

# CONSERVING GEORGIA'S WILDLIFE



WILDLIFE RESOURCES DIVISION

n October 2022, the U.S. Fish and Wildlife Service announced that the gopher tortoise would not be added to the endangered species list in the eastern part of the tortoise's range, which includes Georgia. The decision followed an extensive evaluation of the species' status, long-term threats and ongoing conservation.

In Georgia, a concerted effort to conserve gopher tortoises and their habitat began in 2015 with the start of the Gopher Tortoise Conservation Initiative. The goal is permanently protecting 65 viable populations within the tortoise's range in the state. Though the gopher tortoise is the focus, conserving habitat for this keystone species also benefits hundreds of other native species.

By the end of fiscal year 2022, Georgia had protected 62 populations and the initiative was continuing to push for 65. This ambitious conservation campaign was made possible through the support of state and federal agencies, nongovernmental organizations, private corporations, individual landowners and private foundations.

The Gopher Tortoise Conservation Initiative reminds us that successful conservation depends on dynamic and effective partnerships as well as adequate financial resources. Consistent long-term funding — as envisioned in the Recovering America's Wildlife Act that failed to pass Congress in 2022 — is critical to maintain habitats, recover imperiled species and conduct a myriad of other activities that support wildlife conservation.

V I N

Through research, education, outreach, technical support, land conservation, habitat management and species recovery programs, Georgia DNR's Wildlife Conservation Section works with partners to address threats to native species and natural communities, focusing on elements in our natural heritage that are rare or declining. In this report, you will learn of the many significant challenges facing us, as well as some hopeful signs of success. Everyone can play a role in helping prevent the decline and loss of wildlife and their habitats, and in helping maintain this legacy for future generations.

As always, your support is greatly appreciated.

Jon Ambrose Chief, DNR Wildlife Conservation Section

WILDLIFE

GEORGIA'S

# CONSERVATION

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#### C O N S E R V A T I O N

BIRDS

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:

- Protecting important colonial waterbird and shorebird nesting habitats.
- Creating and restoring key waterbird habitats.
- Conducting research to determine the status and habitat needs of resident, migratory and wintering waterbirds.

Creating partnerships for long-term conservation of wetland-dependent bird species.

Conservation actions include protecting and managing five sand islands for beach-nesting and migratory birds. While this work is especially valuable for seabirds, resident and migratory shorebirds also benefit from nesting and resting areas free from disturbances. One of the areas, a dredge-spoil island near Brunswick called Bird Island, supports one of the largest colonies of nesting seabirds on the southern Atlantic Coast. Given the recent degradation of these offshore bar habitats, DNR is collaborating with the U.S. Army Corps of Engineers to create more habitat through the beneficial use of dredge spoil.

Highlights and challenges in fiscal year 2022 included the following.

For the seventh consecutive year, the Wildlife Conservation Section supported a Beach Stewards Program. This volunteer group helps protect a colony of least terns and nesting Wilson's plovers on St. Simons Island. Wildlife Conservation built the volunteer base through starting a master birder class, now held annually and taught with coastal partners. As during the previous year, training and outreach involving the Stewards Program was scaled back because of coronavirus concerns, although stewards continued to rope and protect the St. Simons' East Beach nesting site.

The East Beach site produced Wilson's plover chicks in 2022. An offshore bar at nearby Gould's Inlet produced two American oystercatcher chicks, but several nesting attempts by black skimmers, least terns and gull-billed terns failed due to high tides.

Because of the degradation of Georgia's offshore nesting sites, Wildlife Conservation experimented with deploying sand fencing on Ogeechee Bar to build up the bar's elevation. The efforts appeared to pay off, with three American oystercatcher chicks fledging and some 255 black skimmer nests fledging over 100 chicks, making it the state's largest black skimmer colony.

Unfortunately, other sites didn't fare as well. St. Catherines Island Bar began the year too low to use sand fences and was washed over often through the nesting season. The year proved challenging, too, for other priority seabirds such as least tern and gull-billed terns. The continuing degradation of offshore bars led to complete losses of colonies because of tides washing over St. Catherines Island Bar and sites on Little St. Simons.

Given these issues, Wildlife Conservation has worked closely with the Army Corps of Engineers since 2019 to encourage using material from maintenance dredging on the Intracoastal Waterway and shipping channels to build bird nesting habitat. The agency helped plan creation of a bird island as part of a dredging project where the Intracoastal Waterway crosses the Altamaha River. While ultimately there was not enough sediment to produce a supratidal island for nesting (an island above the spring high-tide line), the site created is used heavily by birds for foraging and roosting. The project also laid important groundwork for future collaboration with the corps on other projects that benefit birds.

Wildlife Conservation and partners tracked seabird colonies on Tybee, Little Tybee, Ossabaw, Little St. Simons and Cumberland islands, as well as the Brunswick dredge island, St. Simons' East Beach, Plantation Creek rakes and Ogeechee, St. Catherines and Little Egg Island bars. Staff also monitored several rooftop colonies of least terns. Overall, Bird Island was highly productive again, despite several oil spills from the removal of the MV Golden Ray carrier wreck that reached the island and oiled a number of birds. Peak counts at the dredge island in St. Simons Sound included 10,357 royal terns, 407 sandwich terns, 490 laughing gulls, 42 black skimmers and 254 brown pelicans. Another 583 brown pelicans nested nearby on shell rakes and marsh.

American oystercatcher productivity in Georgia slipped in 2022. DNR confirmed 24 chicks fledged and banded 23 of them. The agency continues to struggle with nest depredation and flooding as major challenges at many sites. Ongoing habitat restoration projects focused on providing increased elevation in areas with minimum risk of depredation will hopefully address some of these challenges.

In fiscal 2022, Wildlife Conservation completed a fall resight season focused on the ecology of migrating red knots. In the past two years, the species has experienced dramatic recent declines of up to 80 percent at a primary stopover site in Delaware Bay. Georgia provides critical foraging and roosting habitat for red knots during spring, fall and winter, and during some fall seasons supports up to 90 percent of what's called the species' Southeastern population.

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

During fall, a significant uptick in Mulinia bivalves was observed. 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. The birds in Georgia do not appear to be in decline, 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.



In 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 2022 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 66 surveys in all at 29 sites. DNR's red knot work was supported by a National Fish and Wildlife Foundation and Southern Co. grant.

During the spring 2022 field season, Wildlife Conservation staff and partners conducted night roost surveys along the Georgia coast, between Dafauski 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 help determine the highest 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 2022) 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 2023. 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.

In other updates, Wildlife Conservation:

- Continued coordinating spring and fall International Shorebird Surveys. These repeat surveys at key migratory stopover sites provide the best trend data for most shorebird species across the Western Hemisphere.
- Led the Georgia Shorebird Alliance with several coastal partners. Involving state, federal and private groups, this organization is making significant progress in management, monitoring, research and education regarding shorebirds on the Georgia coast.

- Continued with partners a sharp-tailed sparrow banding project that is providing data on the winter distribution of two species – Nelson's and saltmarsh sparrows – and five subspecies of these little-known birds.
- Received a National Fish and Wildlife Foundation and Southern Co. grant to install additional Motus towers in coastal Georgia and South Carolina in order to help track red knots.
- Helped with a project designed to provide education, outreach and volunteer opportunities for the public and area high school students during ongoing bird monitoring projects. This included providing support and guidance for two field events in which students and their parents learned shorebird and coastal bird identification and how scientists monitor the species, and leading online training to instruct volunteers in methods for collecting shorebird resight data. Project partners included Manomet, Georgia Audubon, UGA Marine Extension, Oatland Island Wildlife Center, Fort Pulaski National Monument and volunteer educators.



# 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.

2022 was busy for both Safe Harbor and redcockaded 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 53 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 200 groups.

The Wildlife Conservation Section worked with Safe Harbor participants and conservation partners in fiscal 2022 to conduct outreach and monitor woodpecker nesting and populations on cooperating properties. The agency 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 will partner with Tall Timbers to install inserts on Safe Harbor properties to boost red-cockaded woodpecker populations. 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 and conservation partners surveyed and updated the cavity tree inventory on multiple Safe Harbor properties this year. During these surveys, more than 100 new cavity trees were found and mapped for monitoring and to ensure they are protected during land management activities. The survey results continue to indicate a healthy population of the birds and underscore the importance of the Red Hills population, 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 several southwest Georgia sites and new cluster sites were added on properties in the region.

In partnership with Tall Timbers and The Jones Center at Ichauway, staff banded a record 128 nestlings on Safe Harbor properties. 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 2022, 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. This research will be done on wildlife management areas and Safe Harbor properties over the next few years.



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 71 young birds and installing recruitment clusters in suitable but unoccupied habitat, Ichauway now has 51 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, with 40 family groups -38potential breeding groups and two single-bird groups – as of fiscal 2022. The latest count reveals an additional three breeding groups since 2021, a substantial increase and further evidence of the positive impact of habitat work through regular prescribed fire, cavity management and installing recruitment clusters. Staff installed three recruitment clusters this fiscal year, including a cluster installed on adjacent U.S. Army Corps of Engineers property on Fort Scott Island at Lake Seminole. The new clusters proved successful, with two of the three being occupied by pairs soon after completion. Wildlife Conservation monitored nesting in 38 clusters at Silver Lake and banded 54 young, a 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 2022, the WMA near

Baxley had nine potential breeding groups, two more than the previous year. Staff and The Nature Conservancy monitored 14 fledglings on the property. The population at Moody is only one breeding group shy of reaching the WMA's goal of 10 groups. Staff will install another recruitment cluster this fall, which will fill all the currently available habitat. 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 Wildlife Management Area near Thomasville 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 2022, staff added or refurbished 12 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 has increased from two single birds to seven family groups (five potential breeding groups and two single-bird groups).

The WMA had a successful nesting season in spring 2022, with four nests producing five fledglings. The birds were also busy creating natural cavities and refreshing old, relict cavities. Late in the nesting season, a male that had not been banded, likely from an adjacent population, showed up at River Creek. This natural dispersal and the successful reproduction at the site are positive trends for the rare birds at River Creek. Thinning and burning multiple pine stands improved foraging habitat for the woodpeckers in fiscal 2022. With continued habitat management and prescribed fire, the red-cockaded woodpecker population is expected to increase at River Creek, 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 on the Oconee National Forest and Piedmont National Wildlife Refuge, giving this project a high likelihood of success. Next steps will include hardwood control in fiscal year 2023, with the first prescribed fire in decades planned for fiscal 2024. Inserts will then be installed in the park to attract red-cockaded woodpeckers dispersing from the adjacent population.

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 will work closely with the U.S. Fish and Wildlife Service in the coming years to propose and plan a reintroduction strategy. Red-cockaded woodpeckers once inhabited most of Pine Mountain, and there are relict nest cavities on F.D. Roosevelt State Park, Sprewell Bluff and 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 in the future. Habitat restoration is in full swing on Ceylon. In fiscal 2022, staff mechanically removed midstory from over 2,000 acres and thinned over 1,000 acres of upland pine. To further restore habitat for a range of highpriority wildlife species, staff have burned more than 2,000 acres on the WMA since 2020. 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.

The Wildlife Conservation Section and Georgia Southern University teamed to conduct a markrecapture study of this species for 11 years to gain a better understanding of its life history and demographics at wintering sites in the state. Standardized transects at three wildlife management areas – Paulks Pasture in Glynn County, Townsend near Ludowici and Moody Forest near Baxley – were surveyed each winter from January through March using a survey technique known as flush netting. In fiscal year 2022, Wildlife Conservation staff and Georgia Southern researchers published a paper summarizing the results of the study in the Journal of Field Ornithology.

In addition to conducting mark-recapture surveys, a Georgia Southern graduate student also conducted radio-telemetry surveys and vegetation analysis from 2019 to 2021 to determine winter movement patterns, use areas and vegetation structure important to wintering Henslow's sparrows. This work resulted in a master's thesis by the student in fiscal 2022.

Parallel research to learn more about the distribution of Henslow's sparrows in powerline corridors began in 2018. A habitat predictor model was developed with the Georgia Cooperative Fish and Wildlife Research Unit to help identify potential sites, based on known Henslow's sites and a qualitative evaluation of potential habitat. 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.

The model was refined during 2020 and an additional 200 transects selected to test for accuracy of habitat quality categorization using a statistically robust, random-stratified process. The primary question this effort will answer is whether stretches categorized as good or poor habitat match their assessments. Researchers can then accurately determine what stretches of habitat have a high probability of being suitable for Henslow's sparrows, and which have a moderate or low probability of being suitable. Estimates of the amount of suitable habitat, used in concert with other information, can provide a gauge of the size of the Henslow's sparrow population in Georgia.

From January through April 2022, staff visited and evaluated approximately 75 of the remaining 100 transects that had not been evaluated the previous two years. Over the three-year period, 178 of the 200 transects in the original sample were evaluated in the field for accuracy of categorization. Although results are preliminary, the habitat quality categorization model appears accurate and reliable. Habitat models are being refined further.

For **southeastern American kestrels**, nest box numbers reached a record high in 2022 with 70 boxes occupied, a 66 percent increase over the previous high of 42 boxes in 2019 and far above an unusually low occupancy rate in 2021. This exceptional rebound included 27 boxes that have never had kestrel nests before. Nest success rates also set a record with 116 chicks fledged, marking the first year to surpass 70 fledglings.

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 49 more installed statewide. Collaborations with Georgia Power are expected to result in another 50-60 high nest boxes in central west Georgia in fiscal 2023.

While many of these new high boxes have yet to be discovered by kestrel nesting pairs and remain unoccupied, fiscal 2022 saw the population of these small falcons spreading into new areas. 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. 2022 proved a testament to the many years of work poured into improving the habitat surrounding these nest boxes and to the power of developing collaborative relationships. The results offer hope for spreading the species further across the state and ensuring the stability of Georgia's kestrel population.

#### 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. This was the first systematic survey effort 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 whether the long-term restoration efforts have been successful 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 2022 surveys were conducted at 197 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 response of Bachman's sparrows to habitat management and restoration activities, the recent surveys have provided data for developing mathematical models that will be used to predict Bachman's habitat suitability on other state, federal and private lands. The modeling work is being done under contract by a graduate student and a researcher at the Virginia Cooperative Fish and Wildlife Research Unit at Virginia Tech University. Preliminary models have been developed, and field checks and ground truthing occurred from May-July in 2022. Refinement of these models will take place over the next year. The plan is to develop similar predictive models for loggerhead shrikes under this contract.

#### Prothonotary Warblers

The Wildlife Conservation Section continued surveying for prothonotary warblers in fiscal year 2022. 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 – often over water.

As part of a study exploring the bird's use of nesting habitat in riparian corridors in the region, Wildlife Conservation staff placed 45 nest boxes along the Ochlockonee and Alapaha rivers on Alapaha River and River Creek, the Rolf and Alexandra Kauka wildlife management areas. Alapaha WMA is near Ocilla; River Creek the Rolf and Alexandra Kauka WMA is near Thomasville.

In 2022, artificial nesting boxes were built to replace the oldest boxes at both sites. Six nests in boxes and three natural nests were monitored

at Alapaha River WMA. Three adult males, five adult females and 19 chicks were color banded to identify each bird. The nine nests fledged seven young. Also at Alapaha River WMA, an adult male first captured and banded in 2018 was resighted and recaptured, providing new morphometric data. The male was at least 5 years old and occupied the same territory it had established in 2018.

Oddly, no nests were discovered at River Creek in 2022 and only two adult males were banded, despite the presence of several adult pairs and evidence of nesting behavior. However, at Alapaha River WMA prothonotary warblers had a productive year, yielding the highest number of nests and fledged nestlings since monitoring began in 2018.

Point count surveys at 21 locations along the Ochlocknee and Alapaha rivers were also conducted three times during the 2022 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.

#### Wood Storks

The wood stork was federally listed as endangered in 1984 following dramatic declines in breeding colonies in southern Florida. Nests of this species were first documented in Georgia in 1965.

By the 1980s, wood storks were nesting here in increasing numbers. Georgia now supports more than 20 percent of the U.S. nesting population, which is estimated at about 9,500 breeding pairs. The recovery plan for wood storks in Georgia includes monitoring the reproductive success of nesting colonies, identifying potential threats and working with landowners and site managers to promote colony survival and longevity.

The Wildlife Conservation Section conducts aerial surveys each spring to find and monitor nesting colonies. Stork nesting effort – the number of pairs that attempt to reproduce – fluctuates annually. Calendar year 2014 set the state's nesting record for wood storks, with 2,932 nests in 22 colonies. Water levels then were favorable for nesting and foraging, and the colonies monitored for productivity had high nest success.

2022 proved an average year. Staff documented 22 colonies totaling 2,354 nesting pairs, a slight increase over the last several years. Twelve wood stork chicks were also tagged at the Gilman colony in St. Marys. Gilman is the second largest and most species-diverse colony in the state. Staff have worked closely with the new owners of the property to ensure that development plans take the colony into account and ensure minimal risk of disturbance. Possible options for controlled public viewing of the colony are also being pursued.

Another project in the works is the creation of a wading bird colony along the Altamaha River at Altama Plantation Wildlife Management Area near Brunswick. Efforts this year included manipulating water levels, planting trees and shrubs, and installing nesting platforms. The site will hopefully become a nesting colony as vegetation grows to a suitable size.

Overall, wood stork numbers are increasing throughout the species' range, and that range is continuing to expand northward into North Carolina. More than 75 percent of wood stork rookeries in Georgia are on private land. Conservation of this species depends on landowners' willingness to ensure the protection of viable freshwater-wetland nesting sites. DNR continues to reach out to and work with landowners to help protect and maintain colonies.

#### 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 radiotagged 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 2022 nesting season, Wildlife Conservation confirmed 26 active kite nests at 18 sites. The agency advised timber companies that owned property with nests about the nest locations and status. Staff confirmed that seven of the nests fledged young and two failed (including an adult killed by an owl), while three likely failed and the outcome for the rest was unknown. The productivity rates for swallow-tailed kite nests in the state seem to be only marginal.

Overall, swallow-tailed kite numbers appear stable in Georgia, although little recolonization of the species' historic range has been observed. About two-thirds of confirmed and probable kite breeding areas are on private land. The remaining third are on protected lands such as wildlife management areas, national wildlife refuges and military bases.

#### 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 have included monitoring known eagle nests in January and in March, working 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. Of those 229 territories, staff monitored 227 to determine their outcome and 146 successfully fledged at least one eaglet. In all, the nests fledged 227 eagles, or almost 1.6 per successful nest, slightly more than the 2017 average. While most nests had one to two eaglets, a nest near Columbus fledged three. At Fort Pulaski National Monument near Savannah, an eaglet fledged from a platform built for nesting ospreys. This was the first known successful bald eagle nest on a human-made structure in Georgia.



Despite the promising increase in total nests since the last comprehensive survey, not all news was good. A late-winter outbreak of highly pathogenic avian influenza substantially diminished 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.

Elsewhere in the state, nest success ranged from just below average in southwest Georgia (65 percent for 96 nests) to average in the north/northwest (77 percent for 22 nests) and significantly above average (90 percent for 30 nests) in the east/northeast region. The totals were similar to those from previous years. The 65 percent success rate for southwest Georgia is about 10 percent below average, but fluctuations of that magnitude are not unusual. Notably, Wildlife Conservation staff found 21 new nests in that area of the state, which is encouraging given that in 2018 Hurricane Michael felled more than a dozen nest trees there.

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 2022 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.

On the coast, the 73 nest territories recorded was typical, but only 47 percent fledged at least one young. Nests that succeeded fledged 1.5 young each, which is average. However, the 50 eaglets fledged fell far shy of the 80-plus the coast normally produces. The survey revealed more failed nests than expected. Some had dead eaglets. Others were missing young that usually would not have left the nest by that time.

The carcasses of eight ducks and three bald eagles collected on the coast in February and March 2022 tested positive for highly pathogenic avian influenza. Some eagles likely were infected by preying or scavenging on dead or sick waterfowl. Ducks often gather in large rafts in coastal waters during winter. In the months following the migration of waterfowl that winter in Georgia to breeding areas in the northern U.S. and Canada, no eagles found in the state tested positive for avian influenza.

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 work to return rehabilitated eagles to the wild.

#### Peregrine Falcons

For the fourth 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 two adult falcons were seen in the area during breeding season, no nest was found despite inspections of the gorge by parks and Wildlife Resources Division staff.

Nor was a nest site confirmed in Atlanta. However, three juvenile falcons and a pair of adults were seen around the Four Seasons Hotel in June. One of the juveniles suffered a collision-related injury and had to be removed from the wild. Wildlife Conservation staff built and donated a falcon nest box to engineers at Four Seasons, who installed it on the hotel's 50th floor in January. As of the close of fiscal year 2022, falcons had been seen inspecting it but had not yet occupied it. Wildlife Conservation initiated a potential partnership with managers at another high-rise building to possibly install a nest box.

Falcon sightings were reported from several other places in the metro area including Piedmont Park, Promenade Tower, One Atlantic Center, an apartment building in West Midtown, Norfolk Southern Corp. building and on a communications tower one mile south of Four Seasons.

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.



# 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.



AMPHIBIANS AND REPTILES

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Since comprehensive surveys were established in 1989, loggerhead nesting has been highly variable, with an average of 1,588 nests per year. In 2022, 4,053 loggerhead nests were documented on Georgia beaches. Nesting was over twice the 32year average and far 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 2022, it is 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 took part in a pilot study to assess the entrapment risk of sea turtles in poultry transport cages that were 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, has identified an average of 655 loggerhead females using the Georgia coast annually from 2008-2021, with a range of 303 to 1,093 turtles per year. A genetic sample was collected from every known nest deposited in Georgia in 2022. 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 2022, 78 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 2.3 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 33 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").

# 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 make it unnecessary to list Georgia's state reptile under the federal Endangered Species Act in the eastern part of the species' range. Members include DNR, Georgia Forestry Commission, the U.S. Department of Defense, Fish and Wildlife Service and 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. The species is federally listed as threatened in Louisiana, Mississippi and western Alabama. Within the rest of its range, until fall 2022 the gopher tortoise had been classified as a candidate species that warrants listing. In October, however, the Fish and Wildlife Service determined that tortoise populations in the species' eastern range were "robust" and the reptile in that area was no longer a candidate for listing.

The federal agency said partnerships contributed to conserving gopher tortoises and even helped document populations that weren't known about. But the Fish and Wildlife Service and DNR emphasized that the species still faces major threats, including habitat loss, and the need for continued protection in states is critical.

Ecologically, the gopher tortoise is a keystone species. Georgia's state reptile digs 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 diamondback rattlesnake.

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.

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 2022, the total was 62. The goal of the Gopher Tortoise Initiative has long been to protect 65 populations, an effort that will require raising an estimated \$150 million. The funding is expected to come equally from three sources: state, federal and private donations. Other projects may bring the total to 63 or as many as 66 protected populations by the end of fiscal year 2023.

The progress made for gopher tortoises has been 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 2022, the Wildlife Conservation Section's tortoise survey crew completed line-transect distance surveys on 7 sites. The surveys are used to estimate tortoise density and abundance. Sites included a private tract, the school forest at Abraham Baldwin Agricultural College in Tifton, The Conservation Fund-owned Beards Creek Tract and re-surveys of Penholoway Swamp, Sansavilla, Townsend and Silver Lake wildlife management areas. The crew also marked burrows before timber sales and habitat improvement projects on several WMAs and at Rosemont Plantation, a private Treutlen County tract and tortoise population under conservation easement.

Wildlife Conservation began conducting linetransect distance sampling for gopher tortoises in 2007. As of fiscal 2022, surveys have been completed on 122 sites statewide, public and private. Seventeen sites have been 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. One protected tortoise population was added in fiscal 2022, raising the total to 62. Conservation easements in the works could add four more in fiscal year 2023, bringing the total to 66, surpassing the collaboration's goal of protecting 65 populations.

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 several sites in Georgia, including Flat Tub and Canoochee Sandhills wildlife management areas and the Orianne Indigo Snake Preserve along the Ocmulgee River in south Georgia, 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 fifth year of a mark-recapture study of indigos on other lands. In fiscal 2022, staff tagged 29 "new" indigos with PIT, or passive integrated transponder, tags and recaptured 40 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 2023.

Also this year, the University of Georgia continued a telemetry study of indigos on state lands to investigate interactions between the snakes and translocated populations 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.

# **Bog Turtles**

The federally threatened bog turtle, the world's smallest turtle species, lives in Georgia mountain bogs generally found along slow-flowing spring creeks and seepages in low mountain valleys.

A captive population of five bog turtles is maintained at the U.S. Fish and Wildlife Service's Chattahoochee Forest National Fish Hatchery in outdoor enclosures that simulate natural mountain bog habitat. Two more wild Georgia bog turtles spent the winter and spring of fiscal 2022 with these captive turtles to facilitate breeding. The hope is the captive turtles soon produce hatchlings that can be head-started and released into restored mountain bog habitat.

# **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, and for the first time this year, Gaskins Forest Education Center and Abraham Baldwin Agricultural College, operate the project's rearing facilities. To address past difficulties with obtaining wild-produced gopher frog eggs, lab-reared gopher frogs have also been 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.

Two reintroduction or augmentation sites collectively received over 2,000 head-started frogs in 2022: 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.

An additional 500 Georgia gopher frogs were reared at the Amphibian Foundation for release in a newly constructed pond in Alabama as part of another cooperative project involving wetland hydrology restoration and gopher frog head-starting. Also, 125 frogs and 200 head-started tadpoles were returned to the source pond where the eggs were collected to supplement that existing population. In all, nearly 3,000 gopher frog metamorphs were reared in Georgia in 2022, which is a record.



# Flatwoods Salamanders and Striped Newts

Fiscal year 2022 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 have been 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 confirmed breeding at Sandhills and Alapaha River wildlife management areas. The population at Alapaha River, near Ocilla, appears to be responding positively to site management activities, which include prescribed fire, timber thinning and controlling hardwoods from encroaching on wetlands where the newts breed.
- The Amphibian Foundation also keeps a breeding colony of frosted flatwoods salamanders, a federally threatened species. The colony consists of more than 40 animals, and for the first time these animals bred 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 fall 2021 the Wildlife Conservation Section collected groundcover seed consisting mostly of native grasses such as toothache grass, wiregrass, bluestems and dropseeds from a wet seepage slope in Turner County. This seed was used to start about 7,500 grass plugs to restore groundcover around a reticulated flatwoods salamander site on Mayhaw Wildlife Management Area near Colquitt. Staff planted the plugs in spring 2022. Restoring native warm-season bunch grasses in the breeding wetland ecotone will improve the effectiveness of prescribed fire in maintaining the open herbaceous conditions necessary for salamanders to use the wetland. The grasses also provide cover for migrating adults and juveniles as they move between the pond and surrounding uplands.

# Alligator Snapping Turtles

Wildlife Conservation Section biologists reviewed and commented on a U.S. Fish and Wildlife Service proposed rule to list the western alligator snapping turtle as threatened under the federal Endangered Species Act. The best available scientific data for Georgia populations includes abundant estimates from catch-per-unit-effort surveys and population modeling using a longterm data set collected from a natural population. These findings do not indicate precipitous population declines, massive growth or quick recovery. Instead, the data suggest a gradual recovery of alligator snapper populations.

The alligator snapping turtle is a long-lived reptile that is slow to reach sexual maturity. The lack of a population increase is not surprising, especially considering that conservation measures such as banning harvest have been in place in Georgia for a small fraction of the species' life span. Threats identified for alligator snapping turtles – examples include nest depredation and incidental hooking – are only anecdotally supported in Georgia. Because the data collected from natural populations here did not indicate population declines, the data did not support federal listing in Georgia.

The state's Endangered Wildlife Act has protected all alligator snapping turtles from harvest and other harm since 1992.

# Georgia Blind Salamander

A 2021 petition to the U.S. Fish and Wildlife Service to list Georgia blind salamander under the federal Endangered Species Act triggered a challenging species status assessment involving the Wildlife Conservation Section in fiscal year 2022. While such assessments, part of the legwork aimed at clarifying a species' conservation status, are always demanding, they are more difficult when there are only a small number of confirmed occurrences or data on the species' distribution is limited. This is the case with Georgia blind salamanders.

These salamanders live in the subterranean waters of the Floridan Aquifer in southwest Georgia and adjacent Florida. The first known specimen was collected from an artesian well near Albany in 1939. Georgia added the salamander to the state's list of protected species in 1977, largely because of perceived rarity and the general lack of occurrence records. To date, there are only three known occurrences in Georgia and little understanding of the species distribution in the state. Over the last 45 years, only one additional Georgia site has been documented. All records are limited to sites accessible to humans, such as springs, caves, sinkholes and wells, which represent a small fraction of the total subterranean habitat likely occupied by these salamanders.

To break this conservation stalemate, rather than relying solely on the few occurrence records, Wildlife Conservation biologists delineated the extent of the Georgia blind salamander's likely geographic distribution based on an analysis of local geology, aquifer hydrogeology and species natural history. This delineation became the basis for an extensive species threat assessment conducted by the Fish and Wildlife Service as part of a now completed species status assessment. That assessment will, in turn, be used to determine if Endangered Species Act listing is warranted.

# 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 and has been slow to recover 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 have found 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. NOAA estimates that 50 calves would be 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 works with scientists and managers from the National Oceanic and Atmospheric Administration, 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.

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 and serve on the board of the North Atlantic Right Whale Consortium. Support is also 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. 'Q5

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During the 2022 calving season, survey teams identified 15 females with calves, 10 adult females without calves, 13 adult males and 11 juvenile whales. No dead or injured whales were documented, a significant improvement over 2020 and 2021 when two calves and a breeding female were killed and injured by vessel collisions off Georgia and Florida.

One entangled whale, a calving female known as number 3560 and nicknamed Snow Cone was spotted off Georgia with a calf in 2022. Snow Cone was first seen entangled in heavy fishing rope off Massachusetts in 2021 and was the focus of disentanglement attempts in New England and Canada. This was the first time a chronically entangled right whale had been documented calving successfully. No attempts were made to remove the remaining rope while she was in southeastern waters because the work would have posed a danger to Snow Cone's young calf. This case underscored that disentanglement response, while helpful in some cases, will not solve the whale entanglement problem. Solutions, such as seasonal fishing closures and ropeless fishing technology, must focus on preventing entanglements from occurring

## Marine Mammal Stranding Network

'02 '03 '04 '05 '06 '07 '08

\* All calves, including those documented outside the southeastern U.S.

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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 that have 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.

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The network documented 26 cetacean stranding events in calendar year 2021. This count included 23 bottlenose dolphins, two pygmy sperm whales and one entangled right whale. The cause of stranding could not be determined in half of the cases because carcasses were either too decomposed or could not be recovered. Of the remaining cases, four dolphins died from disease, one died from nonspecific findings (likely old age or disease), three dolphin calves died from natural perinatal complications, one right whale was entangled in Canadian snow crab fishing rope and three dolphins were entangled in local blue crab gear. One dolphin was still alive when it was reported and was successfully disentangled by Wildlife Conservation staff. A pygmy sperm whale carcass was frozen and dissected during a marine science class at Savannah State University in September 2022..

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 has 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 has shown that the bulk of Georgia's manatees overwinter in the same areas affected by the seagrass collapse.

Deaths subsided during the summers of 2021 and 2022 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 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. Eight manatee carcasses were found in Georgia during calendar year 2021. Three died from starvation during the spring of 2021 – likely in connection with the seagrass die-off in Florida. One manatee died from a watercraft collision and another from cold stress. Cause of death could not be determined in the remaining cases.



# **Small Mammals**

A grant for bat and small mammal conservation first awarded the Wildlife Conservation Section in 2019 continued to support work through fiscal year 2022.

The agency teamed with the U.S. Fish and Wildlife Service and the Georgia Department of Transportation in ongoing, statewide surveys of transportation structures for bats. Environmental surveys done 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. Wildlife Conservation has increased efforts to survey structures that are not scheduled for maintenance or other construction work.

This year staff revisited culvert sites that are considered significant hibernacula for state-tracked species such as the tricolored bat and southeastern myotis. Several of the sites were discovered during surveys in fiscal 2021. Continued monitoring is important both for conservation decisions and DOT project consultation. In addition to checking culverts, Wildlife Conservation staff also visited two bridges scheduled for DOT work to survey and monitor maternity colonies of big brown bats and Mexican free-tailed bats to recommend appropriate avoidance and minimization measures.

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 two courses in April 2022, both booked to capacity, plus a special session for biologists with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service in August 2021. This training ensures more survey coverage throughout the state by gualified 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 staff with questions regarding species identification and early coordination on minimizing project impacts on bats.

Wildlife Conservation also collaborated with the Fish and Wildlife Service and Federal Highway

Administration to release the training video "Bats and Transportation Structures Survey Training." The Georgia Bats in Bridges mobile app, available for download on Android and iOS devices, has also continued to provide an effective fielddata collection platform. During fiscal 2022, approximately 415 surveys of transportation structures for bats were documented through the app.

The statewide Anabat surveys continued in fiscal 2022. Project volunteers drove 17 DNR mobile acoustic route and nine North American Bat Monitoring Program route transects across the state collecting bat calls. DNR and U.S. Forest Service partners drove another 14 routes for the surveys. Most routes (detailed at georgiawildlife. com/AnabatProject) were run once or twice. Wildlife Conservation used software and visual identification to analyze acoustic survey calls

collected in calendar year 2021 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. This year, biologists worked with researchers from the University of Georgia to publish a scientific paper documenting the seven-year impact of white-nose syndrome on tricolored bat populations in Georgia. The paper presented results illustrating a significant decrease in tricolored bat activity two years after the disease was detected in the WNS-positive region of Georgia, whereas activity in the region where WNS was not detected remained stable. Understanding



changes in bat populations as WNS spreads and measuring the magnitude of population declines to assess disease impacts is crucial for informing management decisions.

A citizen-science program started in 2014 to monitor summer bat maternity roosts in the state continued in 2022. 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. Nearly 30 reports came in through the online survey and DNR staff connected with volunteers who did counts on public lands for the project. Information and annual reports can be found at georgiawildlife. com/bat-roost-monitoring.

As of winter 2022, Wildlife Conservation had confirmed white-nose syndrome, a deadly disease to bats, in 14 north Georgia counties and detected Pseudogymnoascus destructans, or Pd, the causative agent for the disease, in 11 more counties. Biologists also documented a 90-percent decline in bat populations at known hibernacula in north Georgia. Although tricolored bats have historically been the most abundant bat during the winter in north Georgia caves, low numbers of Myotis bats have always been observed. In fiscal 2022, gray bats were seen during north Georgia winter surveys in three sites. The gray bat is a federally endangered species that seems to be resistant to white-nose syndrome, or WNS.

Data from summer mist-netting in the state also shows declines for tricolored bats and Myotis bats, compared to pre-WNS summer mist-net surveys. In summer 2021, staff conducted mist-netting surveys at eight longterm monitoring sites across the state. These surveys detected some state-tracked species, including eastern small-footed and tricolored bats. The monitoring will provide biologists data needed to monitor capture trends in the years since WNS arrived. Sampling sites include areas where WNS has been documented and others where it hasn't.

Staff joined with volunteers from the Georgia Bat Working Group to hold the Bat Blitz at Crooked River State Park in October 2021. Researchers from across Georgia, as well as from six other states, conducted mist-net surveys along the coast at wildlife management areas, state parks, historic sites, national wildlife refuges and barrier islands. The turnout proved impressive, and participants hailed from state and federal agencies, multiple southeastern universities, and consulting firms. This blitz was the first conducted on the Georgia coast and during fall migration, with the focus centered on studying bat migratory patterns in the state.

Over 150 bats of seven different species were captured during the blitz. Georgia species of concern, such as the tricolored bat, were banded for capture-recapture studies. Motus Wildlife Tracking System transmitter tags were deployed on northern yellow, Seminole and eastern red bats. Five Motus tags were deployed on three northern yellow bats and two Seminole bats as part of a DNR migration study. Motus is an automated radio telemetry system that allows passive tracking of tagged bats for approximately 60 days. The blitz helped collect Georgia data on bats that will inform further survey and conservation efforts.

White-nose syndrome has killed millions of bats. According to the Fish and Wildlife Service, at the close of fiscal 2022 the disease had been documented in 38 states and eight Canadian provinces. Wildlife Conservation will keep monitoring sites in winter to document the spread of WNS and related mortality. Monitoring also has been expanded to south Georgia. During surveys, staff members swab bats to check for Pd, the fungus that causes WNS.



In winter 2022, 207 road culverts were surveyed, most of which had bats. The most significant site was in Chattahoochee County: This culvert had 364 southeastern myotis bats and 39 tricolored bats. Also this winter, staff documented Pd in six new counties. These results represent the third consecutive year that Pd has been detected in culverts and show Pd spreading farther south in the state. This winter was the first time in Georgia that WNS was found on a bat using a culvert hibernaculum. Before in the state, white-nose has been found on tricolored bats using caves. The site with the WNS-positive bat had tested positive for Pd in a previous winter. Biologists will be carefully monitoring all Pd-positive areas in future winters for the development of WNS.

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 16 bat education and outreach programs in fiscal 2022. The programs were given to school groups, master gardeners, volunteer groups and visitors at state parks and nature centers statewide.

In fiscal 2022, Wildlife Conservation continued surveying for eastern spotted skunks, another species of conservation concern in the State Wildlife Action Plan. The surveys targeted wildlife management areas in the Piedmont and the Chattahoochee National Forest. Only one eastern spotted skunk has been observed – at Tallulah Gorge – in three years of camera sampling. Several striped skunks were recorded, although their habitats are slightly different. Interestingly, the spotted skunk was spotted with a striped skunk. Reports of spotted skunk sightings have trickled in via the georgiawildlife. com/spottedskunkreporting website.

In 2021, Wildlife Conservation captured photos of a long-tailed weasel on the Chattahoochee National Forest. Long-tailed weasels are another



high-priority species in the Wildlife Action Plan and this find prompted a shift in planning for the eastern spotted skunk camera trapping program. Because the methodology syncs with several other carnivore camera trapping studies, in fiscal 2022 staff began repeated sampling for a study based on a multiseason occupancy design. The sardine bait used attracts carnivores of all sizes, from bears to bobcats, among many others. The eastern spotted skunk sampling design works for multispecies as well. Converting the design into a multiseason, multispecies occupancy approach will allow the agency to not only survey for spotted skunks but also to better understand population dynamics of predators and their prey.

Also in 2022, Wildlife Conservation analyzed scat data from Appalachian cottontails in north Georgia. Appalachian cottontails, also a species of conservation concern in the Wildlife Action Plan, are known to inhabit high-elevation balds. Sampling was done at several WMAs in the Chattahoochee National Forest. Scat analysis returned detections for two species: Appalachian and eastern cottontails. Preliminary results from the analyses show that elevation for site occupancy is important regardless of species.

Appalachian cottontails are usually found only at 1,900 feet above sea level or higher. Protective cover surrounding open areas is also important regardless of species. Cottontails need cover to hide from predators. Brambles and other cover surrounding wildlife openings were important for all cottontails. The presence of forbs was much more important than grasses for Appalachian cottontails, but not for eastern cottontails. This result is surprising and may indicate that Appalachian cottontails are more selective in their diets than eastern cottontails. Because detection was more limited for Appalachian cottontails, models with factors affecting detection were heavily weighted. Snow on the ground or recently burned stands had higher detection probability than those with vegetation or litter in the understory.

The monitoring efforts are important for developing baseline information on the status of cottontails in Georgia. The death of wild rabbits from rabbit hemorrhagic disease virus serotype 2 in the southwestern U.S. and as far east as Texas have raised concern about cottontail health in the Southeast. 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 – such as the Coosa River drainage in northwest Georgia – support an exceptional number of common and rare species. As part of the State 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 right 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.

#### River Basins and Priority Watersheds

#### **River Basins**

- 🔲 Atlantic Slope
- 🔲 Coosa-Tallapoosa
- 🔲 Gulf Coast
- 🗖 Tennessee

#### Priority Watersheds Highest

High

# FRESHWATER AQUATIC SPECIES

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 the Stream Survey Team of DNR's Fisheries Management Section, 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.

#### Coosa-Tallapoosa River Drainage

The Wildlife Conservation Section continued a project to support conservation of trispot darters. The trispot has a complex life history, requiring migration from feeding habitats in large rivers to breeding habitats in tiny headwater streams. Documenting more breeding sites and ensuring fish passage between breeding and feeding habitats is critical for recovering the species.

Staff coordinated with partners from the U.S. Fish and Wildlife Service and the Tennessee Aquarium Conservation Institute to sample for trispot darters. They piloted a repeated sampling approach where the same site is visited twice within a seven-day span. These repeated visits help researchers determine the probability that any given site is occupied by trispot darters, a federally threatened species. The pilot project detected two additional breeding sites, bringing the known total to nine. Staff plan to implement a full study in winter 2024 to better understand breeding habitats for trispot darters. Wildlife Conservation also worked 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 in 2022. Several rare fish and mussel species were detected, including blue shiner, trispot darter, bridled darter, finelined pocketbook, Alabama creekmussel, Coosa creekshell and Alabama rainbow.

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 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 fishes 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 has been important for conservation planning, species status assessments and documenting relationships between fish populations and environmental stressors.

In fiscal 2022, 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 and collected brood stock in the Tennessee portion of the Conasauga. These mussels were taken to the Alabama Aquatic Biodiversity Center, where the larvae transformed into juveniles. The juveniles collected in 2021 are now large enough for reintroduction at sites in Georgia and Alabama.



#### 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 the 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. Through the agreement, 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 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.

More than 300 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.



#### 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 have included 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 2024.

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.

During fiscal year 2022, Georgia, South Carolina and North Carolina completed work associated with a competitive State Wildlife Grant awarded in 2016. The grant allowed the Wildlife Conservation Section to increase monitoring in Georgia, adding more habitat surveys, visual surveys during the spawning season and targeted electrofishing surveys. The agency's robust redhorse team worked to improve management of data by developing and maintaining a rangewide database that helps the Robust Redhorse Conservation Committee make research and management decisions. The database houses 30 years of historic and ongoing collections and is used for geographical analyses and mapping. Providing easy access to and dissemination of data, it links genetic lineage information maintained by the South Carolina Department of Natural Resources to data collected in the field.

The robust redhorse team also held technical working group meetings to identify conservation actions to be included in Georgia Power's Candidate Conservation Agreement with Assurances. Georgia Power, a long-standing conservation partner, has committed to a new agreement when the current one expires in 2023. Staff continued to work, as well, with colleagues on conservation actions and restoration priorities in the Ocmulgee and to raise public awareness in general. Other entities involved in the robust redhorse grant include Georgia Southern University, the Georgia Cooperative Fish and Wildlife Research Unit, the University of Georgia's River Basin Center, the Fish and Wildlife Service and other agency and industry partners.

Partners continued a long-term study of the robust redhorse's Savannah population in fiscal 2022. 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. This year, the stationary receiver arrays detected eight tagged fish.

Also during 2022, the robust redhorse team secured funding for several targeted conservation efforts. Together with South Carolina and North Carolina, members applied for and were awarded another three-year Competitive State Wildlife Grant. In Georgia, this grant will help fund surveys, an environmental DNA (eDNA) study in the Oconee River and life history research projects such as radio-carbon dating of otoliths to age fish. Using mitigation funds from the Georgia Department of Transportation, staff will also conduct an eDNA survey in the Ogeechee River and pursue other conservation actions in the Savannah River basin.



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.

In 2022, 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 Sinclair at multiple depths using snorkeling and scuba. Species distribution and demographic data were collected and sites identified for future monitoring. Over 1,500 mussels were collected at 31 sites on Sinclair and more than 2,400 mussels from 11 sites on the main stem of the Altamaha. The latter included Altamaha arcmussels, the first for the project now in its fourth year.

Staff also began a partnership with UGA focused on conducting host fish identification and phylogenetic analyses for four mussel species of interest. At Magnolia Springs State Park near Millen, surveys done at six sites – two within the park and four downstream in Spring Mill Branch – assessed mussel and fish populations. The work helped inform park managers on establishing minimally harmful herbicide treatment options while protecting habitat aquatic species.

Wildlife Conservation managed contracted research involving federally endangered shortnose and Atlantic sturgeon. The work is carried out 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 Atlamaha and estimating the number of adult Atlantic sturgeon migrating into Atlamaha tributaries – the Oconee and Ocmulgee rivers – for spawning. The Atlamaha 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.

Wildlife Conservation 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 2022, biologists completed surveys of three long-term monitoring sites in the lower Flint River and observed how prevailing conditions have 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 is the result of several years without a significant drought event. Unfortunately, high flows prevented the annual long-term monitoring survey of Spring Creek in fiscal 2022. However, this reach still provides habitat for common and rare species and remains a priority for monitoring and conservation.

While collecting fish on the upper Flint River for a UGA-led project identifying host fish for freshwater mussels, staff spotted a winged spike mussel. The find represented the first record of this species, a high priority for conservation in Georgia's State Wildlife Action Plan, above the Flint River Dam at Albany since 1953.

Staff biologists took part in the second year of the ACF freshwater mussel host project with Albany State University, the University of Georgia and Flint RiverQuarium. The host-fish trials for Flint River mussels were conducted at the RiverQuarium and available for viewing by visitors to the Albany center, while Albany State students and UGA handled the care of host fish and the collection of mussel data.

Unlike most mussel host-fish identification studies, the project focuses on wild inoculated fish, as opposed to fish that have been exposed to mussel larvae in a lab setting. This method allowed researchers to not only identify fish species capable of acting as hosts for native mussels in the Appalachicola-Chattahoochee-Flint River basin, but which fishes interact with these mussels in the wild. Initial results are promising and larva from several mussel species successfully developed on a variety of fish species. Further trials looking at fall and winter host relationships are scheduled for fiscal year 2023.

Staff played host for the first virtual meeting of the newly re-formed Appalachicola-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 will meet annually to share research and collaborate on conservation efforts in the ACF basin.



# PLANTS AND NATURAL HABITATS

# **Rare Plant Conservation**

Rare plant conservation in the Wildlife Conservation Section is led by the botany team, a group that includes mostly new staff since 2019. In fiscal year 2022, the team worked to redefine its role in Georgia's plant conservation community. Public awareness of the need for plant conservation is increasing and DNR botany efforts are benefiting from increased support. With the public looking to DNR as a primary source of information on rare plants and their conservation, the agency made more strides toward clearly defining its scientifically sound leadership role in plant conservation in the state and the Southeast, alongside primary partners of the Georgia Plant Conservation Alliance (GPCA).

The resulting long-term topical goals for the botany team are:

- 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 Georgia Plant Conservation Alliance to share data, expertise and resources.
- Promote plants: raise awareness of plant conservation, foster young botanists and build connections with landowners.

Fiscal 2022 offered insights on the team's abilities and limitations as it pursues

these goals. A significant challenge is that Georgia has more than 4,500 plant species. Systematically ranking the conservation priority of species is central to DNR's advisory role. The GPCA has helped facilitate communication and standardize sharing of sensitive data with partners, while DNR has taken a step-by-step approach to implement new technologies and workflows in the agency and within GPCA.

TRANSIL

In Georgia's State Wildlife Action Plan, plant conservation follows 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 high priorities for protecting plant biodiversity.

#### 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 the Fish and Wildlife Service Endangered Species Act grants is critical to botanical surveys in the state and is why surveys often target federally listed plants or plants 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.

Fiscal 2022 proved a banner year for finding plants thought to be nearly extirpated from Georgia. For over 25 years, both Georgia leadplant and state-endangered American barberry were known to exist in Georgia in only one population each. Georgia leadplant was in marginal timber plantation habitat in Telfair County. Yet surveys this year led by the North Carolina Natural Heritage Program discovered the plant in a second site and GPCA volunteers found a third. DNR visited the landowners and the Fish and Wildlife Service organized habitat improvement workdays. As for American barberry, it had declined to only a few stems in Bartow County. But DNR botany staff digging through Heritage archives uncovered two undocumented sites on U.S. Forest Service lands in Northeast Georgia, on the opposite side of the state.

Federally petitioned dwarf hatpins were surveyed in late-spring 2022. This species flowers just as pools and seeps on its granite outcrop habitat begin to dry up. Out of seven outcrops visited, plants were only found at two: Both were small populations with less than 20 plants.

Occurrences of federally endangered pondberry are systematically being visited as part of a Fish and Wildlife Service Recovery Challenge Grant administered by DNR. Unexpected resiliency for the species was documented at Sandhills Wildlife Management Area East. Although monitoring had shown the population declining as the hydrology changed at the pond site, plants appear to be migrating into preferred microsites, using tree boles, stumps and shrub bases in the pond and moving up the slope into the margins of the pond. Over 580 stems were counted in fiscal 2022. Also, two undocumented locations for pondberry were marked at Mayhaw Wildlife Management Area near Colquitt during a routine survey before forest management work began. One had more than 5,000 stems, while only 20 stems were found at the other site.

In fall 2021, stem counts were completed for all locations of endangered dwarf sumac. Two sites have natural populations; seven are introduced. At a natural site in Newton County, only three female stems were found, a sharp decline from the population's peak of 162 stems in 2008. Counts at the other natural site, Lower Broad River Wildlife Management Area near Elberton, showed the plant continuing to increase, from 1,504 in 2020 to 1,762 in 2021. This site is a restoration success story powered by the use of prescribed fire and regular mechanical control of hardwoods. DNR's Game Management Section burned the site as recently as spring 2022.



Of the introduced populations, one at Panola Mountain State Park is thriving – with more than 1,000 stems in the latest count – while the other six are small, each with less than 50 stems.

DNR botanists led volunteers in monitoring Georgia aster, which helps meet requirements for the Candidate Conservation Agreement with the Fish and Wildlife Service to prevent this species from becoming endangered. Populations of Canby's dropwort, a plant already federally listed as endangered, are monitored regularly at high-priority sites. At the start of fiscal 2022, the species was seen for the first time since 2014 at a pond on the state-owned Neyami Tract in Lee County. The site has experienced high levels of flooding since 2013. Botanists feared the species would be extirpated from the pond because the plant relies on a seasonal dry down for germination and growth. With continuous flooding, the seeds and roots would be more likely to rot.

In Dooly County, a new monitoring protocol was implemented at the recently protected Woodward Canby's Dropwort Preserve. Hundreds



of thousands of stems occur at this private site in Vienna and restoration of the threatened habitat – pond cypress savanna – is ongoing. The monitoring goal is to assess the success of restoration efforts, while hopefully also capturing the movement of the species into newly improved habitat.

In southeast Georgia's Jenkins County, Canby's dropwort populations occur at Big Dukes Pond Wildlife Management Area and a nearby protected private pond. At Big Dukes, repeated monitoring indicates a stable population of over 500 stems. At the private pond, the population dipped in 2019-2020 to fewer than 50 stems, but a census in summer 2021 found a reassuring increase to slightly more than 200 stems.

Endangered persistent trillium has a narrow distribution: It is known only from steep slopes around Tallulah Gorge in northeast Georgia and is closely associated with eastern hemlock. In fiscal 2022, Wildlife Conservation botanists continued their survey and population counts of the plant on Tallulah Gorge Wildlife Management Area near Tallulah Falls. Joined by volunteers, staff focused this year on extensively surveying the two largest populations on state property by walking the branches and even examining areas with non-suitable habitant to rule them out for future surveys. Twenty-eight volunteers and land managers spent over 500 people hours surveying for the species. DNR now knows with some certainty the extent of the populations on these branches. Unfortunately, while the effort documented additional plants in these areas, the results were consistent with surveys the previous two years showing an overall decline in the habitat and populations of this globally rare species.

Five of the state's seven known populations of Tennessee yellow-eyed grass were visited in collaboration with the Fish and Wildlife Service. All of the populations were in good condition: One had over 5,000 stems. Seeds and DNA samples were collected at each for ex-situ conservation and research under the Recovery Challenge grant.

Wildlife Conservation also made a renewed effort in fiscal 2022 to assess Biotics records for species not seen in over 20 years: These are labelled historic species. Some taxa can be found in recent herbaria collections and simply needed data updates. Others required site survey to determine their status. A DNR volunteer found velvetleaf milkweed in Taylor County. Prior to this discovery, Georgia had only two historical specimens of the plant, one documented in 1909 and the other in 1969.

In similar work to improve rare-plant records, the team's Natural Heritage botanist is leading a continuing collaborative effort to survey and understand cryptic and understudied plants such as non-vascular liverworts, hornworts and mosses, and also to help document lichens. The plants' habitats, such as spray-cliff walls in the Georgia mountains or open sandy patches in Coastal Plain bottomland forests, are often challenging to access. DNR volunteers assist with surveys, and regional experts in these plants provide identification information. For example, DNR staff trained with Dr. Paul G. Davison at the University of North Alabama, one of the foremost bryologists in the Southeast. Wildlife Conservation began identifying the plants in its growing bryophyte collection, started in December 2020

In fiscal 2022, Wildlife Conservation staff also continued yearly population monitoring of Radford's mint. This annual grows up to 26 inches tall, has cinnamon-scented leaves and sports showy pink flowers in the fall. The state-endangered species is known to exist in only two locations along the north side of the Altamaha River. One is on a private hunt club under a conservation easement with The Nature Conservancy. The other is on Townsend Wildlife Management Area in Long and McIntosh counties.

Townsend WMA features extensive xeric aeolian river dunes. When DNR acquired the property in 2008, it was planted with invasive sand pine. Assessments of the Radford's mint population began in 2009, documenting only 278 individuals. Since then, the habitat has been improved by thinning and replacing sand pine with longleaf pine. In 2005, Radford's mint was outplanted in six areas, several of which now have sustained annual populations. A population assessment in calendar year 2021 counted 7,544 individuals, the highest count so far.

In northwest Georgia, the Ridge and Valley physiographic province harbors unique plant diversity and rates as a priority for surveys.



Work during fiscal 2022 focused on improving records for spring ephemerals, cedar glade species, large-flowered skullcap and ginseng. New taxonomic entities, such as three species of Canadian wild ginger split from one, also were an important survey focus, as were reviews of DNR forest management proposals, with many Game Management Section projects overlapping with rare species occurrences. The agency continued a partnership with the Forest Service to update rare species records on the Chattahoochee National Forest to account for these occurrences during landmanagement planning. Fall surveys during 2021 turned up new locations of Georgia aster and Carolina thistle; spring 2022 surveys found a robust population of pink lady's slipper orchid.

#### Natural Heritage Data

DNR is regularly adding to the knowledge base of what wild plant species are in Georgia, where they are and how they are doing. These tasks are interrelated and based on the objectives of collecting specimens from the field, identifying species collections, accessioning herbarium specimens, entering data to the Biotics database, compiling checklists of species in Georgia, ranking species based on rarity and using those ranks and data to inform priorities for further surveys and conservation management. Staff work with Natural Heritage Network partners at NatureServe to keep skills sharp and communications up to date.

A comprehensive checklist of the vascular plants that occur naturally in Georgia has not been published since Wilbur H. Duncan and John T. Kartesz<sup>.</sup> "Vascular Flora of Georgia: an Annotated Checklist" in 1981. Since then, countless updates involving flora additions and taxonomic changes have been overlooked. The Wildlife Conservation Section has been working with Dr. Alan Weakley at the University of North Carolina at Chapel Hill to renovate the state checklist of vascular plants. In fiscal year 2021, the agency began digitizing its archival records, which date to the start of the wildlife conservation program in the 1970s. The need to modernize how the data is communicated and shared within DNR and with others was underscored by the COVID-19 pandemic, which limited staff communications and access to historical documents. Many of these records contain location data, landownership context and population data for longest-standing projects.

By the end of fiscal 2022, Modern Image of Marietta, hired to handle the scanning of rare plant data and priority management sites, had scanned hundreds of thousands of pages representing a total of 1,400 species folders and 510 management area folders. The information is keyword searchable and available electronically to Wildlife Conservation Section and key partners throughout the state. Daily, this resource is used to update Biotics, the rare species database. Consistent and regular updates to Biotics increase the accuracy of the data Wildlife Conservation provides to partners and the public.

#### 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 Georgianative 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 at the start of fiscal year 2022 was the awarding of nearly \$780,000 for a Wildlife Conservation-led partnership to safeguard 14 imperiled plant species in Georgia. The U.S. Fish and Wildlife Service Recovery Challenge grant will also boost 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 spreading their horticultural expertise and support to the members of GPCA. The overarching goal of the grant-funded work is to develop genetically sound plant collections – living and seed-banked – in botanical gardens and in the wild.



As part of the grant objectives, new ex-situ safeguarding collections were made by DNR for endangered hairy rattleweed, pondberry, Virginia spiraea and Tennessee yellow-eyed grass. Seed was collected from two occurrences of hairy rattleweed, both on private property, and deposited at the State Botanical Garden. On an industrial timberland. thousands of hairy rattleweed seed were collected in anticipation of upcoming harvest. For pondberry, 50 fruits were collected from Sandhills Wildlife Management Area East and deposited into long-term seedbank storage at Atlanta Botanical Garden. Staff trekked to remote rocky waterfalls in Cloudland Canyon to collect Virginia spirea cuttings, which were placed in the care of Atlanta Botanical Garden and the Chattahoochee Nature Center. For Tennessee yellow-eyed grass, approximately 300 seedheads were collected from Georgia's largest known site of the rare grass. The seeds will be used to augment an introduced population at Crockford-Pigeon Mountain Wildlife Management Area near Lafayette.

Funds provided by this project also increased GPCA collaboration. As part of their commitment to this grant, the state and Atlanta botanical gardens, Chattahoochee Nature Center and DNR led or took part in over 16 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 implementing new technologies to share data.

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 the Ohoopee River floodplain swamps, all funded by a U.S. Fish and Wildlife Service Coastal Program grant. During fiscal 2022, more than 500 plants of state-protected purple honeycomb head, at-risk wireleaf dropseed and bog yellow coneflower were planted in seeps. Federally endangered pondberry and state-protected Georgia bully and pond spice were planted in other wetlands. Monitoring of outplantings in fall 2021 documented a survival rate of about 75 percent for the honeycomb head

and bog yellow coneflower and 90 percent for Georgia bully. Wireleaf dropseed was too small to be monitored effectively.

For this same project, 700 pitcherplants were tucked into the Ohoopee powerline seeps in spring 2022. Species included sweet pitcherplant, Coastal Plain purple pitcherplant and parrot pitcherplant. Their survival will be monitored as well.

Wildlife Conservation also worked to protect pineland lily, also commonly called sandhills lily. 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 protective cages around the lilies at The Nature Conservancy's Broxton Rocks Preserve in Coffee County. The cages are protecting the plants from deer browsing in hopes they will 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 population size.

#### 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 smallscale controlled burning and hydrologic repairs.

In fiscal year 2022, the Wildlife Conservation Section worked on restoring habitat for federally endangered Alabama leatherflower, dwarf sumac, Tennessee yellow-eyed grass and hairy rattleweed, plus state-tracked pineland, or sandhills, lily. These efforts were done in partnership with the Georgia Plant Conservation Alliance.

The only known natural occurrence of Alabama leatherflower in Georgia is on state Department of Transportation property in Floyd County. The primary threats to leatherflower are deer herbivory and loss of open woodland habitat due to encroachment of trees and shrubs. In fiscal 2022, DNR and DOT collaborated to find resources to build a deer fence around the plant's habitat. Installation is planned for fiscal 2023. The two



agencies led workdays with the Georgia Plant Conservation Alliance to remove woody species, survey rare plants and plan the fence installation.

The Wildlife Conservation botany team hosted several volunteer work events for GPCA's Day of Service, initiated this year to provide an outdoor venue for the GPCA gathering each fall. DNR botanists led crews in multiple activities for dwarf sumac. This work included restoring habitat for a natural population at Lower Broad River Wildlife Management Area near Elberton, building protective enclosures and controlling encroaching woody plants for an introduced population at Chattahoochee Nature Center in Roswell, and rescuing plants from a declining natural population on private property in Covington.

Wildlife Conservation has partnered with DOT long-term to restore a population of Tennessee yellow-eyed grass on a DOT site along Interstate 75 called Interstate Hypericum Springs. This plant community is severely affected by invasive plants and channelization of a stream. DOT and DNR have planned bi-annual workdays to remove invasives using herbicides and solarization. In fiscal 2022, staff removed larger woody material, uncovered invasive vines covering the native vegetation and outplanted yellow-eyed grass seeds into previously solarized areas. While the area needs continuing management, the endangered grass has bounced back to more than 50 flowering spikes.

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 rarest habitats of the Southern Appalachians. These wetlands are typically small, from a half-acre to 5 acres, and usually associated with seeps, springs and small creeks. Yet 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 pitcherplant also occupies wet meadows in the seeps. Other rare and stateprotected 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 the Georgia Plant Conservation Alliance. In calendar vear 2021. GPCA held 43 workdays totaling 197 days of labor. Target sites include 10 mountain bogs – and five upper-Piedmont prairie and woodland sites - in northeast Georgia. Activities varied from habitat mapping, rare plant monitoring, seed collecting and planning meetings to management and monitoring of feral hogs, habitat restoration, invasive species management and Bog Learning Network meetings. The Wildlife Conservation Section consults in planning management for these bogs and takes part in restoration workdays. Specifically in fiscal year 2022, staff focused attention on bogs with the highest floristic diversity and on helping monitor and collect seed from a "flagship" bog species, endangered swamp pink.

#### **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 going on 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 occurrences has been 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.


In fiscal years 2021 and 2022, Wildlife Conservation collaborated with Columbus State University graduate student Melanie Flood on the project's fieldwork component, which involved research at three of the highest priority bogs. Each bog is in a different physiographic province of the Coastal Plain: the Tifton Uplands in Colquitt County, the Atlantic Southern Loam Plain in Wheeler County and the Sea Island Flatwoods in Charlton County. The research includes a floristic inventory, an assessment of threats and possibly classification and geographic analysis of vegetation associations at the bogs.

Six surveys conducted at each site in the previous fiscal year found rare species such as Tracy's dew-threads, Stokes aster, purple honeycomb head, feather-bristle beaksedge, hartwrightia, wire-leaf dropseed, yellow flytrap and parrot pitcherplant. Among all three bogs, the diversity totals came to 43 distinct families, 98 genera and 179 species. The data provide guidance for conservation actions at each bog.

Wildlife Conservation Section worked with the Georgia State Parks and Historic Sites Division to continue monitoring and stewardship of 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 of the species in Georgia's southeastern Coastal Plain. Most protected sites for sweet pitcherplant are in the western Fall Line sandhills region of the state.

Another 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 also feature gopher tortoises, Georgia's state reptile. The bogs are in adjacent drains owned by five landowners. Wildlife Conservation coordinates with each landowner to monitor and restore the bogs along a powerline right of way. Work at the site began in 2006 and demonstrates the effectiveness of partnerships and consistent landowner outreach in concert with the Interagency Burn Team, the GPCA, Atlanta Botanical Garden, Georgia Power Co., Georgia Botanical Society and the Georgia Native Plant Society. In fiscal year 2022, monitoring of 300 pitcherplants outplanted in 2019 revealed encouraging results. Sixty-five percent of the Coastal Plain purple pitcherplants (174 plants) and 70 percent of the trumpet pitcherplants (14 plants) remained.

The Coastal Plain Native Plant Society Chapter also provided yellow trumpet and hooded pitcherplants grown from local seed to outplant in a bog at Reed Bingham State Park near Adel.

#### 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 111 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 2022, 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.

The Recovery Challenge Grant from the U.S. Fish and Wildlife proved a primary support for GPCA coordination in fiscal year 2022. As a result, coordination through the network reached a new level. Project planning for the 2022 field season, started in June 2021, 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 has provided for better data sharing, meeting planning, volunteer coordination and resource allocation, increasing GPCA's productivity in fiscal 2022. Innovations include:

- An online volunteer application form and volunteer database that enables pairing of local plant stewards with projects.
- A field form for tracking species occurrence visits.
- Protocol for reporting and submitting calendar deadlines.
- An online open share folder with critical GPCA policy and information documents, including updated contacts and species leads, and lists of priority species and sites by region.
- Updated project planning protocol synced with a calendar.
- A revised species prioritizing plan that involves "parking" some species for discussion annually and loops back to those species in following years.
- A Day of Service statewide for team building in the aftermath of the COVID pandemic.
- An archive spreadsheet of all GPCA species project planning meeting notes sorted by species and year.

#### **Agency Partnerships**

Public-private partnerships are often critical to plant conservation because most land in Georgia is privately owned. A focal point for these joint efforts 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 their emphasis on improving data collection and communications regarding such sites.

One focus of DNR's collaboration with GDOT 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 botany, have collaborated closely with DOT in this effort. Botany provides plant survey data and recommendations for managing protected plants at these sites.

A primary example is a pitcherplant bog environmentally sensitive area near Waycross. The area protects a diverse pitcherplant bog that includes parrot and hooded pitcherplants. The bog occurs along the entrance to Okefenokee Swamp Park, which is home to a state Regional Education Service Agency. Education staff at the park have a long-term relationship with DNR botanists. They use the 177-acre bog for education and to harvest seed from pitcherplants for their teaching collections. In return, they monitor the bog for DNR. In winter of 2018-2019, the park naturalist reached out to DNR with concerns that DOT was damaging the bog through improper mowing. Pitcherplants were not able to set seed and ruts were occurring in the bog. DNR-mediated negotiations involving Okefenokee Swamp Park and DOT have been ongoing since 2019. In 2021, park staff offered to take responsibility for stewardship of the bog and DOT will no longer mow the site. By June 2022, the partnership had grown to include Georgia Forestry Commission to help with prescribed fire. An agreement for mowing and burning by the partners is still in negotiation. DNR has served a consulting role in developing the agreement.

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 on the ground 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, the number of impacts to this plant is increasing. In fiscal year 2022, DNR helped DOT and consultants on relocating four populations. Three projects to move stands of 100-300 plants were done in Coweta, Paulding and Union counties. DNR helped with selecting relocation sites, digging and planting orchids and monitoring the rescues.

The fourth pink lady's relocation is exceptional because all of one of Georgia's largest populations and its habitat will be affected by state Route 400 construction in Alpharetta. There are over 1,000 plants in one of the last patches of intact woods in the area. Because the impact is 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 worked 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, sampling orchid mycorrhizae (a symbiotic association between fungus and plant) for research and studying genetics of the populations relocated at the new sites.

In March 2022, DNR completed phase one of this pivotal relocation, moving over 600 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. The project involved more than 45 volunteers from the Georgia Plant Conservation Alliance, Georgia Botanical Society and DOT. Atlanta Botanical Garden also sampled population genetics, hand-pollinated plants and collected seed for long-term storage. 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 fiscal 2021, DNR and DOT began exploring avenues for the Georgia Native Plant Society on 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. The first high-profile project occurred in fiscal 2022, when a transportation project in Twiggs County would displace trilliums, skullcaps and rare milkvine. The trillium at the site seems to best fit a new species that is in the process of being described. The skullcap species is also unknown. DNR determined the presence of these species justified a rescue, but since none were confirmed as protected, the Native Plant Society was brought in the loop. DNR, DOT and society members mapped out plant locations and in May 2022 rescued more than 300 plants. They are being transferred from Native Plant Society coordinators in Tifton to the State Botanical Garden in Athens.

DNR has had a formal partnership with the U.S. Fish and Wildlife Service since 1985. This association has 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. In fiscal 2022, Wildlife Conservation helped the Fish and Wildlife Service in drafting a formal species status assessment for relict trillium. The data analysis provided justification for keeping the relict trillium on the endangered species list.

The federal Natural Resource Conservation Service is a critical partner in outreach to private landowners for conservation. Wildlife Conservation botanists are working with the federal agency to protect wetland habitats of endangered Canby's dropwort. In the past decade, two wetlands have been 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 have halved the total acreage initially targeted, but closure on conservation easements is expected in calendar vear 2022.

Also for Canby's dropwort, DNR botanists have engaged directly with private landowners. On the recently protected Woodward Canby's Dropwort Preserve, a private site with a DNR-held conservation easement in Vienna, restoration of cypress savanna habitat is ongoing. Through federal Endangered Species Act grants, DNR has been able to provide critical support for hardwood management at this site. In fiscal 2022, monitoring of hardwood treatments showed the need for a second application.

Also during the fiscal year, DNR and the U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program started a collaborative project to conserve habitat for federally endangered 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.

Wildlife Conservation biologists also worked in an advisory role to give input on management and research on high-priority coastal lands. As part of the Little St. Simons Island Ecological Advisory Council, staff helped make decisions concerning management and potential research projects on the private island. Staff also served on the Cannon's Point Preserve Conservation Task Force and provided technical support to Cannon's Point, The Nature Conservancy and St. Simons Land Trust staff. Participation included reviewing potential research projects, helping with management plans and evaluating threats to conservation values at Cannon's Point, a conservation site of more than 700 acres on St. Simons.

#### **Milkweeds and Migratory Butterflies**

Wildlife Conservation Section staff continued to participate in a 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 datacollection effort on the coast to determine what 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 and 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 prompted research. Wildlife Conservation partnered with other organizations studying monarchs – the University of Georgia Odum School of Ecology, Monarchs Across Georgia and The 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.

This year, DNR verified southwest Georgia's first known overwintering site. Although no milkweed grows there and no breeding took place, biologists documented over 200 monarchs and queen butterflies (a close relative that migrates a shorter distance) spending the winter there. Like butterflies overwintering in Mexico, those at this site – which is on a wildlife management area – remained in a state of sexual diapause, surviving until they could breed in the spring. The numbers also were up from the previous winter, when DNR first heard of monarchs at the site. As part of a WMA, the location is protected. The site will be surveyed again this winter.



#### 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 2021, the dealer-reported wild ginseng harvest in Georgia totaled slightly more than 167.8 pounds dry weight. This amount is lower than the 10-year average harvest of about 255 pounds. On average, dealers paid \$654 a pound for Georgia-harvested ginseng in 2021, the same as in 2019.

Populations of wild ginseng face pressures including legal harvest, poaching, consumption by deer and habitat degradation. Knowing how these populations are doing will help determine the sustainability of Georgia's ginseng trade. Results indicate that ginseng is likely declining in the state. In early summer 2021, the U.S. Forest Service suspended harvesting permits for American ginseng on the Chattahoochee-Oconee National Forest to allow time to study how poaching and harvesting have influenced the ginseng decline in the forest. The Forest Service extended that moratorium for the 2022 harvest season.

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 critically imperiled species, a high priority in Georgia's State Wildlife Action Plan, is known primarily from a handful of road rights of way in the state's southeastern corner. Forest Investment manages 18,000 acres in the heart of the plant's range, and surveys last year uncovered a population of 20 flowering plants in a loblolly pine stand in the tract's interior. The company has agreed to allow more surveys on the property and to manage for the species. The primary goal is to restore pine flatwoods habitat for the orchid. The work with Forest Investment will expand the orchid's habitat beyond the roadside edges it is currently limited to (for more: see Private Lands).

2022 also proved a big year for habitat conservation on newly acquired 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. Late this fiscal year, 3,900 acres of the adjacent Glover Tract were added to the WMA. The addition enlarged Canoochee Sandhills to more than 10,000 acres and added a pine flatwoods component, increasing the diversity of habitat types on the property and providing opportunities for the conservation of rare species endemic to this vanishing ecosystem.

The Wildlife Conservation Section hired a wildlife technician to manage the area. This staff member is primarily responsible for habitat management and has made significant headway



in reintroducing prescribed fire to the WMA, including 628 acres of first-entry burns this year. 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. The progress made in fiscal 2022 will help reintroduce fire to more acres next year. The goal is to manage at least a third of the burnable acres with fire each year.

#### 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.

While habitat restoration involves many tools and techniques, determining when and how to apply them depends on a habitat's state of restoration. One goal in a multistate sandhills and upland longleaf pine ecological restoration project that DNR helps lead is evaluating these tools and methods to inform land managers on how effective restoration techniques are based on the responses in vegetation structure (more in Sandhills Conservation).

Fall 2021 marked the fifth round of habitat monitoring for the sandhills project. Sites are sampled on a two- to three-year rotation. 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. A diverse understory is critical in the restoration process: Herbaceous groundcover dominated by grasses, legumes and other forbs help carry fire through this fire-maintained habitat, favors pine seedling regeneration, and provides forage and structure beneficial for wildlife.

Overall, sites using restoration techniques that favor herbaceous groundcover (i.e., canopy tree thinning, herbicide to reduce midstory hardwoods, growing-season prescribed fires) are seeing positive shifts in vegetation structure typical of upland and sandhill pine habitats.

#### Sandhills Conservation

Four competitive State Wildlife Grants in Georgia and other states have 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 highpriority 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 3 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 4.

In phase 1, 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 2, 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 3, 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 4, the four states combined are treating 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 2022 the Wildlife Conservation Section harvested southern wiregrass seed from Moody Forest Wildlife Management Area near Baxley, Fort Stewart military base and private land in Wheeler County. The seed was used in wiregrass restoration efforts on high-priority private land in Wheeler County and on a newly cleared sand pine plantation being converted to longleaf pine at the Open Space Institute's hairy rattleweed tract near Sansavilla Wildlife Management Area in Wayne County.

The west-central Georgia fire crew grew nearly 700 plugs of 15 species important for pollinators and other wildlife and outplanted them on seven properties across middle Georgia. They also raised and outplanted 8,000 little bluestem and lopsided indiangrass plugs on Sandhills Wildlife Management Area West in Taylor County and burned about 550 acres of native grass restoration areas on Panola Mountain State Park in Stockbridge, Sweetwater Creek State Park in Lithia Springs and Flat Creek Public Fishing Area near Perry. These three grasslands, along with several others, have received pollinator plant outplantings.

As part of a long-term coastal groundcover restoration project on Altama Plantation Wildlife Management Area near Brunswick, 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 Wildlife Management Area in Appling County. 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.

Also at Altama Plantation, staff are converting a former 5-acre vegetable garden into a native groundcover nursery. Seeds of more than 40 different native forbs, legumes and grasses have been collected. 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 completed in 2021 is being used as the propagation area for target species. Drift fencing has been installed around the perimeter to reduce impacts to and from wildlife. New main irrigation lines and risers have been installed. Private donations proved crucial to funding the shade house and the irrigation updates.

The seed collected at Altama Plantation are being grown in plugs, then transplanted into planting rows. Several rows of species are anticipated to be planted in the fall of fiscal year 2023. The mix of species being grown was selected for flowering throughout the growing season, offering cover and food for northern bobwhites and gopher tortoises and 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, 20,000 lopsided Indiangrass and wiregrass plugs were planted into old-field loblolly pine stands at Chickasawhatchee Wildlife Management Area near Albany. The addition of native grasses to these stands will greatly improve wildlife habitat as well as conditions for controlled burning. Staff collected seed for the plugs from Silver Lake Wildlife Management Area near Bainbridge the previous year.

At Mayhaw Wildlife Management Area in Miller County, staff planted 7,500 toothache grass plugs on the perimeter of a wetland pond, improving habitat for endangered reticulated flatwoods salamanders, which use the pond as a breeding site.

# **Prescribed Fire**

Prescribed fire is one of the best, most costeffective 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.

In fiscal year 2022, DNR's Wildlife Resources Division recorded yet another record year, burning 75,153 acres. This total exceeded last year's 68,422-acre mark, again topping the 60,000-acre mark the division had tried for decades to break. The new fire goal is 80,000 acres.

The Wildlife Conservation Section also supports prescribed fire efforts by the Georgia State

#### DNR-MANAGED ACRES BURNED 2013 - 2022 Totals by fiscal year



Parks and Historic Sites Division. That agency burned 2,668 acres in 2022, with a record 56 operations. (For comparison, Parks worked 10 operations in 2015.) The burn program has grown considerably with Wildlife Conservation's help and mentorship., Staff helped facilitate the division's southern resource manager in gaining his Georgia Prescribed Burn Managers certification in 2022.

The Interagency Burn Team posted another strong year. Wildlife Conservation and volunteers teamed with the U.S. Forest Service on a number of large-scale burns on the Chattahoochee-



Oconee National Forest. High-elevation pitcherplant bogs, montane longleaf and bog turtles all benefitted from the fires.

The Nature Conservancy is also an important Interagency Burn Team partner. State Wildlife Grants supported their seasonal fire crew in fiscal 2022. The conservation organization led or helped on 27 burns totaling 5,311 acres on state lands. Moody Forest, an Appling County preserve and wildlife management area managed as one property, is a regular highlight. The Nature Conservancy burned 1,861 acres, or 59 percent of the burnable acres, at Moody Forest during the calendar year. That higher-than-normal acreage reflects weather and COVID-19 obstacles that fed a backlog of tracts needing fire. Tracts at Moody Forest are burned on an average interval of every two-and-a-half years.

The Orianne Society is another integral interagency partner. The nonprofit posted its second-most productive burning season in fiscal 2022 and assisted with fires totaling 3,087 acres on DNR lands.

#### Seasonal Fire Crews

Since 2009, seasonal fire crews have carried out the bulk of the Wildlife Conservation Section's prescribed fires. There are now three crews, 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 a National Fish and Wildlife Foundation longleaf pine grant through The Longleaf Alliance and by a State Wildlife Grant. 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. Wildlife Conservation's gopher tortoise crew, supported by Wildlife Conservation's oopher tortoise State Wildlife Grant, was housed at Harris Neck National Wildlife Refuge near Townsend. The crews typically worked independently of each other, with the westcentral crew focusing on the Fall Line sandhills and Pine Mountain regions, the southeast Georgia crew on the Fort Stewart-lower Altamaha River area and the tortoise crew on properties across Georgia's Coastal Plain.

In fiscal year 2022, the southeast Georgia crew conducted 52 burn operations in 49 days, covering 8,295 acres. This total included 5,754 acres on wildlife management areas and state parks, 500 acres on private lands rated a high-priority for conservation, and 2,041 acres on U.S. Forest Service property. Statistical analysis of the last seven years sized the median burn unit at 135 acres, up from 70 acres as of 2016. Although this analysis helps fire leaders measure efficiency, achieving ecological objectives is as important as the acreage totals burned.

The crew helped burn on WMAs across the region as well as at high-priority state parks in the Coastal Plain. Sites included Alligator Creek, Altama Plantation, Big Hammock, Canoochee Sandhills, Clayhole Swamp, Ceylon, Moody Forest, Ohoopee Dunes, Townsend and Tuckahoe WMAs, as well as Crooked River, George L. Smith, Little Ocmulgee, Reed Bingham, Seminole and Wormsloe state parks. Staff also took part in prescribed fires on key private lands such as The Nature Conservancy's Broxton Rocks Preserve in Coffee County and the Orianne Society's Indigo Snake Preserve along the Ocmulgee River in Telfair County. Wildlife Conservation also provided mentorship for Orianne Society's new fire crew.

The Southeast Georgia crew also supported filming fire and rare species for an outreach initiative with The Longleaf Alliance, with funding leveraged from the alliance grant, the National Fish and Wildlife Foundation and The Environmental Resources Network, or TERN, friends group of Wildlife Conservation. The effort produced two videos: "Getting Started with Prescribed Fire on Private Lands," to inform private landowners, and "A Walk in the Woods with Burner Bob and Friends," a youth-focused video explaining prescribed fire and how it helps restore longleaf habitats and rare wildlife.

The west-central Georgia crew burned 7,722 acres – 7,502 on public lands and 220 on private lands – over 25 burn days. Most burn units are on a two-year rotation with habitat management such as timber thins and hardwood control allowing more sunlight to reach 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. New rare plants also are being found in these properties, including Fothergilla milleri, a newly described species of shrub lurking in boggy habitats along sandhill creeks, and Clematis terminalis, another newly described species and known from only two places on Pine Mountain.

A unique aspect of the west-central Georgia crew is that they pursue many other ecological restoration activities other than prescribed fire. Members logged 108 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.



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 built a twomile nature trail, including a footbridge, benches and an interpretive kiosk so the public can enjoy the public property.

Members also spent 60 days planting groundcover, including 700 groundcover forbs and 8,000 native grass plugs, all from local seed sources. Grass seed collected from the area had been shipped to Roundstone Native Seed Co. in Kentucky, which grew the plants and shipped them back to DNR for planting in Georgia sandhills. The west-central Georgia crew 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 54 days picking up trash along roads and at illegal dump sites.

During only its second fire season, the gopher tortoise burn crew burned 7,105 acres, 5,064 involving high-priority gopher tortoise habitat. This small crew, made up of two members and a leader, increased its burn days from 33 its first season to 40 in fiscal 2022. The crew also helped with prescribed fire operations on high-priority WMAs and state parks across the range of the gopher tortoise in Georgia. Sites included Canoochee Sandhills, Altama Plantation, Bullard Creek, Sansavilla, Ohoopee Dunes, Tuckahoe, Moody Forest, Penholoway Swamp, Clayhole Swamp, Alligator Creek and Ceylon WMAs, as well as Crooked River, George L. Smith, Magnolia Springs, and Reed Bingham state parks. The crew joined burns on The Nature Conservancy's Broxton Rocks Preserve in Coffee County and the privately owned Lewis Tract in southeast Georgia, as well as a burn on Oconee National Forest.

Wildlife Conservation also cooperated with the Wildlife Resources Division's Game Management Section on more than 5,500 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 Wildlife Management Area in Colguitt County, 275 acres of longleaf forest were burned during the growing season, including several of the site's most significant bogs.



#### Training and Outreach

While COVID-19 continued to make training and outreach challenging during fiscal year 2022, the Wildlife Conservation Section worked with the Interagency Burn Team to shift fire training to virtual platforms or a combination of virtual and hands-on.

Developing new material and employing creative techniques, leaders trained Wildlife Conservation, Wildlife Resources Division Game Management Section and State Parks and Historic Sites staff, plus Interagency Burn Team partners and volunteers. The agency led six virtual RT130 Fire Safety refreshers for the burn team, training 196 people, and two FFT2 academies for 36 students. These trainings maintained certification for Game Management and Fisheries Management staff, Parks personnel, and several burn team partners. Five pack tests were conducted with 127 participants passing. Working with Tall Timbers and The Nature Conservancy, Wildlife Conservation also led two hybrid S131 Firefighter Type 1 courses, with 29 volunteers and staff from the Wildlife Resources Division. Parks and the Georgia Forestry Commission completing the course in person. Five more completed the virtual portion. Wildlife Conservation took part in multiple ATV safety sessions and led some S-212 Wildland Power Saws training.

Staff also were integral in creating a Wildlife Resources Division Private Lands Burning Fast Action Implementation Team. One seminal event was a virtual stakeholders meeting attended by more than 30 people statewide. Wildlife Conservation helped The Longleaf Alliance produce a video that targeted landowners unfamiliar with prescribed fire and took part in developing a resources page on the Georgia Prescribed Fire Council website. Staff also worked with Southern Fire Exchange to create a webinar playlist for private landowners and hold several field days with state and private partners. Highlights from the latter included showcasing a new Burner Bob video that explains prescribe fire to children and a demo burn as part of two workshops held at Gaskins Forest Educational Center in Alapaha.

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 2022 to update Georgia's list of wild animals regulated by state law. The rule changes, which were approved by the Board of Natural Resources in October 2022, after the fiscal year closed, 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 vary 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 that had been 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.

# INVASIVE SPECIES

The proposed changes were explained in a Facebook meeting and at board meetings, and comments collected online, by email, in person and by phone. Following the board's approval, the changes were scheduled to take 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 were also provided 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 2022 staff gave talks to groups varying from garden clubs and Audubon chapters to forestry experts and local colleges about identifying invasive species, emerging threats and native plant alternatives.

#### Coastal Georgia

During fiscal year 2022 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.
- 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 are helping 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 that have continued to invade this site.
- During the 2022 National Invasive Species Awareness week, coordinated a series of volunteer workdays (dubbed Weed Wrangles) to remove catclaw vine, sand pine, parrot feather

and Chinese tallow.

- Further improved a native plant pollinator garden in a restored 1930s-era formal garden at Altama Plantation. 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 on the Savannah Pest Risk Committee (now 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.

Wildlife Conservation biologist Earnonn Leonard served on the Savannah Pest Risk Committee, which addresses pest occurrences at the Savannah and Brunswick ports. Members include the Georgia Ports Authority, U.S. Customs and Border Protection, Animal and Plant Health Inspection Service, DNR, Georgia Forestry Commission, and the state Department of Agriculture. The committee is focused on the significant potential for introducing invasive species through trade activities at U.S. ports. Leonard also served as treasurer for the Georgia Exotic Pest Plant Council.

#### 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.
- Staff again spot-treated Japanese climbing fern, Perilla, Chinaberry and Tree of Heaven at many spots on Sprewell Bluff Wildlife Management Area near Thomaston this year. 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 ninth year of herbicide work to control showy rattlebox. The WMA has two tracts. Crews had eradicated showy rattlebox from Sandhills West, but a new population was found in 2020. Sandhills East is being monitored and treated as needed.
- 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. However, the plant has 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 have been found as of fiscal year 2022, the 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 effort 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.

However, early in fiscal year 2022 funding changes spurred coordinators to focus on engaging landowners to help with trapping following verified sightings and by offering loaner traps. Soon after, that approach resulted in the capture of at least one tegu. 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 has raised awareness of tegus with residents through emails, direct mail, flyers, news releases, social media and advertising campaigns. In fiscal 2022, that included:

- Supplying tegu flyers and cards to project partners and local outlets. A radio public service announcement was also sent to local stations.
- Conducting an email and social media ad campaign in late-spring 2022 to inform local residents and encourage the reporting of sightings. The two Facebook ads – one static and one a video – reached an estimated 11,200 and 36,000 people, respectively, in the area.
- 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.



# 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 worked with landowners throughout Georgia in fiscal year 2022 (also see: Land Acquisitions and Conservation Easements).

Staff answered landowner questions and visited sites to give management advice. 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, Conservation Stewardship Program, Wetlands Reserve Easements Program and Working Lands for Wildlife, as well as technical and financial assistance programs available through Georgia Forestry Commission or Regional Conservation Partnership Programs. Staff developed new training programs and articles for Master Timber Harvesters and independent forestry companies, providing education to loggers and foresters about many of Georgia's high priority wildlife species and communities and guidance to protect or enhance habitat for federally listed species during timber harvests.

Wildlife Conservation also coordinated with The Longleaf Alliance, Georgia Conservancy and Wildlife Resource Division's Game Management staff to host landowner workshops 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).

### Forestry for Wildlife Partnership

The Wildlife Conservation Section also has 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 publicprivate partnership provides opportunities to enhance wildlife conservation on private lands. Companies are then 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 has 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 for participating in Forestry for Wildlife also was lowered from 20,000 to 10,000 acres, making more landowners, including individuals, families and organizations, eligible. Significant accomplishments are still highlighted on social media and in the hunting and fishing regulation guides. And partners that complete projects are recognized in an annual news release and photos with the governor.

Georgia Power, Weyerhaeuser and CatchMark Timber Trust were the Forestry for Wildlife Partners for calendar year 2022. These corporations are among the largest landowners and managers of private lands in Georgia, directly affecting wildlife habitat on more than 1 million acres. In fiscal year 2022, DNR also solicited new partners and began work with several that will likely gain partner status. Highlights of partner conservation efforts in 2022 include the following.

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. Several bald eagle nests are monitored and protected on company lands and lakes. 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 are often 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 data to the U.S. Fish and Wildlife Service regarding populations of smooth purple coneflower on its power line rights of way. Analysis of this information was included in the agency's decision in 2022 to downlist the species to threatened under the Endangered Species Act. Also in fiscal 2022, the company marked for relocation a few individual plants that would potentially be damaged by upcoming construction work.

Georgia Power also helped collect hairy rattleweed seed at a transmission right of way in southeastern Georgia. The distribution of this federally endangered plant is limited to two counties in the state. Staff also monitored several established plots as part of a Candidate Conservation Agreement for Georgia aster, a rare plant that does well at several right-ofway locations and on company land at Goat Rock Reservoir near Columbus. Populations of federally threatened Georgia rockcress were monitored within designated critical habitat at Goat Rock.

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 tortoise, 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.

In their first collaboration with the Shortleaf Pine Initiative, Georgia Power conducted a prescribed burn on a boulder-field shortleaf pine regeneration site at Lake Oconee adjacent to Lake Oconee Wildlife Management Area. 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 also helped DNR plant plum thickets on company land at nearby Blanton Creek Wildlife Management Area to enhance habitat for quail and other wildlife. The company partnered, as well, 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 as a result of the company's integrated vegetation management strategy. The Electric Power Research Institute is producing the video in cooperation with the Southeastern Grasslands Initiative.

As an original member of the 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 has also 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 project funded by DNR 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.

In the lower Coastal Plain, efforts with Wildlife Conservation have included conserving wood stork rookeries and isolated wetlands. Weyerhaeuser consulted with the agency before harvesting timber near an important wood stork site and provided access for staff to monitor water levels of ponds used by wood storks in recent years. Swallow-tailed kite surveys identified two nests on Weyerhaeuser land this year, and both fledged chicks in late spring. In fall 2021, Weyerhaeuser also helped in hairy rattleweed seed collection at a property in southeastern Georgia. This federally endangered plant is found worldwide in only two counties in Georgia.

In the Coastal Plain and the Piedmont, Weyerhaeuser has taken part in a pollinator ecology study with UGA. The study is assessing the effects of early and midrotation herbicide application on herbaceous understory plants that support native bees, giving managers tools to recognize and promote conditions favorable to pollinators.

**CatchMark Timber Trust** supports a conservation easement on its Townsend property, protecting natural areas in the easement and making the tract available for recreation and research within the 4,000-acre Townsend Wildlife Management Area. Another easement on a company site in Long County protects high-priority habitats identified by Georgia's State Wildlife Action Plan and maintains open spaces adjacent to Fort Stewart as part of the Army Compatible Use Buffer Program.

CatchMark also hosts DNR bird surveys and ongoing studies investigating the response of grassland birds to different chemical and mechanical site preparation prescriptions. DNR is provided access to company lands in Long, Brantley and McIntosh counties to conduct annual surveys of swallowtailed kite nests, sites documented in the company's GIS database.

The company works with the U.S. Fish and Wildlife Service to protect habitat for endangered fringed campion on CatchMark lands in Talbot County and allowing DNR and other botanists to survey for the plant, identifying and verifying sites. Staff also update the Natural Heritage data to ensure known locations of significant populations of threatened plant and animal species are protected and monitored on CatchMark property

CatchMark continues to integrate a harvest planning system that considers landscape-level diversity, including robust thinning of pine plantations that improves wildlife habitat and forest health. Prescribed fire is also used in site preparation and mid-rotation applications to the benefit of wildlife communities and forest health. About 3,000 acres were burned in 2022.

CatchMark sponsors and hosts hunting events with youth groups and organizations for the disabled to provide opportunities for these groups to learn about hunting and enjoy the outdoors. The company is also monitoring its carbon footprint and investigating options for future carbon sequestration projects.

In late 2021, Forest Investment Associates began working with Wildlife Conservation to develop a new Forestry for Wildlife project that would add the firm as a program partner for 2023. The effort involved surveying for Chapman's fringed orchid on about 18,000 privately owned acres that Forest Investment Associates manages in Camden County. In Georgia, Chapman's fringed orchid is known from only a few small roadside populations in two southeastern counties and is a high-priority species in the State Wildlife Action Plan. This rare and beautiful orchid is associated with pine flatwoods wetlands, many of which have been converted for forestry in southeast Georgia. Like many similar orchids, it requires moist soils and open sunny conditions to thrive.

Wildlife Conservation had been helping manage a small population on a public right of way along the boundary of the Camden County property, but surveys in 2021 identified an additional population of 20 flowering plants in a 15-year-old loblolly stand in the tract's interior. More surveys are being done to search for other populations on the property. Forest Investment Associates also has agreed to continue teaming with DNR to improve habitat for the orchid where it occurs on the site, using a combination of mowing, thinning and prescribed burning.

# 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 awardwinning 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 4,500 certified backyards, 625 of which were certified with two or more adjoining neighboring yards for Neighborhood Backyard Certification.

While the pandemic limited participation in fiscal year 2021, in fiscal 2022 the program's biannual workshop was held in July at the Barnesville-Lamar County Library, with the Barnesville Garden Club serving as host. Also, a new certification category involving container gardening is in the works.

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 (a yard 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 region levels.



During fiscal year 2022, 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 1,210 personnel hours at sea, including 415 doing boat patrols. Game wardens recorded 113 hours on TED inspections and 95 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.

TED and other federal violations documented by game wardens were turned over to NOAA for prosecution.

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 425 hours supporting 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 pandemic-related requests. 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.

Game Warden 1st Class Brock Hoyt was named DNR's 2022 Game Warden of the Year. Assigned to Fulton County, Hoyt is known for his attention to detail, community involvement and excellent investigative skills. In fall 2022, Hoyt was honored as 2022 Officer of the Year for Georgia at the annual conference of the Southeastern Association of Fish and Wildlife Agencies. Cpl. Dean Gibson from Talbot County received the James R. Darnell Award as Warden of the Year runner-up. Gibson, a two-time recipient of the Darnell Award, is noted for his leadership potential and strong work ethic, as well as for charging a known Harris County poacher who had eluded game wardens for years.

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 rangerhotlined 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' six 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 local school systems, Regional Educational Service agencies and other state and federal agencies to deliver wildlife-focused education.



The centers are Charlie Elliott Wildlife Center near Mansfield, the Go Fish Education Center in Perry, Smithgall Woods near Helen, McDuffie Environmental Education Center in Dearing, Grand Bay Wetland Education Center near Valdosta and Sapelo Island National Estuarine Research Reserve. All told, these six centers provided programming in-person and virtually for more than 94,000 youth and adults during fiscal 2022.

Arrowhead Environmental Education Center near Armuchee closed at the start of fiscal year 2022 after Floyd County Schools reassigned the center's director, a county schools employee, to a classroom position in the school system. The partnership between DNR and Floyd schools had been in place since 1994.

#### Charlie Elliott Wildlife Center

Since Charlie Elliott Wildlife Center opened almost 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. Charlie Elliott does this through engaging, handson programming that allows participants to experience the subjects covered.

During the 2022 Keeping Georgia Wild Festival, over 600 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 continues to grow. In fiscal year 2022, staff held six in-person programs across the state, including introduction to archery and shotgun classes, tree climbing, paddling and wilderness skills experiences. Several of the single-day programs were done in partnership with DNR's State Parks and Historic Sites Division. The annual Becoming an Outdoors Woman workshop drew 58 women who took part in 20 fishing-, shooting- and wildlife-related activities. Annually, Charlie Elliott Wildlife Center reaches approximately 16,500 school-aged participants through its outreach and school programming. 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. reaching 246 educators through 22 workshops in fiscal 2022. Each summer, Project WILD also holds Advanced WILD workshops, which are immersive experiences designed around exploring a single topic. This year, Charlie Elliott offered two weeklong experiences: a Teacher Conservation Workshop on forestry and natural resources management and how the two are interconnected, and an Outdoor Wildlife Leadership School that examined flora and fauna in Piedmont ecoregions though hands-on activities involving research and conservation.

Also in 2022, staff created a series of homeschool programming based on the personas of some popular nature-based Marvel and DC superheroes.



The theme: Nature Heroes. Taking on these personas, 40 children 8-14 years old learned why these characters had the adaptations and powers that earned them names such as Batman (bats), Groot (plants), Spiderman (invertebrates) and Aquaman (aquatic habitats). At the end of the series, students had the chance to become the heroes themselves as "Earth Warriors" helping in a lake cleanup. Each also took home a certificate and hero gear to continue the mission of helping Georgia's wildlife.

Charlie Elliott offered seven summer camps during the fiscal year. At the year's start in July 2021, camps highlighted fishing and wilderness survival skills for ages 11-16. The summer 2022 camps included two new ones for younger campers – one based on the theme of the children's book "Where the Wild Things Are" and another on nature's heroes - plus the center's popular Outdoor Team Challenge and Shooting Sports camps for older campers. Each year, the center 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-school students interested in wildlife conservation. In this year's version, campers discovered how game wardens solve wildlife-related crimes, including through forensics.

The center continued to provide opportunities for youth and adults to increase their hunting knowledge and skills. Hunt and Learn programs offered new hunters the chance to take part in dove, deer, rabbit and turkey hunts. One young turkey hunter bagged his first turkey during a program. In addition to these traditional programs led by staff on Clybel Wildlife Management Area, 10 hunters with mobility impairments joined an Adaptive Hunting Retreat held with All Terrain Georgia's Action Trackchairs. For some participants, this event marked a return to the woods; for others, it was a firsttime experience.

Two new programs also were held as part of the Safe Harvest and Responsible Practices, or SHARP, series this year: Deer and Small Game. The SHARP deer program provided 24 participants a firsthand experience in field dressing and processing deer. Demand for many of these programs continues to far exceed capacity.

#### Smithgall Woods Regional Education Center

The Smithgall Woods Regional Education Center is on almost 6,000 acres of conservation land near Helen. Being in the heart of the northeast Georgia mountains affords visitors the opportunity to experience a virtually undisturbed wildlife haven. Whether constituents are members of the public visiting the park, school groups on a field trip or outreach patrons enjoying the flora and fauna at their home, Smithgall strives to provide the best environmental education about the Appalachians and the surrounding area.

Fiscal year 2022 proved a record-breaking year for the education center, with Smithgall reaching more people than in any of the past seven years. Through 819 programs, 23,190 constituents received top-notch educational programming from staff and volunteers. Of those programs, 450 were outreach, 362 were held onsite and seven were online. Outreach had the largest audience – 19,741 – with onsite efforts reaching 2,647 and online another 802 people.

Despite only making one video for social media this year, virtual programming is still educating all ages through YouTube. Though not promoted, Smithgall's collection of videos drew 2,902 views this year and reached an estimated 44,141 viewers around the globe.

Plans for fiscal 2023 include continuing to provide a wide variety of programming topics and delivery options. Through flexibility and continuing professional development, the center will offer up-to-date, wildlife-based educational programs in whatever format is most appropriate.



#### Sapelo Island National Estuarine Research Reserve

Sapelo Island National Estuarine Research Reserve Education Program offered a range of environmental educational programming during the 2021-2022 school year. However, because of the ongoing COVID-19 pandemic, in-person programming was not fully restored until mid-February 2022. Public tours were also limited to 24 participants due to ongoing construction at Sapelo's mainland ferry dock. Closures including the program's primary nature trail for renovations for most of fiscal year 2022 and the main bridge accessing the beach from mid-April to early June 2022 further hampered education efforts.

Sapelo Island Reserve sees seasonal ebbs and flows in K-16 participation (K-12 plus postsecondary education). Yet data show a significant increase in student participation during the past 11 years. Of course, the pandemic still significantly affected operations during fiscal 2022, with many schools not resuming in-person field trips and visits. In all, the reserve hosted 22 school groups totaling 528 students (78 college, 87 high school, 105 middle and 528 elementary school students).

Staff also conducted educational programs for 13 Road Scholar groups (389 participants) and 12 programs for special interest groups such as Sierra Club, Audubon and Orianne Society, with 145 participants total.

The Sapelo education program also held a professional development workshop for 13 teachers as part of NOAA's national Teachers on the Estuary standards. This workshop focused on sea turtle conservation and research. In addition. the reserve's education coordinator helped conduct the Georgia Association of Marine Educators conference for educators statewide. The annual event included marine educators from around the Southeast. The reserve also helped train seasonal staff for local environmental education centers. including 19 people from the Burton 4-H Center on Tybee Island and Georgia 4-H at Camp Jekyll. The education coordinator also assisted in teaching the U.S. Army Corps of Engineer's barrier island class (with 36 participants) and the Institute for Georgia Environmental Leadership's coastal class (24 participants). One lecture on the R/V Golden

Ray response also was given to 26 members of the public.

Sapelo Island Reserve's mainland Visitor Center reported 10,824 walk-in guests who were not associated with state education programs during the fiscal year.

In addition to these programs and events, Sapelo's education coordinator continued serving as the DNR Wildlife Resources Division representative for the Golden Ray shipwreck disaster response. He helped a trained member on the Shoreline Clean-up and Assessment Technique team and patrolled area beaches and marshes with a Coast Guard official and another party to assess the amount of oil and debris affecting coastal ecosystems. These teams logged a total of 7,945 surveys covering over 2.468 miles of affected shoreline. The reserve coordinator also was a member of the estuarine juvenile fish monitoring team, twice monthly joining small otter trawl surveys in the waters around Doboy Sound, activities that could then be translated to student and public programs.

On Sapelo, the coordinator maintained 12 picture post sites to help students and the public witness changes occurring at the sites. To expand the overall impact of Sapelo's education programs, he also served on committees and advisory groups including Georgia Association of Marine Educators, Georgia Coastal Educator, the Cannon's Point Education Task Force, the Georgia Independent College Advisory board, the Georgia Sea Turtle Cooperative, the Georgia Shorebird Alliance education advisory group and several National Estuarine Research Reserve System working groups.

#### McDuffie Environmental Education Center

In fiscal year 2022, McDuffie Environmental Education Center continued to provide a range of activities designed to immerse students, parents and teachers in the natural world, enhancing 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.

In October 2021, McDuffie hired a full-time educator to lead programs following the retirement of the center's previous educators. One of the first developed was a fishing program. Through grant funding, McDuffie bought fishing poles and applied and received a grant from Cabela's Outdoor Fund for fishing rod holders and carts. Since receiving the poles in late February 2022, the center has helped 738 students – from schools, Scouts, civic and church groups – to "wet a line." Of those, 376, or slightly more than half, were new to fishing. In all, 404 fish were caught.

Another change is that McDuffie is now open year-round. Day camps (one during spring break and two last summer) had full or almost full enrollment. Many other summer camps and local organizations, such as the Boy Scouts and a local senior center, also booked programs at the center during the summer. McDuffie regularly engages with the Scouts and has participated in merit badge work and achievements for local Central Savannah River Area Scouts.

At the end of fiscal 2022, the center advertised for a second part-time staff member to help with the students and schools that made reservations for the 2022-2023 school year.

#### Go Fish Education Center

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#### Grand Bay Wetland **Education Center**

Grand Bay Wetland Education Center returned to a regular program structure during the 2021-2022 school year. Approximately 7,500 students and 800 adults attended day classes at the center. which is a partnership between DNR and the Coastal Plains Regional Educational Services Agency. Grand Bay also provided outreach programs to about 1,000 local public schools and private learning institutions.

The center continued its partnerships with Valdosta State University's Mass Media Program, now in its fourth year. Supported by the Harley Langdale Jr. Foundation, Grand Bay and Valdosta State staff created virtual lessons that supported some 2,000 students who viewed the video lessons either at home or with an instructor in class during the year. Elementary students were engaged with handson exercises in and out of the classroom. Children observed and learned about wildlife species, from apex carnivores such as American alligators to unusual plants like the hooded pitcherplant, and how these animals and plants interact within Grand Bay's Carolina Bay ecosystem. Visits typically ended with a hike on the boardwalk and an ascent up Grand Bay's observation tower.

Middle and high school students performed exercises involving water guality and wildlife identification and collection. Lab equipment and supplies were provided. Experiments included a turbidity test, pH readings, dissolved oxygen, nitrate level testing and nomenclature usage with identification. Identifying 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.

Other audiences that the center sees on a regular basis come from local behavioral health and long-term care facilities for adults, as well as area home-school organizations.

# **Youth Birding Competition**

The 16th annual Youth Birding Competition ran from April 15-23. 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 and changed to virtual in fall 2021, the popular event returned to in-person in 2022. However, DNR's Wildlife Conservation Section kept the virtual option to address COVID concerns and ease the need for teams to submit their bird checklist at Charlie Elliott Wildlife Center in Mansfield, a long drive for some. The hybrid approach led to 38

teams registering and a large, excited group showing at the Charlie Elliott banquet hall for the awards ceremony. Members from about 10 teams joined the live-streamed event.

The high school team Amazing Anhingas finished as the overall winner with 128 species. Four other teams – including the top elementary and middle school division teams – Birding with Baby Yoda and Pi-billed Grebes, respectively – listed 90 or more.

The Elementary School Division's Lil Birdie Rascals raised \$735 for wildlife conservation, the most of any team. Fundraising for conservation is a voluntary part of the event. Teams raised \$2,638 total this year, pushing the total raised since the competition began to almost \$29,000.

Maegan Donnell and Grace Campbell of Decatur shared the Mentor Award for spending almost 15 hours helping lead and coordinate two teams, The McLendon Chickadees in the primary division and The McLendon Bluehawks in the elementary division. The related Youth Birding T-shirt Art Contest drew in artwork featuring native birds from 132 pre-K through 12th-graders from 70 public, private and home schools statewide. Arvin Guo, a ninth-grader from Suwanee, landed the grand prize with his American kestrel artwork, earning a \$100 Amazon gift card and the honor of having the kestrel featured on the 2022 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 (TERN), 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 12th annual Camp TALON took place June 4-9. The foremost goal of TALON (Teen Adventures Learning Ornithology and Nature) is teaching teens how to identify birds. Yet that only nicks the surface of the ecology-rich syllabus.



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 2022 camp's 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.

Camp leaders included a dozen teachers from state, federal and nonprofit agencies, as well as retired university faculty and professional naturalists. The 15 students and two interns came from six states, a sign of the camp's national visibility. Students counted and learned about the biology of the 116 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 such as wood storks and least terns.

During the visit to Little St. Simons, campers witnessed researchers banding painted buntings and other songbirds. Students also helped remove birds from mist nets and release them after banding. Students talked with biologists concerning research on and management for sea turtles, red-cockaded woodpeckers, flatwoods salamanders and wood storks, as well as to learn about prescribed fire.

In addition to support of volunteers and biologists, the camp was made possible by grants from the Georgia Ornithological Society, The Environmental Resources Network (TERN) and Georgia Audubon.



# **Give Wildlife a Chance Poster Contest**

Kindergarten through fifth-grade students submitted about 1.100 posters for the 2021-22 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 32 years.

Students from 18 public schools, private schools and homeschool groups participated, taking to heart the theme of this year's contest, Nature's Fascinating Engineers. Artwork was judged based on aspects such as theme, originality, quality and impact.

The winning artwork was showcased on the DNR Wildlife Resources Division's SmugMug site and Facebook page. Each state winner received an award ribbon, a bandana featuring the 2021-22 artwork and other prizes. As in years past, the 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 (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 popular 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.

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, among other work the 2021 grants helped build wildlife viewing platforms on nature trails at Prater's Mill Historic Site in Whitfield County, add benches and QR code signs about plants and habitats at Wolf Creek Trout Lily Preserve near Cairo, fund signage to help visitors spot and identify birds at Constitution Lakes Park in Atlanta and restore a boardwalk

open to the public at Abraham Baldwin Agricultural College in Tifton.

The 2022 cycle fielded 19 proposals. Six were funded, totaling \$17,399 in grants. Projects included:

- Creating shorebird guides and banded-bird stickers to help steward programs inform the public about priority species on Georgia beaches and remote coastal sites. Recipient: Manomet; grant award, \$2,999.
- Building six observation platforms along a 2.5-mile nature trail at Hard Labor Creek State Park in Rutledge to improve access to key wildlife-viewing areas. Recipient: Friends of Hard Labor Creek; grant, \$3,000.
- Adding trail markers and two kiosks to improve access and outreach at Lost Creek Forest, a publicly owned, old-growth slope forest in Thomasville. Recipient: Friends of Lost Creek Forest; grant, \$3,000.
- Funding row cover and more native trees and plants for Betty's Garden, a 2020 grant-funded project in Lavonia focused on monarchs and other pollinators. Recipient: Lavonia Elementary; grant, \$3,000.
- Providing 25 wildlife cameras and support materials for Environmental Education Alliance-led teacher/student projects to investigate local wildlife at schools and education centers. Recipient: Environmental Education Alliance: grant, \$3,000.
- Helping fund construction materials needed to repair the Sunrise Pond boardwalk at Phinizy Swamp Nature Park in Augusta. Recipient: Phinizy Center for Water Sciences; grant, \$2,400.

The projects include work and spending by partners that will significantly amplify the grants provided. Final reports for fiscal year 2022 projects are due in December. Considering the importance of wildlife viewing in Georgia, the Wildlife Conservation Section plans to offer the grants again in 2023.

Also in 2022, Wildlife Conservation and Public Affairs continued exploring wildlife viewing and viewers as integral parts of DNR's constituency, significant in helping to achieve conservation



goals. Although staff changes sidetracked work to update the agency's Southern Rivers birding trail for the georgiabirdingtrails.com website, Public Affair's Rick Lavender provided comments 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. Along 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 the agency and how best to engage and serve them.

A nine-member group made up of representatives from each Wildlife Resources Division section - Game Management, Fisheries Management and Wildlife Conservation – provided feedback on questions and other aspects of the national/ regional and the Georgia-focused surveys. Findings from both were released in fiscal year 2023. Details will be summarized in that year's annual report. However, copies of the regional and national survey are available online (along with a webinar exploring the findings), as is the Georgia wildlife viewer survey (and accompanying webinar). Next steps include developing an approach that uses the insights provided to reach wildlife viewers in the state.

# 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, raising awareness of conservation efforts and engaging constituents. The Facebook page recorded 181,535 followers through June 2022, the end of the fiscal year. Twitter had 11,132 followers and Instagram 19,125. Wildlife Resources' YouTube channel fielded 716,509 views during fiscal year 2022, bumping viewership since the start of the channel to more than 2 million views. All of the fiscal totals marked increases compared to the previous year. Also, the division's blog logged 398,216 views during fiscal 2022.

The top Facebook posts involving rare and other "nongame" animal and plant species included:

- Video of a hognose snake doing a dramatic "death performance," taken by ABAC's Dr. Vanessa Lane. Posted during the DNR Wildlife Resources Division's Creepy Critters Week, the video drew 72.2 million views and featured a 71 percent audience retention rate (how long viewers watched, on average).
- Timber rattlesnakes traveling together video, 1.6 million views with a 97 percent retention rate.

- Kingsnake vs. timber rattlesnake video (round 2) – 2.4 million views with a 57 percent retention rate - and round 2 - 1.1 million views; 67 percent retention rate.
- Wildlife Conservation staff freeing a dolphin tangled in a crab pot rope, 954,848 views and a 42 percent retention rate.

The top three Instagram posts were a mix of mammals and reptiles: video of the first North Atlantic right whale mother documented entangled in commercial fishing gear and with a young calf (36,393 views), the round 2 kingsnake vs. timber rattler video (32,430 views) and a Wildlife Wednesday video of an alligator snapping turtle wiggling its tongue like a worm to lure fish within snapping range (32,400 views).

The division's leading nongame tweets featured the entangled right whale nicknamed Snow Cone and her calf, an Alabama shiner video and video of a great horned owl defending her egg from a bald eagle at the Savannah nest livestreamed by The Landings and the Cornell Lab of Ornithology.

Wildlife Resources Division social media coordinator Denise Shepherd landed a one-two awards punch at the 2022 Association for Conservation Information conference in Nashville. Tenn. Shepherd earned first in Conservation Post of the Year for the hognose plays dead video and second in Best Social Media Campaign for "Mythbusters: Wildlife Edition," which tackled topics such as do snakes chase people. The Association of Conservation Information is a national organization of natural resources communicators.

The Georgia Wild e-newsletter, which focuses on Wildlife Conservation's work, added readers in fiscal 2022, as in previous years. Circulation increased by 8 percent to more than 123,000 subscribers. Unique open rates averaged 24 percent, healthy for government agency emails and up slightly over the previous year. The annual reader survey showed consistent support of the content and format. According to respondents:

- Eighty-two percent had told someone at least once about an item in the newsletter.
- More than nine of 10 agreed that the newsletter informs them about conservation in an easy-to-understand way.

 About 80 percent had been spurred to learn more about a wildlife species or issue, and more than a fifth to financially support wildlife conservation in Georgia.

The 15-year-old newsletter features a variety of contributors, from staff, partner agencies 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 offer their photos for use.

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 in the field to journalists, and working with other conservation organizations.

While COVID-19 limited in-person involvement, staff worked some events, including two rattlesnake festivals in south Georgia and Reptile Day at Fernbank Museum of Natural History in Atlanta. Biologists and others also provided scores of interviews with media. Outlets varied from Associated Press, The Atlanta Journal-Constitution, Axios and Georgia Public Broadcasting to The Current, AccessWDUN, Southwest Georgia Living and the U.S. Fish and Wildlife Service's "Fish of the Week" podcast. Topics were as wide-ranging, including the impact of highly pathogenic avian influenza on nesting bald eagles, an entangled right whale Snow Cone seen with a calf off Cumberland Island and the benefits of prescribed fire at Seminole State Park.

Outreach is mentioned throughout this report. However, some notable examples in fiscal year 2022 include:

- Dr. Bob Sargent, a Wildlife Conservation program manager and leader of the agency's eagle surveys, did multiple interviews explaining DNR data that revealed a downturn in bald eagle nesting linked to avian influenza. Sargent also helped create a DNR webpage and online reporting tool as the virus' spread affected other species in the state, primarily black vultures.
- Fire Safety Officer Shan Cammack teamed with The Longleaf Alliance and wildlife biologist Garrett Anderson on a video with prescribed fire mascot Burner Bob that explores how controlled burns help wildlife and habitats. "A Walk in the Woods with Burner Bob" is geared for youth and educators.





- Senior wildlife biologist Clay George, who leads right whale conservation for DNR, worked with Public Affairs' Rick Lavender and Florida Fish and Wildlife Conservation Commission partners to inform recreational boaters about the risks of hitting a right whale. This effort involved direct mail to Georgia charter captains including a "Go Slow, Whales Below" flyer, emailing owners of large boats in the state and a blog post about a Florida sportfisher captain who accidentally hit a whale and calf in 2021.
- Wildlife Conservation staffed educational displays at rattlesnake festivals in Whigham and Claxton. In March 2022, Whigham transitioned from a rattlesnake roundup – the last one in Georgia – to a wildlife education festival, drawing 7,000 visitors for the one-day event. Claxton's weekend festival, which stopped taking in wild-caught rattlesnakes a decade ago, faced inclement weather yet still attracted 6,000 people for the 53rd annual event.
- Streaming from the beach on Jekyll Island, senior wildlife biologist Mark Dodd, with support from Ashley Raybould and Trip Kolkmeyer, joined a Facebook Live presentation held by the National Wildlife Federation's John Kanter and Corina Newsome to discuss sea turtle nesting and



conservation in regards to Recovering America's Wildlife Act impacts.

- 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 e-news article on another close call with zebra mussels at Lake Lanier and a guide created by GIS specialist Abbie Abouhamdan to help differentiate between Joro and native spiders.
- Outreach coordinator Linda May and wildlife biologist Anna Yellin organized and awarded a \$1,000 grant to Atlanta teacher Kendall Xides, who led students in restoring a nature trail and the surrounding habitat at Oak Grove Elementary. The annual Conservation Teacher of the Year grant from The Environmental Resources Network, or TERN, recognizes Georgia's exceptional third- through fifth-grade teachers in life sciences
- May and Yellin also represented DNR at the second annual Citizen Science Academy in Griffin. Held at the UGA Research and Experiment Garden, their presentations covered citizenscience opportunities related to creatures that fly, from bats and birds to butterflies, and included practice collecting data for eBird, NestWatch and Project FeederWatch.
- Wildlife biologists Joe Burnam and Phil Spivey collaborated with Southern Co. media staff on a video highlighting the restoration and management of red-cockaded woodpeckers at Silver Lake Wildlife Management Area. Southern

Co. is a long-standing partner of red-cockaded woodpecker work at the southwest Georgia site.

- Other videos with staff included a dolphin rescue (with social media coordinator Denise Shepherd editing the clips), footage by wildlife technician Matthew Moore of cottonmouth moccasins fighting (it wasn't Moore's first cottonmouth close-up) and video of an eastern hellbender that faked dying for Abraham Baldwin Agricultural College's Dr. Vanessa Lane, which Shepherd promoted for 70-million-plus views on Facebook.
- News releases by Public Affairs varied from the in-person return of DNR's Youth Birding Competition in spring 2022 - following a COVIDforced virtual competition the year before - to why and how to keep bird feeders clean.
- On the DNR Wildlife Resources Division blog, Public Affairs assistant Ethan Hatchett explored work to conserve robust redhorse and how to find

rare species via DNR's Biodiversity Portal. Senior wildlife biologist Erin Cork covered the basics for landowners wanting to create a native plants meadow for pollinators. Environmental consultant Dirk J. Stevenson detailed finding an uncommon insect – the Southeastern sandhill cellophane bee – at Alligator Creek Wildlife Management Area near Lumber City.

- Linda May conducted outreach for a variety of audiences including garden clubs, Boy Scouts, schools, residents in assisted living and the general public. Topics covered include backyard wildlife habitats, birding, conserving pollinators, Georgia snakes, DNR careers and Georgia's State Wildlife Action Plan.
- May and senior wildlife biologist Daniel Sollenberger taught about native reptiles during Fernbank Museum of Natural History's annual Reptile Day. About 3,000 visitors enjoyed learning about the state's snakes, turtles and lizards through displays and up-close encounters.
- As part of the Georgia Aquatic Connectivity Team, program manager Paula Marcinek helped coordinate the second edition of Stream Crossings in Georgia, a guide to installing stream-crossing structures that allow aquatic and terrestrial wildlife to pass.
- Wildlife biologist Todd Schneider teamed with Elizabeth Hunter of Virginia Tech and Georgia Southern University's Abigail Dwire to study population dynamics of Henslow's sparrows wintering in powerline rights-of-way in southeast Georgia. The findings, published in Journal of Field Ornithology, come from an 11year mark-recapture effort detailing how these declining sparrows use rights of way.



#### LAND ACQUISITION AND CONSERVATION EASEMENTS

Paulding Forest WMA 909-acre Addition

Georgia DOT Tract 701 Acres Rosemont Plantation Conservation Easement Warnell Phase 2 Conservation Easement

> Georgia DOT Tract 146 Acres

**Ceylon WMA Phase 2** 6,011 Acres (Open Space Institute)

**Ceylon WMA Phase 2** ,651 Acres (The Conservation Fund)

Through its Real Estate Office, DNR acquired fee ownership of several properties for public recreation and wildlife conservation in fiscal year 2022. The acquisitions added to three existing wildlife management areas and ensured that a natural area is permanently protected. DNR also closed on two conservation easements. Although neither is open to the public, both are important conservation lands. This year's fee and conservation easement tracts were targeted in Georgia's State Wildlife Action Plan to expand conservation and increase public recreation across Georgia.

FISCAL YEAR

# Acquisitions

Here are more details about each land purchase.

#### **Paulding Forest WMA Addition**

DNR expanded Paulding Forest Wildlife Management Area in Paulding County by purchasing 909 acres from the Thompson Estate in December 2021. Acquiring these key in-holdings and edge-holdings will improve management and increase public recreation opportunities on the WMA. The tracts also buffer Raccoon Creek, which has two federally listed fish species, and increase restoration options for the montane longleaf pine ecosystem found on Paulding Forest.

The purchase was made using DNR bond funds, a U.S. Fish and Wildlife Recreation Pittman-Robertson Program grant and support from the Knobloch Family Foundation, The Nature Conservancy, Pattillo Industrial Real Estate and the Georgia Chapter of the National Wild Turkey Federation.

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#### **Ceylon WMA Phase 2 Tracts**

DNR finalized the acquisition of Ceylon Wildlife Management Area in Camden County, acquiring 6,011 acres from the Open Space Institute and 5,651 acres from The Conservation Fund. This project would not have happened without the support of these two partners.

Ceylon includes longleaf pine uplands, maritime forest, freshwater wetlands and tidal saltmarsh wetlands. Protecting these lands not only expands a fire-managed longleaf pine ecosystem beneficial to gopher tortoises and other imperiled species, it also allows DNR to offer more recreation land to the public. The property also serves as a buffer for Naval Submarine Base Kings Bay.

The tracts were purchased with funding from the Georgia Outdoor Stewardship Program, the U.S. Naw, two U.S. Fish and Wildlife Service Grants (National Coastal Wetlands Conservation Grant and North American Wetlands Conservation Act). and private funds from the Bobolink Foundation, the Knobloch Family Foundation and the Robert W. Woodruff Foundation.

#### **Georgia DOT Tracts**

In partnership with the state Department of Transportation, DNR had managed the 701-acre Black Creek Tract in Taylor County as part of Sandhills West Wildlife Management Area and the 146-acres Neyami Tract in Lee County as a natural area for years. In fiscal year 2022, DOT agreed to transfer ownership of those lands to DNR at

no cost, to ensure they would be permanently protected. DNR is grateful for the transfer of these key conservation tracts.

### **Conservation Easements**

#### **Rosemont Plantation**

DNR now holds a conservation easement over the 3.028-acres Rosemont Plantation in Taliaferro County. Rosemont, which fronts the Oconee River, has longleaf pine uplands important for gopher tortoises, as well as rich hardwood forests along the river. This property is not open to the public, but it is an important conservation land to protect.

#### Warnell Phase 2

This conservation easement is the second one DNR holds in Bryan and Bulloch counties with the Warnell family. This tract provides a buffer to the Fort Stewart Army base and a connection to other conservation lands, such as Canoochee Sandhills Wildlife Management Area near Groveland.

The property was protected through a partnership with the U.S. Fish and Wildlife Service and the Army. Although not open to the public, this property also features a tract valuable for conservation

# **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 nine applications in seven counties received in fiscal year 2022, eight were approved by the State Properties Commission and received the tax credit. These eight certifications protected a total of 3,360 acres using bargain sales and conservation easements donated to qualified organizations.



# State Wildlife Action Plan

As coordinator of the State Wildlife Action Plan in Georgia, the Wildlife Conservation Section completed and submitted revision of the 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. Wildlife Conservation staff anticipate starting a full-scale revision early in 2023. 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 conservation needs of priority species. The grant also supports development of a conservation priority mapper to facilitate implementation of Wildlife Action Plan conservation actions by DNR and partners.

Georgia's Wildlife Action Plan – a 10-year roadmap for conservation – outlines critical areas of need, with a focus on keeping native species from declining to the point of requiring federal protection as threatened or endangered species. 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 2022 was \$1,521,469.

Officially called the Comprehensive Wildlife Conservation Strategy, the Wildlife Action Plan is the primary guiding document for much of Wildlife Conservation's work. In fiscal 2022, staff continued work with partners to implement plan priorities.



# **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.

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 has been undertaken 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 efforts that played 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, sub-regional conservation plans into a single map identifying important areas for protection and restoration.

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. Partners collaborated on version 6.0 of the Southeast Conservation Blueprint, which was released in November 2021.

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 as Regional Species of Conservation Need, representing about a quarter of all species evaluated. Freshwater fish, with 281 species, are the group with the most regional priority species, followed by crayfish (172) and freshwater mussels (136). These three groups of aquatic organisms comprise almost two-thirds of the Regional Species of Conservation Need, highlighting the impressive aquatic biodiversity of the Southeast as well as the imperiled status of many aquatic species. The final project report and tables are posted on the Georgia 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 to fund 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. The work is being coordinated by Atlanta Botanical Garden, the Southeastern Plant Conservation Alliance and NatureServe, and will result in a regionally prioritized list of rare plants by early 2023.

# **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 some 17,500 element occurrence records (i.e., geographic locations of species and communities).

During fiscal year 2022, Wildlife Conservation added or updated 966 species profiles and updated thousands of element occurrences. Users visited the agency's Biodiversity Portal, which houses 1,920 species profiles all told plus data on tracked species and habitats, more than 370,000 times during the year.

Taxonomic Group	Tracked*	All	Records
Amphibians	32	97	814
Birds	52	391	1,206
Fishes	103	389	1,756
Invertebrates	316	2,009	2,105
Mammals	35	114	690
Natural Communities	200	348	1,335
Plants	782	6,334	7,439
Reptiles	38	106	1,659
Total	1,558	9,788	17,004

\*Species and habitats. Also tracked: Other (includes caves and wading bird colonies), 407 records.

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 890 formal requests for site-specific data.

#### AND ADMINISTRATION



\*Includes revenue from the 2022 Weekend for Wildlife disbursed by the Georgia Natural Resources Foundation to the Nongame Conservation Fund in fiscal 2023. Expenditures paid through the Nongame Fund.

# NONGAME WILDLIFE CONSERVATION FUND



Listed in millions per year

# Nongame Wildlife Conservation Fund

Fundraising remained a priority for the Wildlife Conservation Section in fiscal year 2022. Although the section received state appropriations, the \$312,605 in state funding for general operations represented just over 2 percent of Wildlife Conservation's total fiscal 2022 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 through gooutdoorsgeorgia. com. Contributions 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.

The Wildlife Conservation Fund received \$4,760,710 in revenue in fiscal 2022:

- \$1,492,864 in license plate sales and renewals.
- \$1,730,792 in donations and other income.
- \$1,116,412 from the 2022 Weekend for Wildlife.
- **\$401,668 via the state income tax checkoff.**
- \$18,974 in earned interest.

Revenues increased 24 percent, or \$916,073, from 2021. The 2022 Weekend for Wildlife revenue is reported here although distributed to the Wildlife Conservation Fund after the fiscal year closed. Fund revenues do not include federal and other grants or state appropriations.

About \$3.8 million in expenses were paid through the fund. The largest share – 71 percent, or \$2,694,234 – involved personnel expenditures. Fourteen percent (\$538,848) went to professional services, a category that includes contracts and fees. Operations accounted for the remaining 15 percent, or \$550,625. Annual spending over the last 10 years has averaged \$2.9 million. Expenditures in fiscal 2022 rose 11.4 percent compared to 2021.

The 2022 fund balance of nearly \$8.5 million marked a 10-year high and a 13 percent increase over 2021. The balance has increased for four straight years, following six years of declines. After dipping to a low of \$5 million in fiscal 2018, fund totals exceeded \$7 million in 2020 and 2021.

# **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 relatively strong in 2022. Vehicle owners can keep and annually renew any nongame plate, even those no longer sold at county tag offices.

For fiscal year 2022, nongame tag revenue fell just shy of \$1.5 million, with 11,750 plates issued (or sold) and more than 63,400 renewed. Compared to 2021, revenue and sales declined 11 and 10 percent, respectively, and renewals increased 2 percent. There were 75,167 eagle, monarch and hummingbird plates on the road in Georgia at the end of fiscal 2022. That is 15 more than in 2021 and marks, if barely, the second straight year of growing circulation for nongame plates. (A 5 percent increase of more than 3,600 plates last year compared to 2019 was the first for these tags since 2018.)

Tag revenue as distributed by the state Department of Revenue can include revenue collected outside the July-June fiscal year. DNR reports plates sold and renewed by 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 – \$67,110 in fiscal 2022.

License plates have long been one of the Nongame Wildlife Conservation Fund's leading fundraisers, providing two-thirds or more of revenue. That share was 31 percent in 2022, down from 44 percent in 2021, as "donations and other income" took the top slot, providing 36 percent of revenue this 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 the fee 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 through marketing. Changes that have helped included releasing a redesigned eagle and U.S. flag plate in 2016 and introducing the vibrant-colored pollinator plate in September 2019. The latter design featuring a monarch butterfly on a Georgia aster replaced the hummingbird tag. In fiscal 2022, nearly 4,000 pollinator plates were issued and 5,625 renewed. The eagle designs continued as the most popular specialty plates in Georgia, with 7,805 issued and 48,550 renewed.

The highpoint for nongame tags was 2010, with 347,401 eagle and hummingbird plates in circulation. Since then, the number of specialty plates offered in Georgia has surged, creating more competition, and the 2010 change in tag fees severely cut sales and support. While factors including the impact of the pandemic and churn of vehicle owners choosing or turning in specialty plates are difficult to gauge, 2022's dip in nongame plate sales is concerning, although offset somewhat by the trend toward more stable and even increasing renewals. Tag revenue has exceeded \$1 million a year since 2018.

# 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, Weekend for Wildlife draws 200-400 guests for a weekend of outdoor trips, auctions and dining.

Although the COVID-19 pandemic led to the first virtual Weekend for Wildlife in 2021, DNR and the Georgia Natural Resources Foundation returned to in-person in 2022. The result: a record-setting fundraiser. Excluding expenses and fees, directed giving for programs and money raised by TERN, the event provided more than \$1.1 million for the Nongame Wildlife Conservation Fund.

The 2023 Weekend for Wildlife also was scheduled 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 netted a new high of \$401,668 in 2022, a 44 percent increase compared to last year.

Over the last 10 years, checkoff contributions – collected by calendar year – averaged \$223,952. The amount had not exceeded \$400,000 since at least 2007. While it's not clear why giving surged in 2022, contributions had been trending upward since hitting a record low of \$113,606 in 2017. The 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 Georgia 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, through other license venues such as DNR offices, the Brandt Information Service help desk and private vendors have grown each year, from \$36,332 in fiscal year 2018 (the option was added that March) to \$113,527 in 2019, \$146,395 in 2020, \$185,778 in 2021 and \$236,351 in 2022. This year's donations represented a 27 percent increase over 2021.

The roundup remained by far the most popular option in fiscal 2022, with 77,954 users giving a total of \$201,856. Another 1,884 people gave \$5 each (\$9,220 total), 830 gave \$10 apiece (\$8,300), 265 donated \$25 (\$6,625), 79 contributed \$50 (\$3,950) and 64 people gave \$100 (\$6,400).

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 animals and plants into financial support for conserving them 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 and through auction, raffle and sale items at Weekend for Wildlife.

In fiscal year 2022, TERN funded 16 proposals totaling \$85,508 from Wildlife Conservation, including:



Friends of Burner Bob and eastern indigo snake education launch - \$6,800

Secret splendors of the longleaf forest - \$5,900

Outboard engine for right whale response boat - \$13,114

Gopher tortoise burrow scope - \$3,205

Youth Birding Competition 2023 - \$6,600

Nest structures for purple martins on state lands - \$4,300

Give Wildlife a Chance poster contest - \$825

Saving the sandhills - \$6,625

ACE (Adventures in Conservation Education) Camp - \$7,000

Outdoor Wildlife Leadership School - \$7,000

Project WILD facilitator mini-grant program - \$2,000

Freshwater Biodiversity Program motor replacement for primary boat - \$12,000

Camp TALON (Teen Adventures Learning Ornithology in Nature) - \$4,500

Increasing student outreach opportunities on the Georgia coast - \$2,185

Drift fence material for snake monitoring -\$2,154

TERN Conservation Teacher of the Year grant - \$1,300

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 \$12.8 million in federal and other grants during fiscal year 2022 to support projects that benefit nongame wildlife and habitats. Expenditures involving grants, bonds and other funds totaled slightly more than\$14 million, including \$4.6 million in land acquisition.

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, the U.S. Department of Defense and the Georgia Outdoor Stewardship Program. 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 2022 apportionment of federal State Wildlife Grants was \$1,521,469, about 4 percent more (\$54,409) than in 2021 but 23 percent less than in 2010, the program's funding high-point. 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 their 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.

Conservation work spurred by the Wildlife Action Plan contributes to local and state

economies by supporting the nation's some 86 million wildlife viewers, part of an outdoors recreation economy that generates nearly \$76 billion a year nationwide in related expenditures, according to a U.S. Fish and Wildlife Service survey. In Georgia, State Wildlife Grants are critical to helping conserve wildlife and natural places. Wildlife viewing included 2.4 million Georgians and Georgia visitors who spent an estimated \$1.8 billion in the state in 2011, according to the Fish and Wildlife Service.

As noted in Education and Outreach, 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 to provide details about these constituents and how state agencies can better engage them. The effort included sampling an additional 1,000 Georgians to inform DNR. The findings, released in fiscal 2023, will be explored in next year's report. However, copies of the regional and national survey are available online (along with a webinar), as is the Georgia wildlife viewer survey (and accompanying webinar).

### **Recovering America's Wildlife Act**

Because the current level of State Wildlife Grants funding is insufficient to meet the conservation needs identified in states' 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 comprised of national leaders representing outdoor recreation retail and manufacturing, energy and automotive industries, private landowners, educational institutions, conservation organizations, sportsmen's groups, and state fish and wildlife agencies worked to identify new funding to support state fish and wildlife conservation 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.

In April 2022, the U.S. Senate Committee on Environment and Public Works approved S. 2372, steering the Senate's bill toward a full Senate vote. That June, the House passed its companion bill, House Resolution 2773. Also noteworthy: In 2021, Georgia's General Assembly unanimously approved a resolution urging Congress to pass the act. However, despite significant support by Congress and the public, the landmark legislation failed after lawmakers left it out of a year-ending omnibus spending bill. Supporters hope to revive the legislation with the new Congress in 2023.

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 comprehensive strategies, developed with partners and stakeholders, are focused on conserving populations of native wildlife species and the natural habitats they need before these animals, plants and places become rarer and more costly to conserve or restore. When the proposed changes are completely phased in, Georgia would be eligible to receive an estimated \$27.4 million a year, according to the Association of Fish and Wildlife Agencies.

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 would be allocated through 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.

Proposed Georgia projects that could be achieved through Recovering America's Wildlife

Act are explored 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, and 83 percent of voters approved amending the state's constitution that year. The change became effective July 1, 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 March 2022, the third round of projects were selected for the final part of the application process. If all nine projects are approved, they will provide \$28.1 million to benefit local parks and trails systems and state-owned lands. The Conserve Georgia grantees would leverage another \$20.5 million in matching funds from project partners

Those 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.
- Cherokee County, \$600,000 to develop Long Swamp Creek Recreation Area at the confluence of Long Swamp Creek and the Etowah River.
- City of LaGrange, \$3 million to create the 45-acre ADA accessible and inclusive Ridley Lake Project, with multi-use trails, fishing piers, pavilions and wildlife viewing areas.
- Sandy Springs, \$3 million for easements and construction of a 2-mile trail and boardwalk, all part of a larger trail system.
- Tucker, \$2,521,800 to enhance the Johns Homestead Park with more access, boardwalks, a fishing pier, orienteering course and bird-viewing blind, plus rehabilitating two dams.

- Groundwork Atlanta, \$1,495,000 for developing, with partners, three miles of trail connecting two trail systems in the Woodall Creek Conservation Corridor.
- Henry County, \$1,498,459 for designing and building a passive recreation park along the South River, including trails, boardwalks and a kayak launch on the South River Water Trail.
- Jones County, \$500,000 to acquire and develop 30 acres as Jake's Woods Park, preserving granite outcrops, highlighting Black history and providing rock-climbing opportunities.
- DNR Coastal Resources Division, \$1,141,692 to build a boat ramp, rehabilitate another and add canoe/kayak launch ramps at Williamson Park (Champney) Public Access Facility.
- DNR Parks and Historic Sites Division, \$1,757,500 to add the 882-acre Coleman Tract to F.D. Roosevelt State Park for more public recreation and restoration of montane longleaf pine forest.
- DNR Parks and Historic Sites, \$2,260,751 to make safer and more ADA accessible the Red Trail at Sweetwater Creek State Park.
- DNR Parks and Historic Sites, \$4,274,579 for building a new visitor center at Vogel State Park, one of Georgia's oldest and most popular state parks.
- DNR Wildlife Resources Division, \$562,264 to acquire and add 1,348 acres, home to several high-priority habitats and species, to Chattahoochee Fall Line Wildlife Management Area.
- DNR Wildlife Resources Division, \$978,274 for conducting large-scale habitat restoration practices including reforestation and prescribed fire in open-pine habitats on stateowned lands.
- DNR Wildlife Resources Division, \$1,500,000 to build a Discovery Zone and pavilion providing new educational opportunities and nature-based activities at Charlie Elliott Wildlife Center

The pre-application period for the 2022-2023 funding cycle opened Aug. 1, 2022. The Georgia Outdoor Stewardship Program is managed by an 11-member board of trustees.



### Administration and Personnel

Nineteen-year DNR veteran Dr. **Brett Albanese** was named a Wildlife Conservation Section assistant chief during fiscal year 2022. While continuing to help guide the Freshwater Biodiversity Program he previously managed, Albanese is coordinating the revision of Georgia's State Wildlife Action Plan and working with legislation, policy and regulation changes. In other administrative changes, **Paula Marcinek** was promoted from wildlife biologist to manager of the Freshwater Biodiversity Program, which encompasses research and conservation involving freshwater nongame species and habitats statewide.

Wildlife Conservation's **Emily Ferrall**, **Todd** Schneider and Jacob Wilson were chosen by administration as Wildlife Resources Division champions in fiscal 2022, while the division's **Public Affairs team** was honored agencywide for coordinating the 2022 Weekend for Wildlife. The selections marking employees' exemplary work are announced quarterly.

The following Wildlife Conservation employees were named We Are DNR recipients, a program in which staff recognize others in the agency for their efforts: Morgan Bettcher, Jarrell "Tripp" Colter, Margie Dent, Joanne Hessick, Maura Hinton, Nathan Klaus, Marcia Malone and Linda May.

Also in fiscal 2022, the Georgia Chapter of the American Fisheries Society named **Albanese** Professional of the Year in Fisheries Science and Research, awarded Fisheries Management Section fisheries biologist Sarah Baker Professional of the Year in Fisheries Management, installed Marion Baker of DNR's Go Fish Education Center as president and elected Wildlife Conservation biologist Ani Escobar as president-elect. Wildlife Conservation Section Fire Safety Officer Shan Cammack worked with The Longleaf Alliance to produce the video for private landowners "Getting Started with Prescribed Fire on Private Lands," And in October 2021. DNR and others mourned the passing of **Don Imm**, a longtime U.S. Fish and Wildlife Service leader. Imm, who died Oct. 1, served as the agency's Georgia state supervisor of ecological services before becoming deputy assistant regional director of Gulf Restoration.



WILDLIFE RESOURCES DIVISION

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