station and the U.S. Fish and Wildlife Service to roll out a conservation program for private landowners in the Red Hills region of Georgia and Florida. The Quail Country Candidate Conservation with Assurances Agreement, a voluntary agreement, provides incentives for private landowners to implement management practices benefiting one or more of 12 at-risk focal species in the region.

Wildlife Conservation also coordinated with The Longleaf Alliance, Georgia Conservancy and Wildlife Resource Division's Game Management staff to host landowner workshops, fire festivals and field days throughout the state, promoting prescribed fire and habitat management to private landowners. Staff were excited to showcase a growing collection of burn trailers that are now available for private landowners to rent through Georgia Forestry Commission or their area Resource Conservation and Development Council (find a burn trailer near you).

Gov. Brian and First Lady Marty Kemp and DNR leaders honor the 2023 Forestry for Wildlife Partners (Office of the Governor)

Forestry for Wildlife Partnership

The Wildlife Conservation Section also plays a strong role in the DNR Wildlife Resources Division's Forestry for Wildlife Partnership. This program has been a standard of excellence in combining forest management and wildlife conservation since 1996. The Wildlife Resources Division strengthened the partnership in fiscal year 2022, making it project-focused and open to more landowners.

Forestry for Wildlife Partnership is a voluntary, flexible, non-competitive and participant-driven effort that:

- Enhances wildlife conservation on the holdings of large landowners.
- Helps deliver wildlife technical assistance, training and outreach.
- Recognizes partners for their wildlife conservation achievements.

Coordinated by Game Management and Wildlife Conservation biologists, this public-private partnership provides opportunities to enhance wildlife conservation on private lands. Companies are recognized for their achievements. Conservation targets include red-cockaded woodpecker habitat, bald eagle and swallow-tailed kite nests, isolated wetlands critical to protected reptiles and amphibians, and remnant Coosa Valley prairies, home to endangered plants. The partnership also provides the public with outdoor recreation opportunities such as wildlife viewing, hunting and fishing. Partners are committed to Sustainable Forestry Initiative goals.

While the program began as a way to recognize corporate Georgia landowners that exceeded Sustainable Forestry Initiative requirements, the number of companies with large forest landholdings in the state has declined, and the expansion of Sustainable Forestry Initiative conservation standards duplicated many Forestry for Wildlife measures. In response, DNR revamped the partnership. The revised requirements center on projects between potential partners and the agency. The focus is making wildlife improvements that sync with DNR's Bobwhite Quail Initiative and Georgia's State Wildlife Action Plan, two guiding strategies created with stakeholders.

The minimum property size for participating in Forestry for Wildlife also was lowered from 20,000 to 10,000 acres, increasing eligibility for more landowners, from individuals to organizations. Significant accomplishments are highlighted on social media and in DNR's hunting and fishing regulation guides. Partners that complete projects are recognized in an annual news release and photos with the governor.

Weyerhaeuser, Forest Investment Associates and Georgia Power were the Forestry for Wildlife Partners for calendar year 2023. These corporations are among the largest landowners and managers of private lands in Georgia, directly affecting wildlife habitat on nearly 800,000 acres. In fiscal year 2023, DNR also solicited new partners and began work with several that will likely gain partner status.

Highlights of partner conservation efforts in 2023 include the following:

As an original member of Forestry for Wildlife Partnership, **Weyerhaeuser** is committed to Sustainable Forestry Initiative standards and integrates conservation into its forests. A key initiative and one area the company has focused on in recent years is conserving gopher tortoises.

Weyerhaeuser centers management for this iconic species on preferred soils with viable populations and helps Wildlife Conservation survey tortoises. The company also has worked with DNR, the University of Georgia, the Fish and Wildlife Service and others to better understand how tortoises respond to the changing mosaic of stand conditions in working pine forestlands, all in a larger effort to research tortoise ecology across company-managed lands in the Southeast.

In the Piedmont, Weyerhaeuser teamed with UGA and Auburn University to explore the effects of forest thinning, prescribed fire and herbicides on plant communities and wildlife in general. Although this DNR-funded project is focused on conserving northern bobwhites, findings will help inform managers about the ability of these pine plantation stands to maintain "open pine" conditions important to numerous species.

Along the fall line, Weyerhaeuser has set aside acres for federally endangered fringed campion. This plant persists along moist slopes of mature hardwood forest and will be sheltered from adjacent forestry activities on company land.

In the lower Coastal Plain, efforts with Wildlife Conservation included conserving wood stork rookeries and isolated wetlands and supporting DNR surveys for protected species, such as the federally threatened indigo snake and swallow-tailed kite. Weyerhaeuser consulted with the agency before harvesting timber near a historic roosting site for swallow-tailed kites and supported surveys for the birds, which often nest on company land. DNR biologists identified two nests on Weyerhaeuser land this year and found indigo snakes on two company tracts where the snakes had not been seen in recent years.

Forest Investment Associates, often called simply FIA, began working with Wildlife Conservation in 2021 and is DNR's newest Forestry for Wildlife partner. FIA supports surveys and management benefiting a population of Chapman's fringed orchid on a large tract the company manages in Camden County. In Georgia, Chapman's fringed orchid is known from only a few small roadside populations in Camden and two other counties in the southeastern part of the state. This rare and beautiful orchid, a high-priority species in the State Wildlife Action Plan, is associated with pine flatwoods wetlands, many of which have been converted for forestry in the region. Like many similar orchids, it requires moist soils and open sunny conditions to thrive.

Wildlife Conservation had been helping manage competing vegetation to support a small and dwindling population of orchids on a public right of way along the boundary of the Camden County property. Like many roadside populations, this one suffered threats from herbicide, mowing and increasing shade from the surrounding pine plantation. In summer 2022, FIA shared their timber harvest plan for the adjacent pine stand. The harvest would return sunlight to the orchids. FIA coordinated with Wildlife Conservation to buffer the site and its sensitive hydrology from heavy equipment and site prep. The stand was harvested that fall and the orchid management area was expanded to allow for regular mowing or prescribed burning.

Surveys in 2021 identified an additional population of 20 Chapman's fringed orchids in a 15-year-old loblolly stand in the tract's interior. FIA is partnering with DNR and the Jacksonville Zoo and Gardens' horticultural staff to improve habitat for the orchid at both places it occurs on the tract, using a combination of mowing, thinning and prescribed burning.

Georgia Power is one of the largest private landowners in the state and manages its undeveloped land for multiple benefits, including public recreation, timber production and conservation of rare species. Prescribed fire is applied to more than 5,000 acres annually. More than 20,000 acres are open for public recreation through DNR's wildlife management areas program, including Blanton Creek, Rum Creek and Oconee WMAs. The company is also restoring longleaf pine habitat in support of conservation partner landscape goals and participates in DNR's Safe Harbor Program for red-cockaded woodpeckers, a federally listed species. More than 20 bald eagle nests were found, monitored and protected on company lands and lakes this past year. Through grants, Georgia Power provides ongoing support for long-term projects to restore longleaf pine habitats, protect populations of bats threatened by white-nose syndrome, conserve shorebirds and imperiled aquatic species, and improve water quality in impaired streams.

Georgia Power lands and transmission rights of way typically are managed with an integrated vegetation management approach. Developed to promote and establish a stable and diverse low-growing plant community on rights of way, this approach often provides significant benefits to wildlife communities adapted to open grass-and-forb-dominated landscapes. Many of Georgia Power's lands provide habitat for several species of rare plants, including 11 federally listed as threatened or endangered.

Georgia Power provided new No Mow/No Spray signage to protect hairy rattleweed on a transmission right of way in southeastern Georgia. The distribution of this federally endangered plant is limited to two counties in the state. Staff conducted a prescribed burn to improve habitat for Georgia aster, a rare plant that does well at several rights-of-way locations and on company land at Goat Rock Lake near Columbus. Populations of federally threatened Georgia rockcress were monitored within designated critical habitat at Goat Rock, and Georgia Plant Conservation Alliance workdays at this site and Georgia Power's Drummond Swamp, home to the rare Georgia alder, were filmed for an episode of Georgia Public Broadcasting's "Georgia Outdoors."

At Plant Hatch, as a participant in the statewide Gopher Tortoise Conservation Initiative and the multistate Candidate Conservation Agreement for the eastern population of gopher tortoises, Georgia Power identified gopher tortoise burrows, stream buffers and other sensitive areas on a tract of loblolly pines scheduled for harvesting. The tract, which borders Moody Forest Wildlife Management Area near Baxley, will be replanted with longleaf pine and managed to enhance tortoise habitat.

Georgia Power monitored a boulder-field shortleaf pine regeneration site after conducting a prescribed burn at Lake Oconee. Adjacent to Lake Oconee Wildlife Management Area, this site is managed cooperatively as part of the Shortleaf Pine Initiative. Shortleaf pine is native to most of the Piedmont but has been supplanted by loblolly pine across much of its range. Restoration of shortleaf pine communities will benefit the federally protected smooth purple coneflower and other associated species. The fire should help control loblolly competition while releasing shortleaf seedlings and benefiting native groundcover plants. The presence of the boulders likely made the site a low priority for agriculture, thus helping preserve the native seed bank.

Georgia Power partnered with DNR, Woodard & Curran, the Natural Resources Conservation Service, Jekyll Island Authority, Linwood Nature Preserve and the University of Georgia on research projects designed to enhance the value of rights of way as pollinator habitat. They also hosted a videographer at four transmission right-of-way sites that represent good meadow and prairie habitat resulting from the company's integrated vegetation management strategy. Production is still underway for the video, a collaboration between Electric Power Research Institute and the Southeastern Grasslands Initiative.

In 2022, former longtime Forestry for Wildlife Partner CatchMark Timber merged with PotlatchDeltic, a forest products company based in Spokane, Wash., that owns 1.5 million forestland acres in the South. In 2023, Wildlife Conservation began collaborating with PotlatchDeltic on conservation activities at several of their Georgia tracts and expects to bring them on as a Forestry for Wildlife Partner in 2024.

Community Wildlife Project

The Community Wildlife Project enhances native animal and plant populations and their habitats in urban, suburban and rural communities throughout the state. Goals for this award-winning initiative of the Wildlife Conservation Section and the Garden Club of Georgia include:

- Fostering wildlife conservation stewardship and education in Georgia communities.
- Promoting respect and appreciation for wildlife in combination with community beautification.
- Improving the quality of life for Georgians living in these communities.

More than 750 communities, cities and counties have been awarded full certification, with more than 600 in different stages of completing certification standards. Since 2005, the Backyard Wildlife Certification survey has added about 4,600 certified backyards, 675 of which were certified with two or more adjoining neighboring yards for Neighborhood Backyard Certification.

In fiscal year 2023, a Container Gardening for Wildlife application was completed and released. The hope is this addition, geared to Georgians who have limited space outdoors to add wildlife habitat, will gain momentum in the next fiscal year.

As part of the Community Wildlife Project, a Garden Club district can win an award each quarter for the most participation per category, overall participation and full certifications (the number of yards meeting all requirements in each category). The program helps Wildlife Conservation build constituency through the 10,000-member club via habitat programs at local, state and regional levels.

Barred owl with fledgling (Linda May/DNR)

During fiscal year 2023, the DNR Law Enforcement Division enforced laws and regulations and conducted investigations involving rare and other native nongame species. That work included teaming with the National Oceanic and Atmospheric Administration to enforce federal measures – such as checking commercial trawlers for compliance with turtle excluder device, or TED, regulations – and raising awareness of marine mammals and the laws that protect them.

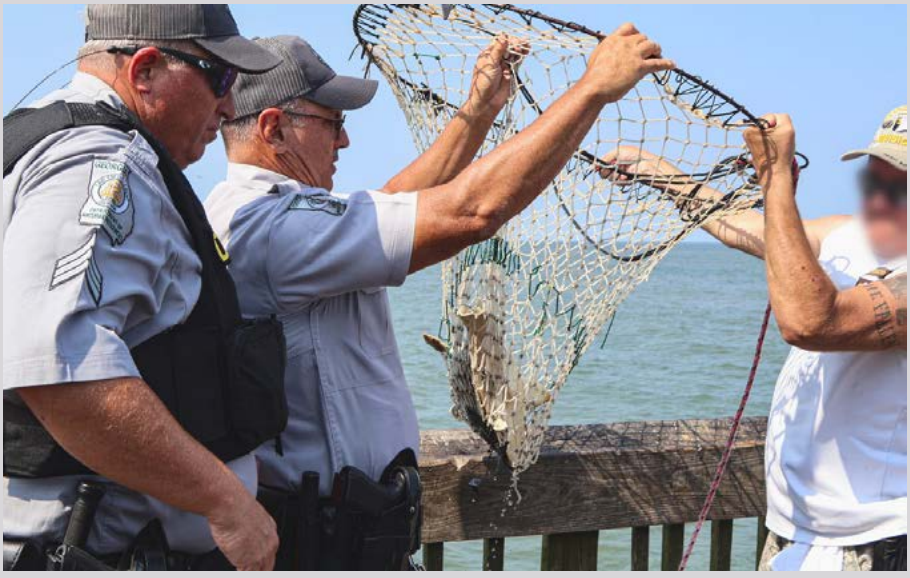
The division's Region 6, based in Brunswick, logged 1,554 personnel hours at sea, including 374 doing boat patrols, with the majority of those involving sea turtles and marine mammals. Game wardens recorded 296 hours on TED inspections and 237 hours dedicated to North Atlantic right whale patrols. Vessel patrol hours focused on:

- Shrimp trawler checks for TED compliance.
- Intercepts of recreational and commercial fishing vessels returning to Georgia seaports from fishing trips in federal waters.
- Offshore patrols to Special Management Zones and Gray's Reef National Marine Sanctuary.
- Concentrations of fishing vessels wherever they occurred in the Exclusive Economic Zone adjacent to the state.
- Offshore and near-shore patrols for compliance with the Atlantic Whale Take Reduction Plan.

Game wardens documented and forwarded to NOAA for prosecution 21 TED and other federal violations.

Region 4 staff, based in Metter, continued to help spread the word encouraging area residents to report sightings of Argentine black and white tegus. DNR's Wildlife Conservation Section worked this year with game wardens, the DNR Game Management Section and Georgia Southern University to assess and try to eradicate a wild population of these large, invasive South American lizards in southeast Georgia's Tattnall and Toombs counties.

Law Enforcement's Aviation Unit flew 415 hours supporting game wardens and the division's core mission of protecting natural resources. The flights included Wildlife Resources Division surveys of bald eagles, southeastern American kestrels, wood storks, sandhill cranes, waterfowl, shorebirds, sea turtles, dolphins and manatees. The unit also flew missions in support of local and state emergency management missions for storm damage and flooding events and continued to fly missions and remain on standby for any federal, state law enforcement and emergency management requests as well. Along with enforcement of state wildlife laws, DNR Aviation also assisted local agencies as requested in search and rescue on land and water, while providing fire suppression support as well. The agency took part in rescue training with SR3 Rescue Concepts and the U.S. Coast Guard while remaining on standby for rescue extraction missions at Tallulah Gorge State Park in Tallulah Falls.



DNR Law Enforcement unhooks a sea turtle inadvertently caught on Tybee Island (Emory Randolph/Tybee Police Department)

In other law enforcement updates:

- Cpl. Tyler Lewis was named DNR's 2023 Game Warden of the Year. Assigned to Cobb County, Lewis worked more than 200 hours on water patrols and nearly 400 on general wildlife and park patrols. He also received the 2023 State Boating Officer of the Year Award. Game Warden 1st Class Jared Wood from Fannin County was honored with the James R. Darnell Award as Warden of the Year runner-up. Wood, a four-year veteran and K-9 officer, logged 189 hunting and fishing license checks, taught four information/education programs and worked 80-plus hours with Atlanta's crime suppression detail.
- The Special Permit Unit teamed with Wildlife Resources Division staff on developing proposed regulations, later approved by the Board of Natural Resources, that expanded limits on animals that can be bought, sold, imported or kept as pets in the state. Georgia pet owners with any of six non-native reptile species newly listed as wild animals were given a one-year grace period to PIT-tag and register their animals or find them an appropriate home. Businesses that had any of the species in stock before the changes had one year to sell them. Those reptiles include Indian rock pythons and Burmese pythons, Argentine black and white tegus, Nile monitors, African helmeted turtles and Chinese softshell turtles.
- The Investigative Unit conducted the successful multi-state investigation Operation Viper and apprehended a subject who had illegally delivered venomous reptiles to 48 of the 50 states. According to investigators, the subject is believed to be one of the country's leading reptile smugglers. At the time of his arrest, he had 27 illegal exotic venomous snakes in his vehicle.

For more, see Law Enforcement's annual reports at gadnrle.org. Report poaching and the violation of protected species laws and regulations by calling the Ranger Hotline at (800) 241-4113 (or *DNR for AT&T mobility customers), emailing rangerhotline@dnr.ga.gov or contacting a local game warden (search by county at gadnrle.org/find-ranger).

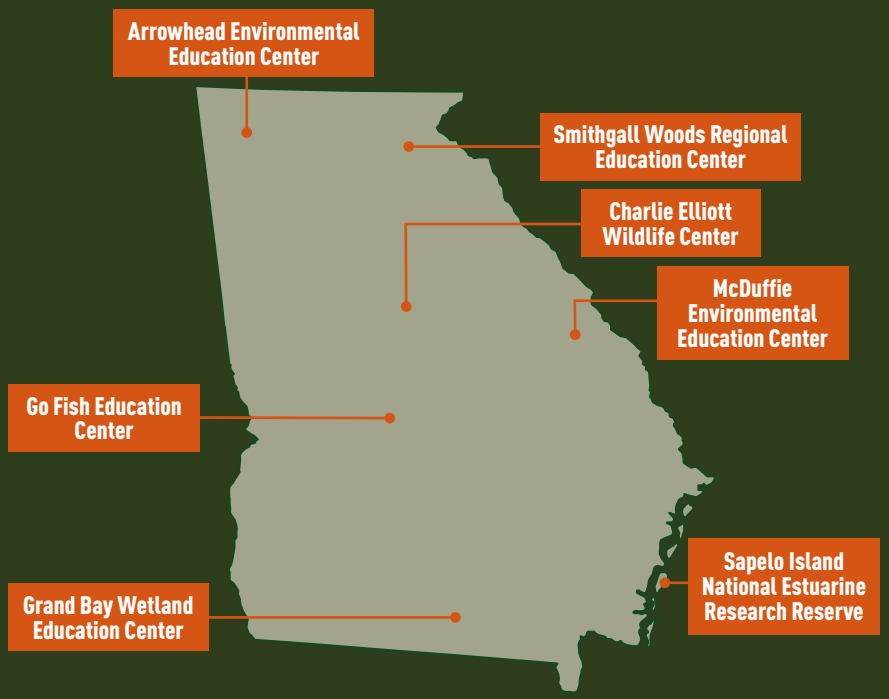
LAW ENFORCEMENT

Regional Education Centers

The DNR Wildlife Resources Division is charged with promoting the conservation and wise use of Georgia's natural resources. This educational mission involves cultivating an appreciation and understanding of wildlife resources, fostering wise stewardship and promoting safe and ethical natural resource-based recreation.

Throughout its history, the Wildlife Resources Division has educated youth and families to increase awareness, engagement and stewardship regarding the state's wildlife and other natural resources. These efforts began in 1940 when Charlie Elliott, the first director of what is now known as DNR, started the Junior Ranger Program. More than 25,000 children took part that year, conducting nature surveys, planting wildlife food plots and helping "senior rangers" – in short, learning and practicing conservation.

Elliott's vision of a conservation education program is reflected through Wildlife Resources' seven regional education centers and continuation of the Junior Ranger Program in the DNR State Parks and Historic Sites Division. Wildlife Resources operates the centers with Regional Educational Service agencies and other state and federal agencies to deliver wildlife-focused education.



Conservation Teacher of the Year Vanessa Boone of The Lovett School (Linda May/DNR)

The centers are Charlie Elliott Wildlife Center near Mansfield, the Go Fish Education Center in Perry, Smithgall Woods near Helen, Arrowhead Environmental Education Center near Armuchee, McDuffie Environmental Education Center in Dearing, Grand Bay Wetland Education Center near Valdosta and Sapelo Island National Estuarine Research Reserve. The centers provided programming in-person and virtually for over 134,000 youth and adults during fiscal year 2023, about 40,000 more than the previous year.

Note: Arrowhead Environmental Education Center was closed for the 2022-2023 school year after Floyd County Schools reassigned the center's lead educator, a county employee, to a classroom position in the school system. The partnership between DNR and Floyd schools had been in place since 1994. DNR's Wildlife Resources Division is now funding the lead educator position, with educational programming beginning again in fall 2023.

Charlie Elliott Wildlife Center

Since Charlie Elliott Wildlife Center opened more than 25 years ago, the focus has been creating opportunities for all audiences to explore the outdoors and instructing Georgia's youth and adults about wildlife and natural resources, equipping them as environmentally literate stewards of natural resources. The center does this through engaging, hands-on programming that allows participants to experience the subjects covered.

During the 2023 Keeping Georgia Wild Festival, over 1,000 participants, many of them in families, came to Charlie Elliott to enjoy activities such as tree climbing, fishing, archery, shooting sports and arts and crafts. Attendees were treated to live animal presentations by the DNR Law Enforcement Division's K-9 team, Georgia Falconry Association and the center's animal ambassadors. The festival was held in partnership with the Georgia Wildlife Federation, Fellowship of Christian Athletes and the Georgia Wild Turkey Federation.

Georgia's Becoming an Outdoors Woman program continued to grow in fiscal year 2023. Staff held 14 in-person programs across the state, including introduction to handgun and shotgun classes, plus fishing, hiking, backpacking and wilderness skills experiences. Several of the single-day programs were conducted with DNR's State Parks and Historic Sites Division. The annual Becoming an Outdoors Woman workshop drew 78 women who took part in 20 fishing-, shooting- and wildlife-related activities. Yolanda Hatch, a Georgia outdoorswoman and U.S. Navy veteran, kicked off the weekend by encouraging women to get outdoors and explore nature. As an avid turkey hunter and herbalist, she shared about the many benefits she received from nature and pathways women can take to engage in the outdoors.

Charlie Elliott Wildlife Center reaches approximately 20,700 school-aged participants through outreach and school programming each year. To extend that reach, the center hosts Project WILD, a K-12 interdisciplinary conservation and environmental education program that emphasizes terrestrial and aquatic wildlife resources. Georgia Project WILD offers training workshops for pre-kindergarten, K-12 and environmental educators across the state. In fiscal 2023, 510 educators were reached through a total of 30 workshops. Every summer, Project WILD also holds Advanced WILD workshops, immersive experiences designed around exploring a single topic. This year, Charlie Elliott offered two weeklong versions: a Teacher Conservation Workshop on forestry, natural resources management and how the two are interconnected, and an Outdoor Wildlife Leadership School that examined flora and fauna in the Coastal Plain though hands-on activities involving research and conservation.

Charlie Elliott held seven summer camps during the fiscal year. Three focused on fishing, hunting

Tree-climbing fun at Charlie Elliott (DNR)

and wildlife conservation for ages 11-16. The other four were geared to ages 6-13 and included Charlie's Trackers (where campers become junior rangers), Gone Fishin' (where youth test their angling skills), Wildlife Rangers (practicing nature skill such as shelter building, canoeing and wildlife identification) and the center's popular Outdoor Team Challenge camp. Each year, Charlie Elliott also hosts an Adventures in Conservation Education Camp sponsored by The Environmental Resources Network, or TERN, friends group of DNR's Wildlife Conservation Section. The summer camp is for middle-schoolers interested in wildlife conservation. In 2022, campers spent five days involved in Georgia wildlife via activities and day trips in the lower Coastal Plain. Sites included Jekyll and Sapelo islands and Okefenokee National Wildlife Refuge.

The center also continued to provide opportunities for youth and adults to increase their hunting knowledge and skills. Hunt and Learn programs gave new hunters the chance to take part in dove, deer, rabbit and turkey hunting. In addition to these traditional programs led by staff on Clybel Wildlife Management Area, eight hunters with mobility impairments joined an Adaptive Hunting Retreat featuring All Terrain Georgia's Action Trackchairs.

The Safe Harvest and Responsible Practices, or SHARP, series also continued to grow this year with 59 participants learning about turkey, deer, falconry and small game.

Smithgall Woods Regional Education Center

Smithgall Woods Regional Education Center is on almost 6,000 acres in the foothills of the Appalachian Mountains near Helen. The property's previous owner, the late Charles Smithgall, envisioned a site open to all and focused on natural resources conservation and education in the Blue Ridge. The goal of the center is to provide environmental education to visitors and through outreach programming off-site, all syncing with Smithgall's vision.

In fiscal year 2023, the center met that goal with another record-breaking year. Boosted by the addition of a part-time naturalist, programs were offered simultaneously on- and off-site. This resulted in a 21 percent increase in programming and 26 percent more participants compared to fiscal 2022. In all, 496 outreach and 497 on-site programs provided top-notch environmental education to 24,917 and 4,195 participants, respectively. The totals, including one online program: 994 programs and 29,127 people.

Social media remained an active part of Smithgall Woods programming. However, the focus shifted toward informing the public of opportunities and less toward providing online education. All videos are accessible through the DNR Wildlife Resources Division's YouTube page, and pre-recorded programming is available on request.

In fiscal 2024, the plan is to continue providing the best programming possible. Through online and in-person continuing education, by helping others in DNR, and through engaging with environmental educators, Smithgall Woods Regional Education Center will strive to adapt and improve

Sapelo Island National Estuarine Research Reserve

Sapelo Island National Estuarine Research Reserve offered a range of environmental education programming during the 2022-2023 school year. Student numbers returned to near pre-pandemic levels. For half of this reporting period, however, public tours were still limited to 24 participants because of construction at Sapelo's mainland ferry dock and the use of a smaller island ferry. The education program was further hampered when a section of the elevated boardwalk on Sapelo's main teaching trail failed, closing the trail.

Sapelo Island Reserve sees seasonal ebbs and flows in K-16 participation. However, data show a significant increase in student participation during the past 12 years. The coronavirus pandemic still significantly affected operations

Teacher and students following a saltmarsh program at Sapelo National Estuarine Research Reserve (SINEER)

during fiscal year 2023, with many schools not yet resuming in-person field trips and some not allowing in-person visits. The reserve hosted 38 school groups totaling 1,572 students, from college to elementary-school ages. Staff also conducted educational programs for 15 Road Scholar groups (406 participants) and six programs (138 people total) for special interest groups such as Sierra Club.

The Sapelo education program conducted nine professional development workshops for 106 educators, all told. Two of the workshops were held to NOAA Teachers on the Estuary standards and focused on Georgia's coastal ecology and sea turtle conservation and research. The reserve's education coordinator helped conduct the Georgia Association of Marine Educators conference for educators statewide as well. The annual event included marine educators from around the Southeast.

The reserve also helped train seasonal staff for local environmental education centers, including 13 people from the Burton 4-H Center on Tybee Island and 16 from the Tybee Island Marine Science Center. The education coordinator helped teach the U.S. Army Corps of Engineers' barrier island class, which had 36 participants.

Sapelo's mainland visitor center reported 12,908 walk-in guests who were not associated with state education programs during the fiscal year. The public also was educated through the reserve's public tour program, held each Wednesday and Saturday. Ninety public tours were conducted for 1,304 participants. The reserve took part in four outdoor education events, too, including CoastFest (engaging with an estimated 6,290 people), Tybee and St. Simons Island Beach Week events (1,200 people), and the Living Shoreline Expo coordinated by St. Simons Land Trust and DNR (29 people). The reserve staffed a booth at the College of Coastal Georgia's Coastal Science Symposium. About 40 students stopped by. Also, the education coordinator maintained 13 picture-post locations on Sapelo so that students and the public could witness changes occurring at the sites.

To expand the overall impact of Sapelo's education programs, the coordinator served on committees and advisory groups including the Georgia Association of Marine Educators (as a board member), Georgia Coastal Educator, Cannon's Point Education Task Force (as the chair), the Georgia Independent College Advisory Board, the Georgia Sea Turtle Cooperative, Georgia Shorebird Alliance education advisory group and several National Estuarine Research Reserve working groups.

The reserve increased its social media presence in fiscal 2023. The reach on Facebook rose by nearly 81 percent. An Instagram account and YouTube channel were created, drawing 424 views and resulting in a more diverse audience. The assistant education and coastal training program coordinators teamed up to create a podcast in August 2022. With 18 episodes, "Sapelo NERRds" totaled 928 downloads for the fiscal year. The reserve's education staff also was interviewed by the producers of "View Finders," a Georgia Public Broadcasting television show that explores photographing Georgia's wildscapes.

McDuffie Environmental Education Center

In fiscal year 2023, McDuffie Environmental Education Center continued to provide a range of activities designed to immerse students, parents and teachers in the natural world and enhance development of a lifelong awareness of nature and conservation. The center's 60-plus activities for pre-K through seventh grade are aligned with Georgia educational standards.

McDuffie saw a record number of students – 6,811 in all – from school field trips during the 2022-2023 school year. The center also started offering outreach and public programing. The total number of people reached, including school trips, for the year reached 10,191. Many new schools and organizations, including an adult day care center and two senior centers, began visiting McDuffie.

The center received an award of appreciation from the American Fisheries Society and was given two $500 grants to help support a new fishing program.

McDuffie took part in Eco-Meet, an environmental science competition for middle schoolers in the central Savannah River area, and Georgia Envirothon. Plans are to host test stations at both events next year. The center also saw two Eagle Scout projects completed (adding bat houses and an alligator/turtle enclosure), offered spring break and summer fishing day camps, and began posting more on social media. With the addition of another staff member at the start of fiscal 2024, the hope is to produce educational videos for use online and at the center. McDuffie also added a second part-time employee in September 2022.

The lead educator at McDuffie completed Advanced Training for Environmental Education in Georgia courses and is working to finish the final independent project (which will benefit the center's new fishing program). The educator is a member of the American Fisheries Society, the Georgia R3 Initiative committee and the Environmental Education Alliance of Georgia, as well as other organizations that provide training, networking and other benefits for McDuffie. As a new DNR hunter safety instructor trainer, she held one hunter safety course for local 4-H students. Others are scheduled.

Goals for McDuffie in fiscal 2024 include continuing to provide quality programing to field-trip students, expanding the center's outreach, focusing on R3 for fisheries by offering educational family fishing events at public and private ponds, and building a network with local governments and organizations in the Central Savannah River Area Environmental Science Education Cooperative.

Go Fish Education Center

Almost 20,000 people visited the Go Fish Education Center during fiscal year 2023, a total encompassing general admissions visitors and education participants. Visitation included self-guided tours (some with more than 100 youth), birthday parties and over 200 people taking part in private meetings. As a bonus, visitors during October and March could catch and keep fish from the casting pond.

The center's education staff provided quality environmental education programs focused on fishing and aquatic resource conservation for over 3,000 youth and adults during the year. Information and education efforts maintained an emphasis on recruiting, retaining and reactivating anglers in Georgia. Guided field trips and tours offered to schools, youth groups, day care centers, churches and others contributed heavily to program participation. Guided field trips included an introduction to fishing (plus time to fish), an aquarium tour and an educational program.

Three sessions of summer fishing day camps were held for youth ages 7-15. Participants learned about fishing basics, regulations, fish identification and knot tying. Fish habitats and the need for clean water also were discussed. Campers gained plenty of experience in casting, baiting hooks, and handling and measuring fish. Other programs included bass fishing workshops, fishing seminars, kids fishing events, hatchery tours and homeschool programs. The latter included Fish Senses, Pond Life, and Water and Watersheds.

The 2023 Georgia Fish Art Contest attracted nearly 300 participants. Entries were received from K-12 students statewide. Georgia's winning entries, along with the Go Fish Georgia Award winners, were placed on display for visitors to see.

In staffing changes, the center's longtime curator/preservationist moved into the statewide angler R3 position, and the part-time education employee became the new curator/preservationist in March 2023.

Grand Bay Wetland Education Center

During the 2022-2023 school year, approximately 8,500 students and 1,000 adults attended day classes at Grand Bay Wetland Education Center, a partnership between DNR's Wildlife Resources Division and the Coastal Plains Regional Education Service Agency.

Visiting primary students engaged with hands-on exercises in and out of the classroom. Children observed and learned about wildlife species, from apex carnivores such as American alligators to unusual plants such as hooded pitcherplants, and how these animals and plants interact within Grand Bay's unique ecosystem. Visits typically ended with a hike on the boardwalk and climbing the stairs up the observation tower. The center also piloted new programming.

Secondary education students performed exercises involving water quality and wildlife identification and collection. Experiments included a turbidity test, pH readings, dissolved oxygen, nitrate-level testing and nomenclature usage with identification. Identifying common specimens is always a bonus for these students, who spend most of their day at Grand Bay on the boardwalk doing field tests and making observations.

Program attendance followed a more normal routine compared to years during the COVID pandemic. Mobile field trips were periodic. Local behavioral health and long-term care facilities for adults visited Grand Bay. The center's largest public outreach participant was Lowndes Advocacy Resource Center, which serves adults with disabilities. These opportunities allowed the center to better serve our community beyond public schools. Other target groups included area home-school organizations, the largest being Classical Conversations.

The education center also continued partnering with Valdosta State University's Mass Media Program. Supported by the Harley Langdale Jr. Foundation, Valdosta State and Grand Bay created virtual lessons. With continuing support, more is planned for the next three years. The partnership included new social media involvement. During the year, an estimated 4,000 students viewed these new video lessons, either at home or in class. In June and July, the center also hosted Valdosta State's herpetology class, with Grand Bay serving as an experiential classroom for students to explore its Carolina Bay ecosystem.

Youth Birding Competition

The 17th annual Youth Birding Competition ran from April 14-22. During that time, teams of kindergarteners through high-schoolers picked a 24-hour stretch and competed by age group to find the most bird species.

After being canceled in 2020, held virtually in fall 2021 and switched to a hybrid in-person/virtual event in 2022 – all to address COVID concerns – the popular competition returned to an in-person only structure in 2023. Twenty-nine teams registered and a large, excited group attended the awards ceremony banquet at Charlie Elliott Wildlife Center in Mansfield.

The high school team Amazing Anhingas finished as the overall winner for the second straight year, with 144 species compared to 128 last year. Eleven other teams listed 70 species or more.

The middle school team Pi-billed Grebes raised $1,200 for wildlife conservation, the most of any team. The total for the competition, in

Golden eagle by Duluth's Kevin Lin, overall winner in the Youth Birding T-shirt Art Contest

which fundraising is a voluntary part, topped $2,200. Amy Alderman received the Mentor Award. Alderman spent 17 hours mentoring the St. Andrews Songbirds, a first-year elementary-school team from Macon.

The related Youth Birding T-shirt Art Contest received artwork featuring native birds from 108 pre-K through 12th-graders from 35 public, private and home schools statewide. Kevin Lin, a Duluth 11th-grader and student of SKA Academy of Art and Design in Duluth, won the grand prize for his golden eagle artwork. Lin received a $100 Amazon gift card and the honor of having his raptor featured on the 2023 Youth Birding Competition T-shirt.

The Youth Birding Competition is aimed at cultivating an interest in birds and conservation. Sponsors include The Environmental Resources Network, Georgia Ornithological Society and Georgia Audubon. Volunteers also are vital, helping with the art contest and awards banquet.

Camp TALON

The Wildlife Conservation Section's 13th annual Camp TALON took place June 3-8, 2023. TALON, short for Teen Adventures Learning Ornithology and Nature, is an offshoot of the Youth Birding Competition. (The original goal of the camp was to provide a weeklong ornithology class for recruits from the competition.) TALON is designed to teach teens how to identify birds, but it has evolved into an ecology-rich education for teens from Georgia and across the nation. It is not unusual for 30-40 percent of participants each year to come from other states, from New York to California.

Among other subjects, students learn about habitats and their management, threatened and endangered species, bird survey methods and data collection, coastal plants, island geology, how avian research is performed, the lives of invertebrates that live on beaches, and outdoor career opportunities. While birds are the star attractions, the conversations campers have with teachers and the insider's look provided by TALON into the work of biologists are invaluable. This impact is evidenced by the return of many teens to the camp in subsequent years and the numerous participants who have gone on to study wildlife, ornithology and biology in college.

Epworth by the Sea on St. Simons Island served as the 2023 camp base. Campers traveled by bus or boat to birding and outdoor classroom destinations. Sites included islands such as Jekyll, Sapelo, St. Simons and Little St. Simons, plus Harris Neck National Wildlife Refuge, Fort Stewart Army base and Altamaha Wildlife Management Area near Brunswick.

Camp leaders included a dozen teachers from state, federal and nonprofit agencies, as well as retired university faculty and professional naturalists. The 17 students and two interns came from five states, a sign of the camp's continuing national visibility. Students counted and learned about the biology of the 115 bird species observed during camp. They also learned how tides work; how birds fly, sing and migrate; how shorebirds find food on beaches; how invasive species compete with natives; how habitats are managed; and how biologists are working to recover sensitive species.

During the visit to Little St. Simons, campers witnessed researchers banding painted buntings and studying rare shorebirds. Students also helped remove birds from mist nets and release them after banding. Students talked with biologists concerning research and management involving red-cockaded woodpeckers, Bachman's sparrows, least terns, Wilson's plovers, flatwoods salamanders and wood storks. They also learned about prescribed fire, invasive species control, bird-banding studies and manipulating aquatic habitats to manage wading bird species.

In addition to support of volunteers and biologists, the camp was made possible by a grant from The Environmental Resources Network, or TERN, and donations from DNR Weekend for Wildlife supporters, Georgia Ornithological Society and Georgia Audubon.

2023 Camp TALON group (DNR)

Give Wildlife a Chance Poster Contest

Kindergarten through fifth-grade students submitted about 1,400 posters for the 2022-23 Give Wildlife a Chance Poster Contest. This annual program has encouraged students to explore the wonders of Georgia's native plants and animals through art for 33 years.

Students from 18 public schools, private schools and homeschool groups participated this year, taking to heart the theme of this year's contest, Wildlife Tales: True or False? Artwork was judged based on aspects such as theme, originality, quality and impact.

Winners were showcased on the DNR Wildlife Resources Division's SmugMug site and Facebook page. Each state winner received an award ribbon, a bandana featuring the 2022-23 artwork and other prizes. As in years past, parents and teachers of state winners were offered free DNR wildlife license plates.

The contest is organized and sponsored by DNR, the State Botanical Garden of Georgia and The Environmental Resources Network, or TERN, friends group of DNR's Wildlife Conservation Section.

Wildlife Viewing

From 1999-2008, the DNR Wildlife Resources Division awarded grants for projects that provided public opportunities to see and learn about native animals and plants. Recession-era spending cuts canceled the program in 2009. But the Wildlife Conservation Section resurrected it in 2018, again engaging conservation partners to help meet a wildlife viewing interest in Georgia that involved 2.4 million people and $1.8 billion in spending in 2011, according to the U.S. Fish and Wildlife Service. About one-in-four Georgians view wildlife, and this aspect of outdoor recreation has been growing nationwide since the mid-1990s.

Other than a Georgia Natural Resources Foundation startup grant in 2018, funding for the Wildlife Viewing Grants Program has come from the Georgia Nongame Wildlife Conservation Fund. The program emphasizes projects that reflect Georgia's State Wildlife Action Plan, raising awareness of priority species, habitats and conservation actions.

For example, along with other work, the 2022 grants helped build observation platforms along a nature trail at Hard Labor Creek State Park near Rutledge, provided wildlife cameras for students to investigate local wildlife at schools and education centers across the state, created shorebird guides used by steward programs to inform the public about priority species on Georgia beaches, and restored a popular boardwalk at Phinizy Swamp Nature Park near Augusta.

The 2023 cycle fielded 16 eligible proposals. Six were funded, totaling $16,869 in grants. They included:

- A bat call detector, portable demonstration bat house, red-light headlamps and other gear for outreach programs educating the public about bats. Recipient: Forsyth County; grant award $1,915.
- Cameras to capture time-lapse imagery of Little St. Simons Island habitats and wildlife to reach people about conserving coastal ecosystems. Recipient: Center for Coastal Conservation ($3,000).
- Interpretive trail signs promoting self-guided exploration at the 1,000-acre Henry County Water Authority's Cubihatcha Center in Locust Grove. Recipient: Cubihatcha Center ($3,000).
- Construction of a three-story wildlife-viewing tower for campers, other users and the public at Wanderland Campground near Rising Fawn. Recipient: The Wanderland Society ($3,000).
- Building a wetland observation deck and boardwalk, both open to the public, at McFadden Nature Center on the Chattahoochee River near Donalsonville. Recipient: McFadden Nature Center ($3,000).

Boy enjoys birdwatching and fishing at DNR Gateway to Fishing event (Linda May/DNR)

- Bat houses and signage for a bat viewing area and demonstration garden at the Athens-Clarke County Extension office. Recipient: Athens-Clarke County Government Sustainability Office ($2,954).

The projects involve work and spending by partners that will significantly amplify the grants provided. Final reports for fiscal year 2023 projects are due in December. Considering the importance of wildlife viewing in Georgia, the Wildlife Conservation Section plans to offer the grants again in 2024.

Wildlife Conservation and Public Affairs also continued exploring wildlife viewing and viewers as integral parts of DNR's constituency, significant in helping to achieve conservation goals. As noted in the fiscal 2022 report, Public Affairs' Rick Lavender provided comments in 2021-22 as a steering committee member for a national and regional survey of wildlife viewers led by Virginia Tech and the Association of Fish and Wildlife Agencies' Wildlife Viewing and Nature Tourism Working Group. The focus: a deeper understanding of wildlife viewers in the U.S. and how to engage them – "increasing agency relevancy to a wider array of people who enjoy the outdoors."

In tandem with that effort, funded by a 2021 Multistate Conservation Grant, Wildlife Conservation contracted with Virginia Tech to sample an additional 1,000 Georgians to better inform the agency about wildlife viewers, including their perceptions of DNR and how best to serve them. According to the findings, most wildlife viewers in Georgia:

- Identify as beginners, novices or intermediate viewers.
- List top activities as visiting places to see wildlife, plus feeding and photographing wildlife.
- Deem distance to viewing sites and having time to take part as the top barriers to watching wildlife.
- Consider themselves slightly to extremely familiar with DNR, although a third were "not familiar at all" with the agency.
- List litter cleanups as the conservation activity they're most likely to participate in (56 percent), with buying products that benefit conservation finishing second (40 percent).
- Want DNR to provide more information on where to see wildlife, species and access to viewing opportunities.
- Made at least one form of a DNR-related purchase or contribution in the past five years (over two-thirds), with a fishing license being the most common item bought.
- Hunted or fished in the past five years (51 percent) – respondents labeled "consumptive," with survey data showing them generally more active and involved in the outdoors than "nonconsumptive" respondents.
- This consumptive group also rated more familiar with and supportive of DNR, with 55 percent of nonconsumptive respondents saying they were not familiar with DNR.

Based on these findings, Virginia Tech recommended five actions DNR could take to better support wildlife viewers in the state:

- Provide more wildlife-viewing information and access.
- Promote around-the-home viewing opportunities.
- Develop social support networks for wildlife viewers.
- Focus on broadening DNR's relevance to wildlife viewers who do not hunt or fish.
- Develop financial support opportunities for wildlife viewers.

Next steps include developing an approach that uses the survey insights to reach and engage wildlife viewers in the state. In a follow-up effort to the national and regional survey, Virginia Tech is collaborating with the Wildlife Viewing and Nature Tourism Working Group and interested states on a "community of practice" that will create programs and services for wildlife viewers and share expertise among partners about wildlife-viewing projects.

The Georgia survey is posted in a flip-page format, explored in a webinar and available for download under the Research heading at georgiawildlife.com/wildlifeviewing. The webpage also includes the report, webinar and literature review for the national and regional survey.

Social Media

The reach of the DNR Wildlife Resources Division's social media sites – Facebook, Twitter, Instagram, YouTube, Flickr and a blog – continues to expand, engaging constituents and raising awareness of conservation efforts. The Facebook page recorded 195,061 followers through June 2023, the end of the fiscal year. Twitter had 16,100 followers and Instagram 24,825. Wildlife Resources' YouTube channel fielded 678,619 views during fiscal 2023. All of these totals marked increases over the previous year.

Two of the top-three performing posts on Wildlife Resources' Instagram account involved nongame wildlife. The video-based "First Right Whale Calf of the Season" led with a reach of 24,968 people. "Creepy Critter Week: Killer Songbird," which linked to a blog post profile of loggerhead shrikes, placed third by reaching 16,988.

Wildlife Conservation Section-related posts on the division's blog logged 22,866 views during fiscal 2023. "Rescuing a Right Whale," which documented the successful effort to disentangle right whale no. 1218 (Argo) from commercial fishing gear, drew the most views at 8,600. Largely due to Public Affairs assistant Ethan Hatchett, the number of these topical posts, including about plants and State Wildlife Action Plan species, significantly increased – from five in fiscal 2022 to 21 this year.

The division's social media team received two second-place awards at the 2023 Association for Conservation Information conference at Lake Tahoe, Nev. The honors included silver in Conservation Post of the Year (for "Bears Don't Have Collar Bones") and Best Social Campaign (for "Creepy Critter Week," which involved shedding velvet, the loggerhead shrike profile and other topics).

As in previous years, the Georgia Wild e-newsletter, which explores Wildlife Conservation's work, added readers in fiscal 2023. Circulation increased by 6 percent to more than 134,000 subscribers. Unique open rates averaged 39 percent (or 49,750 readers per issue), a healthy rate for government agency emails and up significantly over the previous year. The annual reader survey also again revealed consistent support for the content and format. According to the survey:

- Eighty-two percent of respondents had told someone at least once about an item in the newsletter.
- Ninety-five percent agreed that the newsletter informs them about conservation in an easy-to-understand way.
- Eight out of 10 were spurred to learn more about a wildlife species or issue, and nearly a fifth to financially support wildlife conservation in Georgia.

The 16-year-old newsletter features a variety of contributors, from staff and TERN Executive Director Terry W. Johnson – who writes the popular "Out My Backdoor" column – to the Georgia Nature Photographers Association, many of whose members generously provide their photos for use in outreach by the division.

Social media, the e-newsletter and other Public Affairs efforts are not only essential to broadening the reach of DNR communications, they enhance interactivity, engagement and customer service.

Other Outreach

Beyond youth contests and social media, the Wildlife Conservation Section promotes awareness of Georgia wildlife and conservation in many ways, such as providing educational displays at festivals, speaking to civic, technical and special-interest groups, informing lawmakers about rare species, explaining research to journalists, and partnering with other conservation organizations.

Staff worked many events in fiscal year 2023, including both rattlesnake festivals in south Georgia, Great Outdoors Day on the Atlanta BeltLine, the Bluebirds and Bluegrass festival at Dauset Trails Nature Center in Jackson, CoastFest in Brunswick and the Georgia Association of Tax Officials annual conference in Athens. Biologists and others also provided scores of media interviews. Outlets varied from Associated Press and Georgia Public Broadcasting to newspapers including The Atlanta Journal-Constitution, Savannah Morning News, The Christian Index and others; television stations in cities including Atlanta and Macon; radio outlets such as WABE-FM (Atlanta), WUGA-FM (Athens) and AccessWDUN (Gainesville); and, Georgia Recorder, The Current, The Georgia Virtue and other online news sites.

DNR's discovery of a gator using a gopher tortoise burrow in winter made headlines (Matt Moore/DNR)

Outreach is mentioned throughout this report. However, notable examples in 2023 included:

- Senior wildlife biologist Clay George, who previously led right whale conservation for DNR, worked with Public Affairs communications specialist Rick Lavender, then-social media coordinator Denise Shepherd and project partners to compile video and blog coverage of disentangling North Atlantic right whale no. 1218 (named Argo) from commercial fishing rope. The effort resulted in national headlines, including on CNN and Fox Weather. Meanwhile, the partial disentanglement of another right whale (no. 3812, Nimbus) in 2023, spurred media coverage as well, including Garden & Gun interviews with George and senior wildlife biologist Mark Dodd.
- A DNR social media post about wild birds becoming inebriated from eating fermented berries ("Don't drink and fly") went near-viral and included wildlife biologist Todd Schneider fielding a number of media requests about drunk birds. In more weird wildlife news, the discovery by wildlife technicians Matthew Moore and Andy Day of a 4.5-foot-long alligator using a gopher tortoise burrow in southeast Georgia spurred more headlines.
- Wildlife Conservation Assistant Chief Dr. Brett Albanese worked with Public Affairs to coordinate outreach, communications and web content about changes to the state's wild animal list. Those changes, explained via Facebook Live, social media posts, news releases and the Georgia Wild e-newsletter, included listing six reptile species popular as pets and requiring tagging and registration – coupled with a yearlong grace period – for owners to keep them as pets.
- Dr. Bob Sargent, a Wildlife Conservation program manager and leader of the agency's eagle surveys, did multiple interviews

DNR's Bob Sargent talks with Claxton Rattlesnake and Wildlife Festival visitors (Berkeley Boone/DNR)

regarding a 2022 statewide nesting survey that revealed a record high number of bald eagle nests – even as avian influenza undercut nest success rates along the coast. At the end of fiscal 2023, Sargent also released that year's findings that eagles were again nesting and fledging at healthy rates, which fueled more interviews and coverage.

- With a grant from The Environmental Resources Network, or TERN, friends group of the Wildlife Conservation Section, Fire Safety Officer Shan Cammack helped produce the video "Introducing the Indigo," a short documentary for youth about a federally threatened snake species and its habitat. The video was featured at seven film festivals and shown at Thomasville's annual Wildlife Arts Festival.

- TERN also helped fund another coloring book in the Burner Bob and Friends series, as well as "Brake for the Snake" bumper stickers. These products were shared at south Georgia schools and community events, including A Day in the Woods at Gaskins Forest Education Center in Alapaha and the Savannah River Fire Festival at the Mary Kahrs Warnell Forest Education Center in Guyton.

- Aquatic biologist Tiffany Penland helped Georgia educators learn about tangerine darters and other rare and threatened species during a snorkeling trip on the Toccoa River, part of an Outdoor Wildlife Leadership School field trip.

- Interviewing with Georgia Public Broadcasting, senior botanist Lisa Kruse described the relocation of more than 1,000 pink lady's slipper orchids from a Ga. 400 tract in Alpharetta marked for road construction. DNR Game Management Regional Supervisor Brent Womack helped explain efforts to conserve northwest Georgia's Dugdown Corridor for listeners of WABE-FM in Atlanta. Wildlife Conservation's coastal Program Manager Jason Lee did the same for how the U.S. Department of Defense has been key to protecting Ceylon Wildlife Management Area in Camden County and other significant tracts in Georgia.

- Wildlife Conservation staffed educational displays at rattlesnake festivals in Whigham and Claxton. In 2022, Whigham transitioned from a rattlesnake roundup – the last one in Georgia – to a one-day, no-kill, educational event. The response by Whigham Community Club organizers and visitors was overwhelmingly positive, with about 6,200 people attending in 2023. Claxton's weekend festival, which stopped accepting wild-caught rattlesnakes in 2011, drew thousands to its 55th annual event.

- Efforts to focus attention on invasive and potentially invasive species featured social media ads urging the public to report Argentine black and white tegus in southeast Georgia, an online survey focused on the effectiveness of that effort and related communications, and an interview with senior wildlife biologist Daniel Sollenberger on the WUNC-FM CREEP podcast episode "Black and White and Banned All Over* *Almost."

- Coosa Basin aquatic biologist Anakela Escobar collaborated with Guy Eroh, co-host of the U.S. Fish and Wildlife Service-funded podcast "Fish of the Week!", and partner organizations to produce the video "Conserving Coosa Mussels." Created as part of a federal Recovery Challenge grant, the video explains freshwater mussels in the upper Coosa basin, with a spotlight on efforts to restore endangered Coosa moccasinshells and the public's role in stewardship.

- Other videos with staff included training and development supervisor Berkeley Boone talking about salamanders, wildlife biologist Thomas Floyd discussing hellbenders with UGA Extension's Nick Fuhrman (aka "Ranger Nick") on the Farm Monitor and Program Manager Katrina Morris walking viewers through a culvert survey for bats.

- News releases by Public Affairs varied from the role the Georgia's Gopher Tortoise Conservation Initiative played in gopher tortoises not being added to the federal Endangered Species Act list in the eastern part of their range and loggerhead sea turtles' nest record in Georgia to downlisting smooth coneflower from federally endangered to threatened, the rebound of nesting bald eagles from bird flu on the coast and how Outdoor Stewardship Grants and partners proved critical to conserving what is now Ceylon WMA.

- Outreach coordinator Linda May and wildlife biologist Anna Yellin organized and awarded a $1,000 grant to technology teacher Vanessa Boone, who led students in designing and creating birdhouses using a 3D modeling program at The Lovett School in Atlanta. The annual Conservation Teacher of the Year grant from TERN recognizes exceptional Georgia K-5 teachers in life sciences.

- Anna Yellin led a Georgia Audubon Urban Ecologists program on invertebrates, helping the group of eighth- through 12th-graders learn iNaturalist, coordinating an insect bioblitz and building mason bee boxes.

- Linda May and Shan Cammack joined Bryn Pipes of The Nature Conservancy and conservation author Doug Tallamy as speakers at Columbus Botanical Garden's Naturalist Symposium, celebrating with more than

100 people in attendance the native plants, animals and habitats that make the upper Coastal Plain ecologically unique. Cammack presented on the role of prescribed fire; May gave an overview of wildlife in longleaf pine ecosystems.

- As a friend of Burner Bob, Shan Cammack teamed with the prescribed fire-promoting bobwhite quail mascot of The Longleaf Alliance at outreach events and developed school presentations that included the "Walk in the Woods with Burner Bob" video and activities from "Teacher Guide to Georgia Sandhills," an instructional resource for use with third and fourth graders.
- Wildlife technician Trip Kolkmeyer took a WTOC-TV (Savannah) reporter and videographer to check on the satellite-tagged manatee Sammy G in the Savannah River in May 2023. Tagging and tracking Sammy G and others is part of a partners project led by Clearwater Marine Aquarium Research Institute to map Florida manatee movements and glean data to help conserve the species.
- Linda May conducted outreach for audiences, including birding, garden and rotary clubs, Georgia master naturalists, schools and the public. Topics included aquatic ecology, backyard wildlife habitats, birding, herpetology, plant identification, DNR careers and Georgia's State Wildlife Action Plan.
- May also joined senior wildlife biologist Daniel Sollenberger, wildlife biologist Marylou Horan and wildlife technician Jacob Wilson in teaching about native reptiles during Fernbank Museum of Natural History's annual Reptile Day. Some 2,200 visitors enjoyed learning about the state's snakes, turtles and lizards through displays and up-close encounters.
- Noting that a 2021 survey of Georgia wildlife viewers showed that about a third also enjoy fishing, May teamed with DNR Gateway to Fishing staff at their community fishing events to inform and engage more anglers regarding wildlife viewing. New and seasoned anglers of all ages learned about local wildlife as May shared live animals on loan from Panola Mountain State Park and provided binoculars and instruction to participants interested in birdwatching while fishing.

Columbus Botanical Garden symposium speakers including DNR staff and author Doug Tallamy, far left, pose with an eastern indigo snake (CBG)

- On the DNR Wildlife Resources Division blog, posts by Public Affairs assistant Ethan Hatchett ranged from State Wildlife Action Plan species profiles, including Piedmont blue burrower and Flyr's nemesis, to Wildlife Conservation Section's work with landowners ("Saving Canby's Dropwort: A Family Tradition") and species ("Bat Crossing"), and general topics such as a four-part Animal Architect series. Administrative assistant Abbie Young wrote about barn owls and nest box options, Program Manager Bob Sargent explained how killdeer protect their nests and Public Affairs' Rick Lavender posted a Q&A with Wildlife Conservation Chief Matt Elliott.
- In publications by staff this year, plant ecologist Stephanie Koontz co-authored companion papers in the journal Conservation Science and Practice – here's one paper and the other – highlighting conservation needs for endangered Garrett's mint (work done in her previous position with Archbold Biological Station in Florida). Bob Sargent served as a co-author on a research paper led by UGA's Nicole Nemeth documenting the impact of highly pathogenic avian influenza on nesting bald eagles in the Southeast. Sargent also teamed with Savannah birder Pam Vercellone-Smith on an article in The Oriole, Georgia Ornithological Society's journal, about the state's first documented successful bald eagle nest on a human-made structure – an osprey nest platform near Fort Pulaski National Monument's visitor center.

Sprewell Bluff WMA (Mishay Allen/DNR)

Through its Real Estate Office, DNR acquired fee ownership of several properties for public recreation and wildlife conservation in fiscal year 2023. The acquisitions added to eight existing wildlife management or volunteer public access areas and ensured permanent protection of natural areas. DNR also closed on two conservation easements. Of is open to the public, and both are important conservation lands. The fee and conservation easement tracts were targeted in Georgia's State Wildlife Action Plan to increase public recreation and expand conservation across the state.

Acquisitions

Here are more details about each land purchase.

Altama WMA: Hammersmith and Indigo Tracts

DNR expanded Altama Plantation Wildlife Management Area in Glynn County in August 2022 with the purchase of two tracts: approximately 369 acres called the Hammersmith Tract and the 267-acre Indigo Tract. These acreages provide for the expansion of a fire-managed longleaf pine ecosystem beneficial to gopher tortoises and other imperiled species, improve management of the WMA and add public recreation opportunities.

The tracts were acquired with funding from a U.S. Fish and Wildlife Service Pittman-Robertson Wildlife Restoration grant, the Knobloch Family Foundation and The Nature Conservancy's Stone Mountain Industrial Park grant. North American Land Trust holds a conservation easement on the tracts and helped in the process that led to DNR's acquisition

Chattahoochee Fall Line WMA: Fort Perry East

Chattahoochee Fall Line, a wildlife management area in Marion County, was enlarged in December 2022 with DNR's purchase of approximately 1,342 acres from The Nature Conservancy. The property was bought subject to a conservation easement funded by the U.S. Army because of the tract's importance to Fort Moore near Columbus. This tract will enhance management of the WMA and increase public recreation opportunities.

The purchase was made using Georgia Outdoor Stewardship funding and a grant from The Knobloch Family Foundation.

Dugdown Mountain: Nature Conservancy Tracts

DNR acquired land along the Dugdown Mountain conservation corridor from The Nature Conservancy as part of the Treat Mountain Voluntary Public Access Area. The acquisition, finalized in December 2022, includes two tracts totaling approximately 2,424 acres in Paulding, Polk and Haralson counties. With this move, DNR can restore the areas' longleaf pine habitat and increase public recreation opportunities.

The purchase was made using a U.S. Forest Service Forest Legacy Program grant in partnership with the Georgia Forestry Commission. Additional grants to The Nature Conservancy that lowered DNR's purchase price came from the Georgia Outdoor Stewardship Program and the Knobloch Family Foundation.

Flat Tub WMA: USHA Reddy Trust Tract

Flat Tub Wildlife Management Area in Jeff Davis County was expanded in December 2022 with DNR's purchase of approximately 392 acres from the USHA Reddy Trust. The addition will allow DNR to restore the tract to longleaf pine and preserve native groundcover (both via controlled burns), while improving gopher tortoise habitat and management of the WMA as well as adding public recreation opportunities.

The purchase was made with a U.S. Fish and Wildlife Service Pittman-Robertson grant.

Altamaha grit outcrop on Flat Tub WMA (DNR)

Oaky Woods WMA: Paul Tract

DNR expanded Oaky Woods Wildlife Management Area in Houston County in July 2022 by purchasing the approximately 657-acre Paul Tract as an addition. This tract, which features about 2.5 miles of frontage on the Ocmulgee River, is considered important for black bears and will improve management of the WMA and increase public recreation opportunities.

The tract was purchased with funding from a U.S. Fish and Wildlife Service Pittman-Robertson Wildlife Restoration grant and the Knobloch Family Foundation.

Paulding Forest and Sheffield WMAs Addition

DNR expanded Paulding Forest and Sheffield wildlife management areas in Paulding and Bartow counties by purchasing 44 acres from the Thompson estate in December 2022. This property was a key edge-holding that improved management and increased recreation opportunities on these adjacent WMAs.

The purchase was made using DNR bond funds and a grant from the Georgia Chapter of the National Wild Turkey Federation.

Sansavilla WMA: Baptisia Tract

In June 2023, the last month of the fiscal year, DNR expanded Sansavilla Wildlife Management Area by purchasing the approximately 2,409-acre Open Space Institute Tract as an addition to the Wayne County WMA. Open Space acquired the tract from Southern Power Co. and held it until DNR could buy it. In helping DNR acquire the property, Southern Power and Open Space recognized the high conservation values, which include a viable gopher tortoise population, eastern indigo snakes and two populations of federally endangered hairy rattleweed, a plant species found only in this area of Georgia. The acreage was dubbed the Baptisia Tract.

Open Space also worked with DNR to restore longleaf pine on the site before the acquisition, removing invasive sand pine and planting longleaf. Prescribed fire will be used to further restore native groundcover and wildlife. This tract, along with the adjacent Wire Road Tract, will be managed by DNR's Wildlife Conservation Section and is open to the public for recreation.

The tract was purchased with two U.S. Fish and Wildlife Service grants, one each from the National Coastal Wetlands Conservation Grants Program and the North American Wetlands Conservation Act.

Sprewell Bluff WMA: Weaver Tract

DNR expanded Sprewell Bluff in June 2023 by purchasing the 104-acre Weaver Tract as an addition to the Meriwether County wildlife management area. This tract will allow the agency to restore the tract to montane longleaf pine using controlled burning, improve management of the WMA and increase public recreation opportunities.

The tract was purchased with funding from a U.S. Fish and Wildlife Service Pittman-Robertson Wildlife Restoration grant and The Nature Conservancy's Stone Mountain Industrial Park grant.

Conservation Easements

Canoochee Sandhills Tract

DNR acquired a conservation easement from the Georgia-Alabama Land Trust for approximately 3,900 acres – most in Bulloch County – as an addition to Canoochee Sandhills Wildlife Management Area near Groveland. This tract is critical for gopher tortoises and includes longleaf pine, native groundcover and bottomland hardwoods.

The property was under a conservation easement held by the U.S. Department of Agriculture's Natural Resources Conservation Service. However, that easement did not allow public access. When the property went up for sale, the Georgia-Alabama Land Trust acquired it. Teaming with NRCS, DNR and the land trust then designed a second conservation easement for the tract that transferred all management and public recreation rights to DNR. The agency will work with NRCS to restore the uplands to longleaf pine and return fire to the landscape, moves critical to the site's gopher tortoise population. After selling the conservation easement to DNR, the land trust conveyed ownership to Bulloch County, which is a full partner in the conservation effort.

The conservation easement was purchased with funding from a U.S. Fish and Wildlife Service Pittman-Robertson Wildlife Restoration grant and the Knobloch Family Foundation.

Warbick Farms

The conservation easement for Warbick Farms in Thomas County covers about 1,520 acres with exceptionally high conservation values. Although not open to the public, the site has mature longleaf pine, rich native groundcover, endangered red-cockaded woodpeckers and gopher tortoises. The easement will ensure conservation of these species and natural habitats of concern. The purchase was made using a U.S. Fish and Wildlife Service Recovery Grant, which the Warbick family matched.

Georgia Conservation Tax Credit Program

The Wildlife Conservation Section administers the Georgia Conservation Tax Credit Program in conjunction with the State Properties Commission. This program provides a tax credit for Georgia taxpayers who place conservation easements on their land or make fee-simple donations to qualified organizations. The original program expired Dec. 31, 2021. However, state lawmakers extended the program in early 2022, and it will continue through Dec. 31, 2026.

Of the two applications in three counties received in fiscal year 2023, both were approved by the State Properties Commission and received the tax credit. These eight certifications protected a total of 383 acres using bargain sales and conservation easements donated to qualified organizations.

Hairy rattleweed (Alan Cressler)

State Wildlife Action Plan

Georgia's State Wildlife Action Plan – a 10-year roadmap for conservation – focuses on Species of Greatest Conservation Need (SGCN) and the conservation actions that will protect and restore their populations and habitats. DNR must develop, revise and implement the plan to receive State Wildlife Grants. Georgia's apportionment of State Wildlife Grant funds for federal fiscal year 2023 was $1,529,756.

As coordinator of the State Wildlife Action Plan in Georgia, the Wildlife Conservation Section completed and submitted a revision of the original 2005 plan for review by the U.S. Fish and Wildlife Service in 2015. The revised plan, created and updated with the help of DNR's conservation partners, was approved in September 2016. Staff applied for and received a competitive State Wildlife Action Plan enhancement grant in fiscal year 2021. The funding, which began in fiscal 2022, supports development of a database that will be used by Georgia and other Southeastern states to identify, via a consistent framework, the status and efforts targeting species of greatest conservation need. Georgia's Wildlife Action Plan lists 640 such species. The grant also supports development of a conservation priority mapper to facilitate implementation of the plan's conservation actions by DNR and partners.

Wildlife Conservation staff officially began working on the next 10-year revision of the plan in October 2022. Staff developed a list of over 1,000 potential species of greatest conservation need that will be assessed during the revision; established and met with technical teams focused on taxonomic groups (birds, mammals, etc.) and conservation themes such as habitat management; and formed an advisory committee that will help guide the process. A draft will be completed and provided for public review in fiscal 2024, with a final plan due to the Fish and Wildlife Service in 2025. More information on the effort to revise Georgia's Wildlife Action Plan is available on the Georgia Biodiversity Portal.

Piedmont blue burrower, a high-priority species in Georgia's State Wildlife Action Plan (Chris Skelton/GCSU)

Regional Partnerships

Since 2010, the U.S. Fish and Wildlife Service has received three mega-petitions to list more than 500 species under the Endangered Species Act. The Fish and Wildlife Service's Southeast Region is responsible for roughly 60 percent of the workload to evaluate these species. More than 100 of the species are found in Georgia, amplifying the need for up-to-date status information to help inform the service's 90-day and 12-month findings to determine whether a listing is warranted. Current information on the status of petitioned species can be found on the Fish and Wildlife Service's at-risk species finder.

Tackling emerging issues such as mega-petitions to list species under the Endangered Species Act requires innovative approaches. One of those approaches has been creating regional conservation partnerships to achieve success that could not be accomplished by individual states. For example, the Southeast At-risk Species Initiative, often referred to as SEARS, is an initiative implemented by the Southeastern Association of Fish and Wildlife Agencies in cooperation with the Fish and Wildlife Service. The goal is for states to work together to preclude the need to federally list species. A similar effort is underway in the northeastern U.S.

State agencies and the Fish and Wildlife Service have prioritized numerous and wide-ranging at-risk species for collaborative conservation efforts. One example is the gopher tortoise, which until October 2022 was considered a candidate for listing across its eastern range in parts of Alabama, Georgia, Florida and South Carolina. While Fish and Wildlife coordinated with states to provide federal Section 6 funding for surveys and to develop proactive conservation agreements, DNR worked with the agency and other partners in Georgia's Gopher Tortoise Conservation Initiative to preserve the species and its habitats. All of these efforts factored into the service's determination that federal listing was not needed for gopher tortoises west of the Mobile and Tombigbee rivers in Alabama.

The focus on regional collaboration includes the Southeast Conservation Adaptation Strategy, called SECAS, an initiative of the Southeastern

Association of Fish and Wildlife Agencies and other state, federal and private conservation organizations. The strategy's primary product is the Southeast Conservation Blueprint, which stitches together smaller, subregional conservation plans into a single map identifying important areas for protection and restoration. The Conservation Blueprint is updated regularly based on new data and partner feedback. A revised version was released in October 2022.

Dramatic landscape-scale changes such as urbanization, competition for water resources, extreme weather events, sea-level rise and climate change pose unprecedented challenges for sustaining natural and cultural resources in the Southeast. Through the Southeastern Conservation Adaptation Strategy, partners are working together to design and develop a connected network of lands and waters that can support thriving wildlife populations and improved quality of life for people throughout the region.

In support of the regional effort, state members of the Southeastern Association of Fish and Wildlife Agencies also worked together on a project to develop a regional species of greatest conservation need list. State Wildlife Action Plans in 15 Southeastern states collectively identified nearly 6,700 species of conservation concern. The goal of this project was to identify a core set of species that represent highest conservation priorities within the region. The priority-setting process involved more than 100 scientific experts. Species were evaluated and ranked based on criteria that included level of conservation concern, regional stewardship responsibility and biological or ecological significance. The regional assessment focused on mammals, birds, reptiles, amphibians and fishes, as well as better-known invertebrate groups (freshwater mussels, crayfish and bumblebees).

Overall, 960 species were identified for this regional list. Three groups of aquatic organisms – freshwater fishes, mussels and crayfishes – comprise almost two-thirds of the lineup, highlighting both the impressive aquatic biodiversity of the Southeast and the imperiled status of many aquatic species. The final report and tables are posted on the DNR Wildlife Resources Division website at georgiabiodiversity.org/natels/sersgcn.

In 2021, Wildlife Conservation Section staff worked with members of the Southeastern Association of Fish and Wildlife Agencies' Wildlife Diversity Committee, Atlanta Botanical Garden and NatureServe to develop a proposal to the Fish and Wildlife Service for funding a similar regional species of greatest conservation need project focused on plants in the Southeast. The proposal was approved for funding in fiscal year 2022. Project partners, including Atlanta Botanical Garden, the Southeastern Plant Conservation Alliance and NatureServe, worked with experts throughout the Southeast to produce in May 2023 the nation's first regional species of greatest conservation need specifically for plants.

Gopher tortoise at the entrance to its burrow (Emily Ferrall/DNR)

Taxonomic Group	Tracked*	All	Records
Amphibians	32	97	900
Birds	52	393	1,292
Fishes	103	390	3,268
Invertebrates	342	2,041	2,534
Mammals	35	114	842
Natural Communities	200	348	1,462
Plants	784	6,328	8,155
Reptiles	38	106	1,703
Totals	1,586	9,817	20,156

**Species and habitats. Also tracked: Other (includes caves and wading bird colonies), 443 records.*

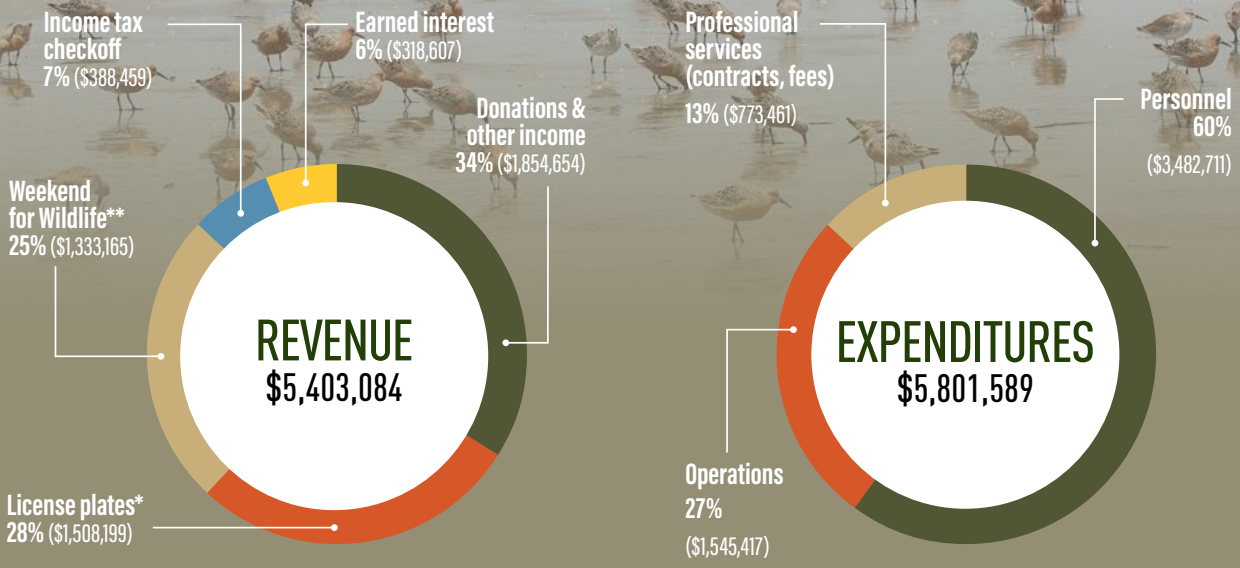
Tricolored heron and nest (Shirley Robinson/Georgia Nature Photographers Association)

Biotics Database

The Wildlife Conservation Section manages the NatureServe Biotics database, the state's most comprehensive database of occurrences of rare species and natural communities. Data in Biotics are used for many purposes, including environmental site reviews, conservation planning, scientific research, habitat restoration and management plan development. About 1,600 rare species and natural communities are tracked in the database, represented by more than 20,400 element occurrence records (i.e., geographic locations of species and communities).

During fiscal year 2023, Wildlife Conservation updated thousands of element occurrences, including 1,361 for rare species or natural community location records, plus adding another 344 such records. Users visited the agency's Biodiversity Portal, which houses 1,944 species profiles plus additional data on tracked species and habitats, around half a million times during the year.

Significant efforts were made to update information on species proposed for listing under the Endangered Species Act. Many are under federal review, and updating database records allows for a more accurate species-review process. Funded in part by an agreement with the Georgia Department of Transportation, staff also reviewed ecological reports and responded to 1,080 formal requests for site-specific data.



Does not include federal and other grants, or $110,759 in state appropriations for the Wildlife Conservation Section.

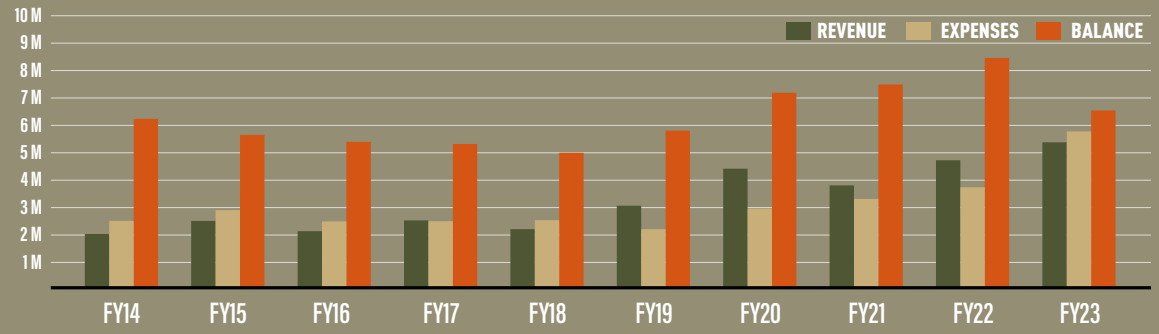
**Includes license plate revenue reported by the Department of Revenue in fiscal 2023 and disbursed after the year.*

***Includes 2023 Weekend for Wildlife revenue disbursed by the Georgia Natural Resources Foundation in fiscal 2024.*

Expenditures paid through the Nongame Fund.

NONGAME WILDLIFE CONSERVATION FUND

Listed in millions per year



Flock of red knots on Sea Island (Fletcher Smith/DNR)

Nongame Wildlife Conservation Fund

Fundraising remained a priority for the Wildlife Conservation Section in fiscal year 2023. Although the section received state appropriations, the $110,759 in state funding for general operations represented only about 2 percent of Wildlife Conservation's total fiscal 2023 budget.

The agency depends largely on four fundraisers: the sale and renewal of "nongame" license plates, Weekend for Wildlife, the Wildlife Conservation Fund state income tax checkoff and direct donations and other income.

Donations go to the Nongame Wildlife Conservation and Wildlife Habitat Acquisitions Fund, often referred to as the Nongame or Georgia Wildlife Conservation Fund. Created in 1989, this fund is dedicated by state law to support nongame wildlife conservation, wildlife habitat acquisition and related educational and promotional projects. The Environmental Resources Network, better known as TERN, also provides significant financial support to the agency.

Estimated revenue for the Wildlife Conservation Fund in fiscal 2023 was $5,403,084. This included:

- $1,854,654 in donations and other income.
- $1,508,199 in fiscal 2023 license plate sales and renewals.
- $1,333,165 from Weekend for Wildlife.
- $388,459 via the state income tax checkoff.
- $318,607 in earned interest.

Estimated revenue increased 13 percent, or $642,374, from 2022. Some license plate revenue reported in fiscal 2023 is disbursed by the Department of Revenue after the year's close. Also, the 2023 Weekend for Wildlife revenue shown was distributed to the Wildlife Conservation Fund at the start of fiscal 2024. Fund revenues do not include federal and other grants or state appropriations.

Expenses totaling $5.8 million were paid through the fund in 2023. Personnel accounted for 60 percent, or $3,482,711. Twenty-seven percent ($1,545,417) went to operations. Professional services, a category that includes contracts and fees, accounted for the remaining 13 percent ($773,461). Expenditures rose 53 percent compared to 2022. Factors included Conserve Georgia grant expenditures paid through the fund in fiscal 2023 and not reimbursed until after the year closed, and a backlog of equipment purchases ordered in fiscal 2022 but because of supply chain issues not delivered until fiscal 2023. Annual spending the last 10 years averaged $3.1 million.

The 2023 fund balance of just over $6.4 million marked a 25 percent decrease from 2022. After hovering in the $5 million range from fiscal 2015 to 2019, the balance increased each year to nearly $8.5 million in 2022. The annual average balance since fiscal 2014 is $6.3 million.

Nongame License Plates

Specialty license plates have been a standard of support for the Nongame Wildlife Conservation Fund for more than two decades. In 2019, DNR introduced the monarch-wildflower tag and retired the hummingbird design. Sales of the agency's popular bald eagle plate and the monarch or "pollinator" plate, as well as renewals of these and older designs, remained stable in fiscal year 2023. Vehicle owners can keep and annually renew any nongame plate, including those no longer sold at county tag offices.

Nongame tag revenue reported for sales and renewals in fiscal 2023 topped $1.5 million. The total is a 1 percent increase over 2022, when revenue was an estimated $1,492,864. Because of changes in tag data provided to DNR, a breakdown of sales compared to renewals was not available. However, there were 75,654 eagle, monarch and hummingbird tags on the road at the end of fiscal 2023. That is 487 more than in 2022. The number of nongame plates in circulation has risen, although minimally, for three straight years.

DNR reports tags sold and renewed by fiscal year. But returns distributed by the Department of Revenue can include revenue collected outside the July-June fiscal year. The differences can affect year-to-year comparisons. Also, 25 percent of net revenue from Jekyll Island's Georgia Sea Turtle Center plate goes to DNR for conserving nongame and is reported as tag revenue – an estimated $18,578 in fiscal 2023.

License plates have a leading fundraiser for the Wildlife Conservation Fund for years. That share was 28 percent in 2023, down from 31 percent in 2022, with "donations and other income" – at 34 percent of revenue in fiscal 2023 – leading all sources for a second consecutive year.

The continuing significance of the specialty plates is largely due to state lawmakers' decision in 2014 to lower the cost of buying and renewing all DNR wildlife tags to only $25 more than a standard plate, and to dedicate up to 80 percent of fees to programs the plates benefit. Since that change, $19 for each nongame tag bought and $20 for each one renewed has gone to conserve wildlife and natural habitats.

Sales and renewals had spiraled downward after legislation in 2010 upped the price for most specialty plates, reduced sponsor groups' share to $10 a tag and added an annual renewal fee. While the changes initially increased nongame revenue – peaking at $1.88 million in 2011 – the higher price, reduced benefit and extra fee soon sapped sales and renewals. Revenue bottomed out at $841,160 in fiscal 2014.

The challenge has been stemming the decline in renewals while increasing sales. Changes that helped included releasing a redesigned eagle and U.S. flag plate in 2016 and the vibrant-colored pollinator plate in 2019. The latter design featuring a monarch butterfly on a Georgia aster replaced the hummingbird tag. In fiscal 2023, 11,827 pollinator plates were issued or renewed, 2,272 more than in 2022. The eagle designs continued as the state's most popular specialty plates, although fewer eagle tags were sold or renewed in 2023 (55,208) than in 2022 (56,355).

The highpoint for nongame tags was 2010, with 347,401 eagle and hummingbird plates in circulation. Since then, the number of specialty plate designs offered in Georgia has surged, creating more competition, and the 2010 change in tag fees severely cut sales and support. Although factors such as the COVID-19 pandemic and churn of vehicle owners choosing or turning in specialty plates are difficult to gauge, 2023's uptick in nongame plate sales is encouraging, if less so because of the slight decrease in eagle tags in circulation. Tag revenue has exceeded $1 million a year since 2015.

Weekend for Wildlife

Weekend for Wildlife is one of the country's most successful fundraisers for conserving rare and other native wildlife, raising millions since its start in 1989. Held each winter at the prestigious Cloister at Sea Island, the event draws 200 to 400 guests for a weekend of outdoor trips, auctions and dining.

After the Georgia Natural Resources Foundation returned the fundraiser to an in-person event in 2022, following a virtual version during the COVID-19 pandemic, Weekend for Wildlife has continued to grow in sponsors, popularity and money raised. The 2022 event provided a record $1.1 million to the Nongame Wildlife Conservation Fund. The 2023 weekend pushed that mark higher, raising more than $1.3 million, excluding expenses and fees, directed giving for programs, and money raised by TERN.

The 2024 Weekend for Wildlife will again be held at The Cloister.

Georgia Wildlife Conservation Fund Checkoff

Created in 1989, the state income tax checkoff offers Georgians a convenient way to donate to the Nongame Wildlife Conservation Fund. Contributions to what is commonly called the Give Wildlife a Chance checkoff dipped to $388,459 in 2023, following a record $401,668 the year before.

Over the last 10 years, checkoff contributions – collected by calendar year – averaged $242,348. Before 2022, the amount had not exceeded $400,000 since before at least 2007. While it's not clear why giving surged in 2022 and continued strong in 2023, contributions had been trending upward since bottoming out at $113,606 in 2017. Although this year's amount declined, the nearly $390,000 collected still ranked second-most since 2017. The checkoff's all-time high of $510,910 was donated in 1991.

Labeled the Georgia Wildlife Conservation Fund checkoff by the Department of Revenue, the checkoff is line 30 on the state's long income tax form (Form 500) and line 10 of the short form (Form 500-EZ).

Online Donations

In 2018, the Wildlife Resources Division's License and Boat Registration Unit supervisor worked with division Public Affairs staff to create options for donating to the Nongame Wildlife Conservation Fund through gooutdoorsgeorgia.com, the agency's license and permit portal.

The additions allowed users to make a set donation or round up license purchases and renewals with the extra going to conservation. A promotion bundling a $10 donation with a $5 one-day hunting/fishing license is also available. License sales and renewals return to wildlife work in Georgia the license fees plus as much as $45 in federal excise taxes on guns, fishing rods and other hunting and fishing gear.

Donations online – and in smaller amounts from other license venues such as DNR offices, private vendors and the Brandt Information Service help desk – grew annually from fiscal year 2018 ($36,332, with the option added that March) to $236,351 in 2022. But the total declined 11 percent to $209,621 in fiscal 2023.

The roundup remained by far the most popular option in 2023, with 63,907 users giving a total of $172,006. Another 1,825 people gave $5 each ($9,125 total), 1,364 gave $10 apiece ($13,640), 262 donated $25 ($6,550), 70 contributed $50 ($3,500) and 48 people gave $100 ($4,800).

Donors new to gooutdoorsgeorgia.com simply select "Licenses and Permits" and create a customer account. They are then only a click away from turning their appreciation for gopher tortoises, Georgia aster and other native wildlife into financial support for conserving these species and their habitats.

The Environmental Resources Network

The Environmental Resources Network, or TERN, is a nonprofit organization founded in 1992 to support Wildlife Conservation Section activities. TERN, online at tern.homestead.com, raises most of its funds through membership dues as well as silent auction, raffle and sale items at Weekend for Wildlife.

In fiscal year 2023, TERN funded nine Wildlife Conservation proposals totaling $38,785. They included:

- **2024 Youth Birding Competition** $3,215
- **Bringing back purple martins** $4,800
- **Give Wildlife a Chance poster contest** $1,900
- **ACE (Adventures in Conservation Education) Camp** $4,240
- **Outdoor Wildlife Leadership School (OWLS)** $5,080
- **Camp TALON (Teen Adventures Learning Ornithology and Nature)** $4,900
- **TERN Conservation Teacher of the Year grant** $1,300
- **Community bat house** $7,750
- **Devouring beauties (pitcherplant conservation)** $5,600

TERN provided financial support, as well, to several other projects and related conferences throughout. The nonprofit has paid or obligated more than $1.5 million to Wildlife Conservation since 1992.

TERN officers in 2022 included President Joey Slaughter, Vice President Jerry Donovan, Secretary Kim Kilgore, Treasurer Jerry Booker, Executive Director Terry W. Johnson and Executive Secretary Wanda Granitz.

Federal and Other Funding

The Wildlife Conservation Section received $10.8 million in federal and other grants during fiscal year 2023 to support projects that benefit nongame wildlife and habitats. Expenditures involving grants, bonds and other funds totaled almost $5.3 million.

Grant sources varied from the State and Tribal Wildlife Grants Program, the Cooperative Endangered Species Conservation Fund and the National Coastal Wetlands Conservation Grant Program – all administered by the U.S. Fish and Wildlife Service – to the National Oceanic and Atmospheric Administration, National Fish and Wildlife Foundation, the U.S. Department of Defense, the Georgia Outdoor Stewardship Program and Southern Co. Use of the grants, usually matched with funds from the Nongame Wildlife Conservation Fund, included acquiring habitat for conservation and research, conducting surveys, and collecting data on occurrences of at-risk species.

State Wildlife Grants

Georgia's fiscal year 2023 apportionment of federal State Wildlife Grants was $1,529,756, up by less than 1 percent ($9,665) from 2022 but down 23 percent from the program's funding high-point in 2010. State and Tribal Wildlife Grants is one in a suite of federal conservation programs cut since 2010.

While there is bipartisan support for State Wildlife Grants in Congress, the funding is not sufficient for states to meet the conservation needs outlined in their State Wildlife Action Plans. Each state needs on average $26 million a year to effectively implement those plans, according to a national survey.

State Wildlife Grants is the only federal program designed to prevent wildlife from becoming endangered through voluntary, proactive conservation. Via the Wildlife Conservation Section, DNR's Wildlife Resources Division uses the funding to research and monitor species of greatest conservation need, restore habitat, acquire land, and accomplish other work identified in Georgia's State Wildlife Action Plan. This comprehensive wildlife conservation strategy is required to receive the grants.

Work spurred by the Wildlife Action Plan contributes to local and state economies. One way is through wildlife viewing. The nation's some 148 million wildlife viewers generated an estimated $250 billion a year in related expenditures in 2022, according to the U.S. Fish and Wildlife Service. A 2011 survey (as of fiscal 2023 the latest Fish and Wildlife Service data available on states) estimated the number of wildlife viewers in Georgia at 2.4 million, with them and visiting viewers spending $1.8 billion that year in the state. State Wildlife Grants are critical to helping conserve Georgia wildlife and natural habitats, the species and places valued by wildlife viewers and others involved in outdoor recreation.

As noted in the Education and Outreach chapter, the Wildlife Conservation Section was part of a national survey of wildlife viewers led by an Association of Fish and Wildlife Agencies working group and Virginia Tech. The survey, aimed at providing details about these constituents and how state agencies can better engage them, included sampling 1,000 Georgia wildlife viewers for DNR. The findings, released in fiscal 2023, are addressed in Education and Outreach. The Georgia survey is posted in a flip-page format, explored in a webinar and available for download at georgiawildlife.com/wildlifeviewing. The page also includes the report, webinar and literature review for the national and regional survey.

Recovering America's Wildlife Act

With State Wildlife Grants funding insufficient to meet the conservation needs in state Wildlife Action Plans, the push to secure dedicated funding to prevent more than 12,000 species from becoming endangered coalesced into the Alliance for America's Fish and Wildlife in 2017. The alliance grew out of the partnership developed by the Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources. Organized by the Association of Fish and Wildlife Agencies, the 26-member panel of national leaders representing outdoor recreation retail and manufacturing, energy and automotive industries, private landowners, schools, conservation organizations, sportsmen's groups, and state agencies worked to identify funding to support state conservation efforts to ensure the sustainability of wildlife.

Legislation in 2017 was followed by later revisions of the Recovering America's Wildlife Act. Powered by bipartisan and public support – a 2022 survey found that 70 percent of adult Americans favored the legislation – the bills outlined a funding model aimed at conserving the more than one-third of animal and plant species in the U.S. that face an elevated risk of extinction.

Bachman's sparrow (Todd Schneider/DNR)

In April 2022, the U.S. Senate Committee on Environment and Public Works approved Senate Bill 2372, steering the legislation toward a full Senate vote. That June, the House passed its companion bill, House Resolution 2773. However, despite bipartisan support, S. 2372 was not brought to a vote in the Senate. And although later added to a larger government spending bill, Recovering America's Wildlife Act was not included in that final omnibus package, reportedly in part because of questions about funding.

Proponents remain hopeful, however. Follow-up efforts in fiscal year 2023 focused on reintroducing the bill and possibly an alternative in the new Congress. From a Georgia perspective, the state's General Assembly unanimously approved a resolution in 2021 urging Congress to pass the act.

As proposed, Recovering America's Wildlife Act would provide $1.4 billion annually for states and tribal nations to conserve species of greatest conservation need in a voluntary, non-regulatory manner. Funding to states would total $1.3 billion a year; tribal agencies would receive $97.5 million. Most of the state funding would be dedicated to fully implementing each state's Wildlife Action Plan. These strategies, developed with partners and stakeholders, are focused on conserving populations of native wildlife species and the habitats they need before these animals, plants and places become rarer and more costly to conserve or restore. With the proposed changes completely phased in, Georgia would be eligible for an estimated $27.4 million a year, according to the Association of Fish and Wildlife Agencies.

Per the original legislation, funding would be allocated through the Wildlife Conservation and Restoration Program, established in 2000 under the Pittman-Robertson Wildlife Restoration Act. Pittman-Robertson, officially the Federal Aid in Wildlife Restoration Act, has provided critical support to states for wildlife management and conservation funding since 1937. Ten percent of the total funding available to states through Recovering America's Wildlife Act would be allocated via competitive grants.

DNR helped shape the effort to identify dedicated nongame funding for states. Former Wildlife Resource Division directors Dan Forster and David Waller took part in the Blue Ribbon Panel's first meeting.

Georgia projects that could be achieved through Recovering America's Wildlife Act are included at georgiawildlife.com/WildlifeActionPlan. Learn more about the nationwide effort at the Alliance for America's Fish and Wildlife website, ournatureusa.com.

Georgia Outdoor Stewardship Program

The Georgia General Assembly passed legislation establishing the Georgia Outdoor Stewardship Act in 2018. Later that year, 83 percent of voters approved amending the state's constitution to suit, and the change became effective in July 2019.

The Conserve Georgia grants and loans program (gadnr.org/gosp) provides a dedicated funding mechanism – at an estimated $20 million a year from the Georgia Outdoor Stewardship Trust Fund – to support lands and outdoor projects critical for wildlife, clean water and outdoor recreation. In February 2023, a fourth round of projects were chosen for the final part of the application process. If all 12 projects are approved, they will provide $28.7 million to benefit local parks and trails systems and state-owned lands. The grantees would leverage another $35 million in matching funds from project partners.

The 2022-2023 projects include:

- Bryan County, $3 million to revive outdoor recreation at Fisherman's Co-Op with boat ramps, a kayak launch, floating boat docks, picnic areas, biking trails and a wildlife observation platform.
- Carroll County, $1.95 million to expand McIntosh Reserve Park by 429 acres, including Chattahoochee River frontage, enhancing recreation and preserving Native American lands.
- Chatham County, $3 million to create Green Island Nature Reserve and Recreational Area by acquiring 400 acres of uplands on Green Island.
- City of Milton, $1.5 million to develop trails and other passive recreational opportunities, restore wildlife habitat, and remove old pipe systems on 130 acres of city-owned greenspace.
- Clayton County Water Authority, $3 million to develop the Huie group camping and outdoor learning area, including group shelters, nature trails and a competition-level archery range.
- McIntosh County, $1.19 million to improve Harper Lake Campground at Fort Barrington Park, adding ADA-accessible restrooms, changes to prevent flooding, a playground and a shelter.
- Wilkes County, $1.42 million to add about 178 acres to Kettle Creek Battlefield Park and develop trails, restrooms, outdoor classrooms and RV and primitive camping sites.
- DNR State Parks and Historic Sites Division, $5.1 million for 2,077 acres to protect high-priority species and habitats, buffer Amicalola Falls State Park, and provide for more outdoor recreation.
- DNR State Parks and Historic Sites, $2.5 million to add 1,493 acres to Providence Canyon State, doubling the size of the Stewart County park, conserving wildlife and increasing recreation.
- DNR Wildlife Resources Division, $2.1 million to grow Chattahoochee Fall Line Wildlife Management Area, buying 2,345 acres leased as voluntary public access lands in Marion County.
- DNR Wildlife Resources, $5.7 million to acquire and conserve three tracts totaling 8,384 acres in the Dugdown Mountain Corridor, one of the Southeast's most ecologically important corridors.
- DNR Wildlife Resources, $570,000 to expand Rock and Shoals Outcrop Natural Area near Athens by adding an 88-acre conservation easement that protects habitats and allows for public access.
- DNR Wildlife Resources, $758,965 for a second phase of habitat restoration on state lands in the Coastal Plain, with a focus on longleaf pine woodlands and savannas.

The pre-application period for the 2023-2024 funding cycle opened Aug. 1, 2023. The Georgia Outdoor Stewardship Program is managed by an 11-member board of trustees.

Administration and Personnel

As noted in the report introduction, the retirement in March 2023 of Wildlife Conservation Section Chief Dr. **Jon Ambrose** was a milestone. Ambrose joined DNR in 1986 after completing his doctorate in ecology at the University of Georgia. He spent the next 36 years informing efforts to better understand and conserve nongame wildlife species and natural habitats, while also helping guide and grow what is now the Wildlife Conservation Section.

Ambrose coordinated the creation and implementation of Georgia's first State Wildlife Action Plan, led a successful push to include plants in the plan (a standard other states would follow), served on state, regional and national committees and groups involving nongame-related work, co-authored "The Natural Communities of Georgia" (UGA Press) with Drs. Leslie Edwards and L. Katherine Kirman, fostered collaboration across agency and organization lines to advance conservation, and mentored and inspired scores of employees. He served as assistant chief of the Nongame Wildlife and Natural Heritage Section from 2004, then became chief of its successor in 2014. Ambrose, of Watkinsville, passed away peacefully on Oct. 12 at the age of 67.

Also during calendar year 2023, Wildlife Conservation marked the loss of retired GIS specialist **Chris Canalos** of Athens, who died Sept. 26, and Forsyth office wildlife technician **Ashley Harrington** of Culloden, who passed Oct. 17.

In April 2023, **Matt Elliott**, an 18-year DNR veteran, was promoted from assistant chief to chief of the Wildlife Conservation Section. The Athens resident began with the agency as manager of the Georgia Natural Heritage Program before being named the section's assistant chief in 2016. In the latter role, he helped manage statewide operations of Wildlife Conservation, served as federal aid coordinator and oversaw budget decisions. Before DNR, Elliott worked as a University of Georgia GIS specialist mapping the distribution of species and ecosystems in the Georgia Geographic Analysis Program.

Elliott graduated from the University of the South (Sewanee), completed a master's in forestry and environmental studies at Yale University, and did post-graduate work in geography at UGA. The avid hiker and kayak angler described his thoughts about challenges and opportunities facing the agency and conservation in a DNR blog post shortly after being named Wildlife Conservation chief.

Kevin Lowrey, formerly a special projects biologist for the Wildlife Resources Division's

Game Management Section, was promoted to fill the vacant assistant chief position. Lowrey started with DNR as a private lands biologist in 2004 and worked as a Game Management biologist in the northeast Georgia region and the state's Wild Turkey Project Coordinator for years. His role with Wildlife Conservation largely involves federal grants and land management.

In other Wildlife Conservation moves during fiscal 2023, the agency added the Stream Survey Team, led by Program Manager **Bryant Bowen** and previously part of Wildlife Resources' Fisheries Management Section. The Stream Team monitors surveys fish communities to monitor the health of wade-able streams. The focus dovetails with Wildlife Conservation's work to survey, restore and conserve freshwater aquatic species and habitats.

The DNR Commissioner's Office also registered key changes at the turn of the fiscal year. Commissioner **Mark Williams** stepped down in July. Williams, who served as commissioner for 12 years, became executive director of the Jekyll Island Authority, a job the Jesup resident said would allow him to spend more time with family. In August 2023, Gov. **Brian Kemp** announced the Board of Natural Resources' vote to appoint **Walter Rabon** as commissioner. Rabon, a Mansfield resident who began work with DNR as a conservation ranger in 1993, served as major of DNR's Law Enforcement Division before being named deputy DNR commissioner and then commissioner.

In September 2024, Rabon named Law Enforcement Division Col. **Thomas Barnard** as DNR deputy commissioner of operations and **Trevor Santos**, a former director with the National Shooting Sports Foundation, as deputy commissioner of public affairs, communications and grants.

Wildlife Conservation's **Courtney Davis**, **Ani Escobar**, **Liz Morata** and **Danny Smith** were chosen by administration as section champions in fiscal 2023. The following Wildlife Conservation employees were named We Are DNR recipients, a program in which staff recognize others in the agency for their efforts: **Ani Escobar**, **Emily Ferrall**, **Maggie Hunt** and **Danny Smith**.

Jon Ambrose with a sicklefin redhorse (Brett Albanese/DNR)

DNR's Matt Elliott releases a gopher tortoise with former UGA researcher Miranda Gulsby (Justin Eckelberry/Zoo Atlanta)

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

GEORGIA DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION
WILDLIFE CONSERVATION SECTION
2067 U.S. Highway 278 SE, Social Circle, GA 30025
(770) 557-3213

OFFICES ALSO AT:
116 Rum Creek Drive, Forsyth, GA 31029
(478) 994-1438
2065 U.S. Highway 278 SE, Social Circle, GA 30025
(770) 557-3213
One Conservation Way, Suite 310, Brunswick, GA 31520
(912) 264-7218
543 Elliott Trail, Mansfield, GA 30055
(770) 784-3059

Walter Rabon
Commissioner, DNR

Ted Will
Director, Wildlife Resources Division

Matt Elliott
Chief, Wildlife Conservation Section

Dr. Brett Albanese, Kevin Lowrey
Assistant Chiefs, Wildlife Conservation Section

Bryant Bowen, Jason Lee, Katrina Morris, Kim Morris-Zarneke, Dr. Bob Sargent
Wildlife Conservation Program Managers

Steve Friedman
Chief, DNR Real Estate Office

Linda May
Outreach Coordinator

Rick Lavender
Report Editor

Contributors:
Wildlife Conservation Section staff,
DNR Real Estate Office, DNR Law Enforcement Division

FOLLOW US

/WildlifeResourcesDivisionGADNR
/GeorgiaWild
/georgiawildlife
/georgiawildlife.wordpress.com, a Wildlife Resources blog
/GeorgiaWildlife

Also sign up for the Wildlife Conservation Section's free e-newsletter, Georgia Wild at georgiawildlife.com/GaWild.

Cover image:
Yearling frosted flatwoods salamander (Mark Mandica/Amphibian Foundation)

Report design:
OM Graphic Design | www.omgraphicdesign.com

Wood stork (Ty Ivey/Georgia Nature Photographers Association)