

2021

FISCAL YEAR

CONSERVING GEORGIA'S

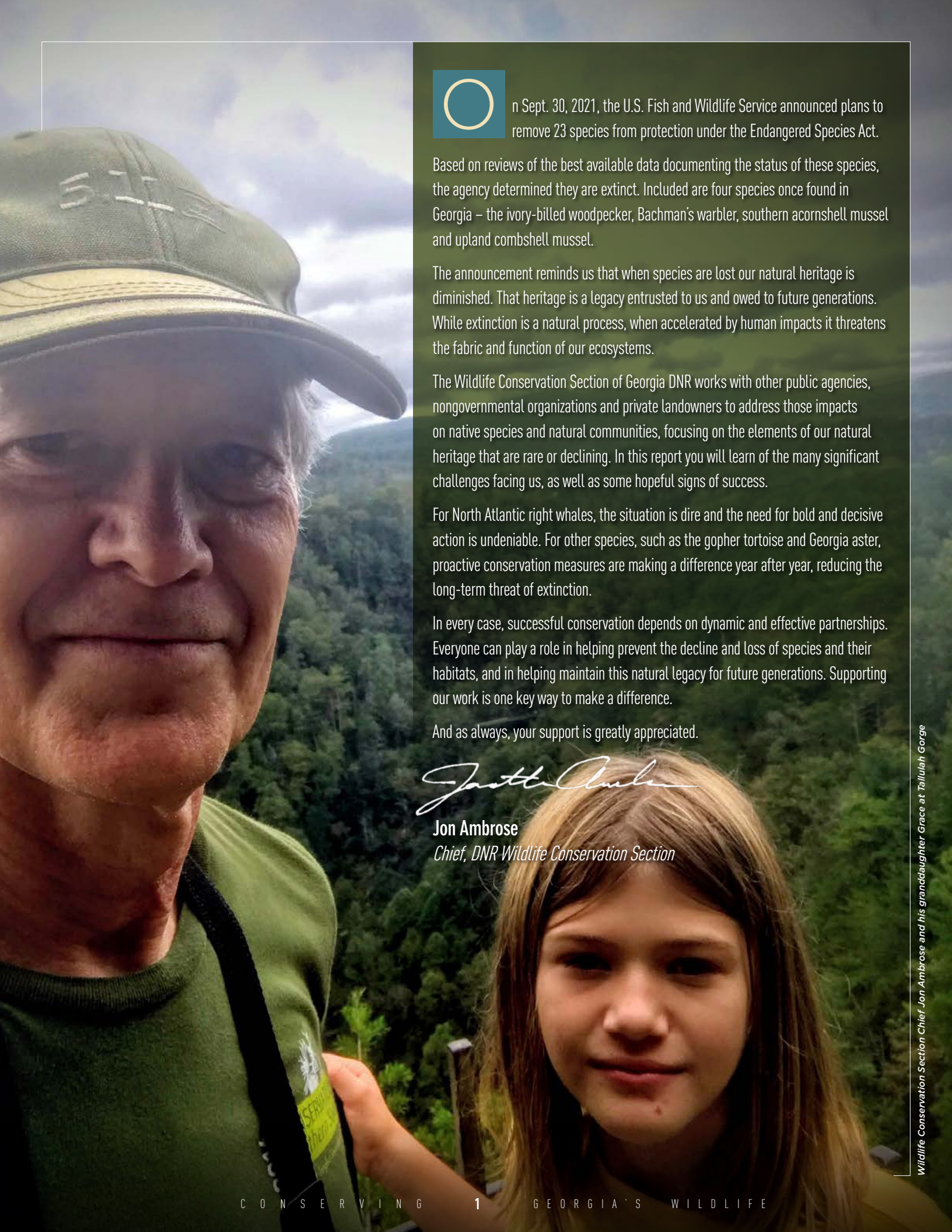
# WILDLIFE



GEORGIA  
DEPARTMENT OF NATURAL RESOURCES

WILDLIFE RESOURCES DIVISION





n Sept. 30, 2021, the U.S. Fish and Wildlife Service announced plans to remove 23 species from protection under the Endangered Species Act.

Based on reviews of the best available data documenting the status of these species, the agency determined they are extinct. Included are four species once found in Georgia – the ivory-billed woodpecker, Bachman's warbler, southern acornshell mussel and upland combshell mussel.

The announcement reminds us that when species are lost our natural heritage is diminished. That heritage is a legacy entrusted to us and owed to future generations. While extinction is a natural process, when accelerated by human impacts it threatens the fabric and function of our ecosystems.

The Wildlife Conservation Section of Georgia DNR works with other public agencies, nongovernmental organizations and private landowners to address those impacts on native species and natural communities, focusing on the elements of 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.

For North Atlantic right whales, the situation is dire and the need for bold and decisive action is undeniable. For other species, such as the gopher tortoise and Georgia aster, proactive conservation measures are making a difference year after year, reducing the long-term threat of extinction.

In every case, successful conservation depends on dynamic and effective partnerships. Everyone can play a role in helping prevent the decline and loss of species and their habitats, and in helping maintain this natural legacy for future generations. Supporting our work is one key way to make a difference.

And as always, your support is greatly appreciated.

**Jon Ambrose**

*Chief, DNR Wildlife Conservation Section*

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## 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 additional habitat through the beneficial use of dredge spoil.

Highlights and challenges in fiscal year 2021 included:

For the sixth 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. While training and outreach involving the Stewards Program was scaled back

again this year because of coronavirus concerns, stewards helped rope and protect the St. Simons' East Beach colony, which produced least tern and Wilson's plover chicks in 2021.

The year proved challenging for other priority seabirds such as black skimmer and gull-billed terns. The continuing degradation of offshore bars led to complete losses of colonies because of tidal overwash on Ogeechee Bar, St. Catherines Island Bar and Little St. Simons. Predators wiped out colonies on Little Tybee and Cumberland islands. Also, Pelican Spit fully merged with Sea Island, making it unavailable for nesting birds.

Brown pelicans continued to grow in number on Little Egg Island Bar, with 749 nests and good chick productivity documented. Seventy pairs nested on Bird Island, the Brunswick dredge island.

Overall, Bird Island was highly productive again, despite several oil spills from the MV Golden Ray wreck removal that reached the island and a

number of birds becoming oiled. In addition to brown pelicans nesting on the island, Peak counts included 8,083 royal terns, 447 sandwich terns, 300 laughing gulls, 107 black skimmers and 17 gull-billed terns. The black skimmers and gull-billed terns abandoned their nest attempts.

On Ogeechee Bar, approximately 500 royal terns managed to fledge young despite the flooding that impacted other species.

A late-summer release of oil from the Golden Ray that made it to Bird Island resulted in about 30 flightless chicks becoming heavily oiled and several hundred flighted terns suffering light oiling. DNR captured 20 flightless chicks, which were transported to Charleston S.C. for cleaning. Ten survived and were returned to the colony. For the second straight year, the pandemic canceled an effort to band royal terns. The hope is to return to banding the birds in 2022.



Prothonotary warbler (Ty Ivey/Georgia Nature Photographers Association)

# BIRDS



Wildlife Conservation and partners tracked seabird colonies on Tybee Island, Little Tybee, Ossabaw Island, Ogeechee Bar, St. Catherines Island Bar, Little Egg Island Bar, Little St. Simons, St. Simons' East Beach, the Brunswick dredge island and Cumberland Island. Staff also monitored several rooftop colonies of least terns.

American oystercatcher productivity in Georgia slipped in 2021. DNR confirmed 28 chicks fledged and banded 24. Issues included the persistent overwash of offshore bars, the loss of Pelican Spit and coyotes returning to Little St Simons and Cumberland. The disappointing productivity followed three years of unusually solid productivity for oystercatchers. The decline highlights the ongoing challenges – from erosion to sea-level rise and introduced mammalian predators – facing these and other beach-nesting birds.

Wildlife Conservation continued monitoring bird health in St. Simons Sound after the MV Golden Ray car carrier capsized in September 2019. Staff documented impacts from several oil releases

and coordinated bird-response efforts, working with the St. Simons Incident response team, the U.S. Fish and Wildlife Service, Tri-state Bird Rehab and Research, and local volunteers. Staff captured and helped transport oiled birds and then banded birds before their release. DNR also continued surveys of St. Simons Sound to ensure that areas where birds could potentially come into contact with oil were cleaned.

The agency completed a spring band resight project focused on migrating red knots. In only the past two years, this species has shown dramatic declines of up to 80 percent in Delaware Bay. The resight project, designed to survey the population of red knots cycling through spring stopovers in Georgia, did not detect a larger than average number of knots in Georgia this spring. It is possible that the species has experienced a precipitous decline in the last few years. DNR also helped the South Carolina Department of Natural Resources with a red knot trapping and tagging study. This study uses 1-gram nanotag units and the existing MOTUS network to track knots from staging areas within the

Southeast to breeding grounds in the high Arctic. The understanding of the relative importance of the Southeast to red knots has increased in recent years, with resight and tracking research showing that the region is likely a terminal staging area for thousands of the federally listed birds.

Wildlife Conservation also worked on several whimbrel projects, including documenting and counting whimbrels at night roosts along the Georgia coast. Staff found several critical roosts used by sizable percentages of the total known whimbrel population. Work documenting these sites was organized by project partners at Manomet, with DNR providing most of the logistical and field support to complete surveys. The roost work will fill in important information gaps on these declining birds. DNR and partners also trapped and tagged whimbrels as part of a larger study exploring roost dynamics of whimbrels. Along with the Fish and Wildlife Service, staff trapped and deployed five Lotek Pinpoint GPS tracking devices. The goal is to provide data and complement a larger tracking study led by University of South Carolina and South

Mixed group of red knots and other shorebirds (Fletcher Smith/DNR)



Carolina DNR. Georgia will deploy two data loggers on Little Tybee Island in fiscal year 2022 to try and download migration data from the trackers.

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 fund restoration projects for American oystercatcher habitat and to continue monitoring red knots and whimbrels.
- Applied for and received a master banding permit, providing for all banding of nongame species under that permit instead of a permit held by DNR’s Game Management Section.

## 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.

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.

2021 was busy for both Safe Harbor and red-cockaded woodpeckers in Georgia. In southwest Georgia, three new properties totaling 7,043 acres and 10 baseline groups were enrolled in Safe Harbor during the fiscal year. 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



DNR's Tim Keyes with a banded American oystercatcher chick (DNR)



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 stabilized at about 180 groups.

The Wildlife Conservation Section worked with Safe Harbor participants and conservation partners in fiscal 2021 to conduct outreach and monitor woodpecker nesting and populations on cooperating properties. In May, staff teamed with Pebble Hill Plantation, a Safe Harbor property, to hold a public field day. Participants learned about red-cockaded woodpecker management, including artificial cavities, prescribed fire and ecological forest management in longleaf pine stands. Attendees also glimpsed woodpecker nestlings in the cavities via “peeper” cameras and observed adults feeding the young. Supported in part by a U.S. Fish and Wildlife Service grant, staff joined with Tall Timbers Research Station to conduct property-wide cavity tree surveys on 21 Safe Harbor properties near Thomasville.

These surveys found nearly 200 new cavity trees, all of which were mapped to ensure they are protected during land management activities and for monitoring purposes. The survey results 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 added on properties in the region.

In partnership with Tall Timbers and The Jones Center at Ichauway and Tall Timbers, staff banded 105 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. 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 47 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 37 family groups – 35 potential breeding groups and two single-bird groups – documented in fiscal 2021. The latest count reveals an additional six breeding groups from 2020, a substantial increase and further evidence of the positive impact of habitat work through regular prescribed fire, cavity management and installing recruitment clusters. In 2021, red-cockaded woodpeckers started using and fledged young in two of three recruitment clusters installed in 2020. Wildlife Conservation also monitored nesting in 35 clusters at Silver Lake and banded 43 young in 2021.

Despite the habitat loss and management challenges caused by Hurricane Michael, 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 near Baxley, Wildlife Conservation continued working with The Nature Conservancy to manage red-cockaded woodpeckers. Staff refurbished cavity inserts in one cluster and added a new recruitment cluster. In December 2020, staff translocated two woodpeckers from Fort Stewart. At least one of the translocated birds remained on Moody Forest.

As of spring 2021, the WMA had nine family groups, one more than the previous year. Staff and The Nature Conservancy monitored 10 fledglings on the property. Habitat management, including timber thins and prescribed fire, is improving and creating more red-cockaded woodpecker habitat at Moody Forest.

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 2021, staff refurbished older cavity inserts at River Creek to ensure that each of the eight cluster sites on the WMA had at least four suitable cavities. Wildlife Conservation added to the initial reintroduction effort by translocating five birds from Apalachicola in fall 2020. 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 2021, with four nests producing four fledglings. The birds were also busy creating natural cavities and refreshing old, relict cavities. 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.

## Surveys and Habitat Restoration

### ■ Marshbirds

Little is known about the population status of the Florida sandhill crane, a resident subspecies that occurs only in peninsular Florida and the Okefenokee National Wildlife Refuge in Georgia. Over the past several years, helicopter surveys have been conducted annually in the Okefenokee refuge in March and April to count nesting Florida sandhill cranes. From 2014-2017, a standardized grid of transects was flown for the counts.

The Wildlife Conservation Section later determined this grid was insufficient to provide a statistically robust sample for developing accurate population estimates and worked with the Georgia Cooperative Fish and Wildlife Research Unit at the University of Georgia to revamp the survey. While similar to the previous survey, the new version features more miles of transects placed using a statistically appropriate design.

The first three flights using this survey occurred in 2018, with another five in 2019. Survey flights were not done in 2020 or 2021 because of safety concerns related to the pandemic. Plans are to resume survey flights in 2022.

## ■ Grassland Birds

Surveys started 11 years ago for **Henslow's sparrows** continued in fiscal year 2021. This small songbird 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.

Henslow's sparrow numbers 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.

Standardized transects at three wildlife management areas – Paulks Pasture in Glynn County, Townsend near Ludowici and Moody Forest near Baxley – were surveyed from January through March using the same technique (flush netting) as the previous 10 years. These surveys are part of a long-term mark-recapture study. Georgia Southern University conducted the surveys under contract with the Wildlife Conservation Section.

Each transect was sampled twice. Researchers captured 65 birds all told, two of which had been caught and banded in previous years. Population estimates for each site will be refined with the addition of the 2021 data.

Efforts 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 sparrow 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.

Staff visited and evaluated approximately 100 of the transects from January through April 2021. The remaining transects will be checked in 2022. Although results are preliminary, the habitat quality categorization model appears accurate and reliable. Several transects categorized as good habitat had Henslow's sparrows, with six individuals detected at one transect. Habitat models are being refined further.

Wildlife Conservation and Georgia Southern also continued a micro-habitat study at Paulks Pasture, Townsend and Moody Forest WMAs. The purpose is to provide insights into Henslow's sparrow habitat preferences and how land managers can better manage habitat for the species. This work includes diet analysis, radio telemetry to monitor onsite movement patterns and vegetation structure measurements. The collection of fecal samples for diet analysis concluded last year. Samples are being analyzed to determine what plant species seeds the sparrows are eating.

Radio telemetry work was conducted at Paulks Pasture, Townsend and Moody Forest WMAs from January to March. Thirty birds were fitted with transmitters. Staff tracked birds three to four times a day following capture until the transmitter fell off, the battery died or the bird died. At least nine telemetry locations were needed to consider tracking of an individual successful: 24 of the 30 birds met that criteria. Most of the transmitter attachment issues experienced in previous years were corrected in 2021.

DNR surveyed vegetation plots from January through early April at the three WMAs. These included 72 plots, 36 in areas used by the tracked birds and 36 outside of these areas.



Flushing Henslow's sparrows for a survey at Paulks Pasture WMA (Todd Schneider/DNR)



Nest box program numbers for **southeastern American kestrels** were down substantially in 2021 with only 23 boxes found occupied. In Tifton, five of 32 older boxes were occupied, a similar number to last year. In the western Fall Line sandhills, kestrels occupied 14 of the nest boxes that are not on Fort Benning, a roughly 50 percent drop. (Fort Benning's boxes are not monitored annually.) Despite these disappointing numbers nest success was high with 62 chicks fledged.

In 2016, 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 are 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). Considering kestrels' heavy use of the high boxes, four other regions of the state were targeted for high boxes, with 40 high boxes added during the 2020 nesting season and another nine in 2021, for a total of 68 statewide.

In spring 2021 these five areas were checked and kestrels were using three of the five groups of high boxes. In 2019 and 2020, kestrels nested in at least 12 of the 18 boxes checked, a 66-percent occupancy rate. This is much higher than what DNR has observed with low boxes. In 2021, nine of those boxes were occupied, reflecting a region-wide downturn in nest box use. However, it is likely that nearly all of these high nests are successfully fledging chicks since they are far above the range of most nest predators. These boxes likely represented 40 chicks fledged in 2021, and even more importantly represent an expansion of the kestrel population to portions of the state where kestrels have likely been absent for decades.

Plans are being made to add high boxes in several areas of Georgia and better monitor all high boxes to better assess the state of kestrels in Georgia. The hope is these new boxes will help spread the species into habitat statewide, helping make the population of our smallest falcon more secure.

Exciting finds continue at DNR native grassland restoration sites, including the Panola Mountain State Park banding station's first catch of a female Dickcissel in summer 2021. This obligate grassland bird of the Midwest is an uncommon

visitor to Georgia. The fact that this species plus bobolinks, American woodcock, numerous rails, bitterns and nearly a dozen species of sparrow have been detected at the station near Stockbridge indicates the success of the park's grassland in providing habitat to declining grassland birds.

In areas next to restored grassland habitats at Joe Kurz Wildlife Management Area and Panola Mountain, Sweetwater and Chattahoochee Bend state parks, Wildlife Conservation also continued work to restore woodlands – open forests with little midstory growth and a rich understory of grasses and wildflowers.

### ■ Prothonotary Warblers

The Wildlife Conservation Section continued surveying for prothonotary warblers in fiscal year 2021. 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 2021, four nests were documented in the boxes at River Creek. In the coming year, staff will refurbish boxes, conduct point count surveys, monitor nesting and capture and band adult and nestling birds.

### ■ 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. Wood storks were downlisted

to threatened in 2014. The recovery plan for the species 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.

2021 proved an average year. Staff documented 23 nesting colonies and 2,260 nesting pairs, almost the same as in 2020. Also, 17 wood storks were tagged. Most of these were chicks at the Gilman colony in St. Marys. One was a rehabilitated stork released by the Georgia Sea Turtle Center on Jekyll Island.

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.

Wildlife Conservation received a U.S. Fish and Wildlife Service grant in fiscal year 2020 for an effort to create a new nesting colony for wood storks at Altama Plantation Wildlife Management Area near Brunswick. With significant assistance from DNR's Game Management Section, staff built an island in a deep-water pond, planted several hundred trees and shrubs, installed artificial nesting platforms and added decoy wading birds and alligators. Although no wood storks used the site in 2021, work at the site will continue to see if storks can be attracted. There are no suitable nesting sites near the mouth of the Altamaha River, although foraging habitat is abundant. By created a nesting island surrounded by deep water, the hope is to add a key nesting site for storks and other wading bird species on state-owned land.

## ■ 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.

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

An estimated 150-200 pairs of swallow-tailed kites nest in Georgia each year. Most nests are on the lower stretches of the Satilla and Altamaha rivers, but nests are also scattered throughout other south Georgia

river drainages that feed into the Atlantic – such as the Savannah, Ogeechee and St. Marys – and almost all rivers that drain into the Gulf of Mexico, including the Suwannee, Alapaha, Aucilla, Flint, Little Ochlocknee 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 2021 nesting season, fieldwork focused on revisiting coastal nesting sites that had not been monitored in several years. Staff documented 16 confirmed nests across the coastal counties, with probable nests at another 14 locations. DNR also emphasized surveying sites considered for possible land acquisition or protection.

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. Five nests were found this year on the Okefenokee National Wildlife Refuge: This population appears to be growing.

## ■ 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 rehabilitation of injured eagles.

Since documenting a record 218 occupied nesting territories statewide in 2017, the Wildlife Conservation Section has surveyed about half to two thirds of the state's eagle nesting areas each year. The change maintains a standardized survey scheme without compromising the agency's ability to detect and respond to notable changes in bald eagle productivity.

Some of the survey flights scheduled in 2021 were canceled because of concerns about COVID-19. As a result, only the six coastal counties were surveyed, leading to the detection and monitoring of 71 nests. An additional 12 nests – scattered about the state – were monitored, in large part through the efforts of volunteers. Fifty-five of the nests on the coast fledged at least one eaglet, with 81 young fledged overall (a 78 percent success rate, which is average). All told, 64 of 83 nests, or 77 percent, fledged at least one eaglet (94 total) for an average of 1.5 young fledged per successful territory. Nine new nest territories were found, six of which were in the coastal counties.

There appears to be a slightly increasing trend in the number of eagle pairs nesting closer to areas



Adult swallow-tailed kite feeding a juvenile (Tom Wilson/Georgia Nature Photographers Association)





Bald eagle carrying nesting material (Jenny Burdette Photography/Georgia Nature Photographers Association)

with more human activity. As a rule of thumb, most eagle pairs in Georgia avoid nesting near manmade structures and human-associated disturbances. While there have been exceptions, 2021 featured an increased number of reports of eagles nesting or exhibiting behaviors associated with establishing nesting territories on relatively small lakes in the midst of extensive development, especially along the northern outskirts of metro Atlanta and on the margins of Savannah.

The U.S. Fish and Wildlife Service estimates there are 316,000 bald eagles in the lower 48 states, a fourfold increase since 2009. Georgia nest totals grew from about 100 in 2007 to 200-plus in 2015. Florida, home to more than 1,500 territories, is documenting eagles nesting in unexpected places, including near urban areas and on electrical towers and other man-made structures. Perhaps more eagles, especially those classified as “floaters” because they hang out waiting for territories to become available, are discarding the rule and building nests closer to human activity.

As in previous years, Wildlife Conservation staff 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 third 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 an extensive search of the upper and portions of the lower canyon, nor were juvenile falcons observed.

For the sixth straight year, no nest site was confirmed in Atlanta, although observations by a biologist during a survey in May and reports

from birders and high-rise building residents and office staff suggested there could have been three or more peregrine falcon territories in the metro area. Similar to 2020, the pandemic had many people working from home during nesting season and there was not the usual surge in falcon observations provided by employees in Atlanta high-rises. Office closures also restricted DNR’s ability to access and search building rooftops and ledges.

Falcon sightings were reported from SunTrust Plaza, Four Seasons Atlanta hotel, the communication towers at Zonolite Park in DeKalb County, Mayfair Renaissance condos, Piedmont Park, Waldorf Astoria Atlanta and the Promenade building. As of July 2021, no juvenile peregrines had been reported in the city. A pair of adult falcons was frequently seen at Four Seasons, especially during a search of the building in May, but no definitive evidence of nesting was recorded. Frequent observations of falcons at the nearby Mayfair Renaissance were likely the same birds.



# AMPHIBIANS AND REPTILES

## 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

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



Loggerhead sea turtle on Ossabaw Island (Breanna Sorg/DNR)





Relocating a loggerhead nest on Sapelo Island (Mark Dodd/DNR)

## 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 2021, 96 dead or injured turtles were documented on Georgia beaches. That total is below the 30-year average of 176 strandings per year. Overall, strandings have declined by approximately 5 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 overall decline. Results from necropsy examinations indicate that boat collisions and commercial fishery mortality are the leading sources of mortality, accounting for 33 percent of strandings in fiscal 2021.

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](https://seaturtle.org/strand/summary) (pick Georgia from "Select a Program").

## Gopher Tortoise Conservation Initiative

The Gopher Tortoise Conservation Initiative is a Georgia-based effort to conserve the gopher tortoise in hopes of making listing under the federal Endangered Species Act in the eastern part of the species' range unnecessary. 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 and The Orianne Society.

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

nests to protect them from tidal inundation, installing predator screening and predator control.

Since comprehensive surveys were established in 1989, loggerhead nesting has been highly variable, with an average of 1,510 nests per year. In 2021, more than 2,484 loggerhead nests were documented on Georgia beaches. Nesting was slightly above the 32-year average and below 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 3.9 percent annual increase in nesting since 1989. Nesting data indicates that the loggerhead sea turtle population in Georgia is making slow but steady progress toward recovery and delisting.

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 participated in aerial and boat surveys to assess the effects of the Golden Ray shipwreck removal activities on sea turtles in St. Simons Sound. The car carrier capsized in the sound in September 2019.

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 715 loggerhead females using the Georgia coast annually from 2008-2020, with a range of 303 to 1,093 turtles per year. A genetic sample was collected from every known nest deposited in Georgia in 2021. The ongoing project is providing a better understanding of loggerhead nesting ecology and interpretation of nesting trends.

DNR also is collaborating with Drs. Clint Moore and Bryan Nuse from the Georgia Cooperative Fish and Wildlife Research Unit at UGA to use the genetic data to develop a Bayesian demographic model for loggerheads. This model will be used to determine the status of the turtles and how changes in management will affect population recovery. Results from the model show that the loggerhead population was very close to extirpation in the late 1990s, and that abundance is currently approximately half to a third of the size of the population in the 1960s. A pulse of hatchlings from early nest protection efforts in the 1970s and 1980s and the implementation of turtle excluder devices, or TEDs, resulted in the increases in nesting over the last 10 years. The model predicts that a lack of recruitment from low nesting in the early 2000s will result in population growth plateauing at current levels. If all current management protections stay in place, the population is predicted to remain stable or decline slightly for another 20 years and then begin slowly increasing toward historic levels.



Hatch-year gopher tortoises (DNR)

## 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 2021, the Wildlife Conservation Section's tortoise survey crew completed line-transect distance surveys on 11 sites. The surveys are used to estimate tortoise density and abundance. Sites included five private properties, an Army Compatible Use Buffer Program site at Fort Benning, the recently acquired Sansavilla Wildlife Management Area Wire Road Tract, completion of the 16,000-acre Ceylon Wildlife Management Area and resurveys of Penholoway Swamp Wildlife Management Area and the Almo Tract at Chattahoochee Fall Line Wildlife Management Area.

Ceylon WMA, in Camden County, has nearly 3,000 tortoises and could potentially be divided into three separate populations.

Wildlife Conservation began conducting line-transect distance sampling for gopher tortoises in 2007. As of fiscal 2021, surveys have been completed on 119 sites statewide, public and private. Fifteen 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 has set a target of 65 viable populations permanently protected across 13 conservation units in the state. Six protected tortoise populations were added in fiscal 2021, raising the total to 61. Conservation easements in the works could add two more in fiscal year 2022.

In another study funded and supported by Wildlife Conservation, The Orianne Society continued

western Alabama. Within the rest of its range, the gopher tortoise is classified as a candidate species. The Fish and Wildlife Service previously determined that the species warrants listing but has delayed a final listing decision until 2022.

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.

Gopher Tortoise Initiative partners know they can be proactive and work to avoid listing gopher tortoises, or they can 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 know does not rest solely on efforts in Georgia – the initiative is working

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 2021, the total was 61. Cumberland Island National Seashore and several conservation easements were added to the list of protected populations this year.

The goal of the Gopher Tortoise Initiative is 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 in the works may bring the total to 63 protected populations by the end of fiscal year 2022.



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 from potentially lethal temperatures in gopher tortoise burrows. 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 surveyed, 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 look 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 Alapaha River 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 the third year of a mark-recapture study of indigos on other lands. In fiscal 2021, staff tagged 25 "new" indigos with PIT, or Passive Integrated Transponder, tags and recaptured 18 individuals that had been tagged before. Mark-recapture data will be used to uniquely identify individual snakes and help assess population estimates and trends. This effort is planned to continue in 2022.

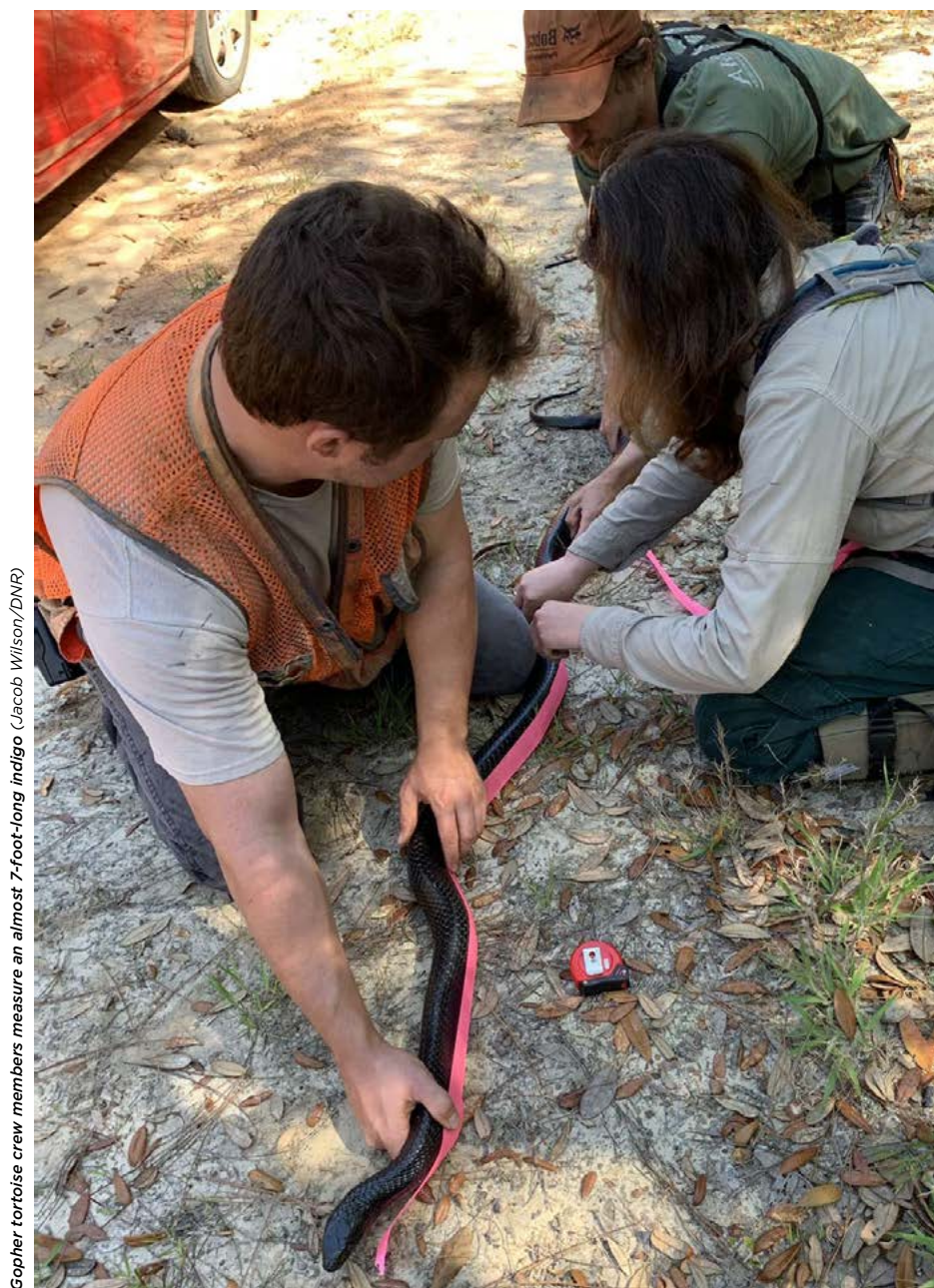
Also this year the University of Georgia began a telemetry study of indigos on state lands to investigate interactions between the snakes and translocated populations of gopher tortoises. Snakes were captured on sandhill sites near the translocated tortoise populations, and after data collection and 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.

The Wildlife Conservation Section's survey effort in fiscal year 2021 included deploying and monitoring 36 traps for a total of 1,512 trap days at two sites where bog turtle populations had been documented. Seven capture-and-releases of six different turtles were recorded. One turtle had been originally caught and marked in 2008, yet not seen since 2009.

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 wild Georgia bog turtles will spend the winter of fiscal 2022 with captive turtles to facilitate breeding next spring. The goal is to produce hatchlings that can be head-started and then released into restored mountain bog habitat.



Gopher tortoise crew members measure an almost 7-foot-long indigo (Jacob Wilson/DNR)

## Gopher Frogs

State-listed as rare, gopher frogs depend on intact sandhill and longleaf pine habitats, where adults survive within the burrows of their namesake host, the gopher tortoise, as well as burned out stump holes and rodent burrows. These frogs also require nearby fishless, temporary wetlands to breed in, where their tadpoles can develop in an environment with fewer predators. Widespread upland and wetland habitat alteration throughout the species' range has greatly reduced populations. Gopher frogs are known from 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 at The Nature Conservancy's Williams Bluffs Preserve in Early County. Williams Bluffs is within the species' historical range. To address past difficulties with obtaining wild-produced gopher frog eggs, lab-reared gopher frogs have 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.

Because evidence of successful establishment of a new gopher frog population at Williams Bluffs remains elusive, a new reintroduction site was selected to begin receiving head-started frogs in 2021. Three wetlands at Alapaha River Wildlife Management Area near Ocilla were selected and incorporated into a parallel experiment on wetland restoration techniques including comparisons between the effects of prescribed fire, herbicide and mechanical treatments, as well as hydrologic restoration.

Even with abundant winter rains, gopher frog reproduction appeared poor to nonexistent this year at Sandhills Wildlife Management Area near Butler, as well as most other sites. Despite repeated searches, no eggs were observed in the WMA's key wetland. However, Wildlife Conservation was able to collect a single mass of donor eggs for the University of Georgia, and UGA raised approximately 950 head-started metamorphs. These head-starts were split between two of the three originally selected wetlands at Alapaha River WMA, bringing the total number of captive-reared and introduced frogs to nearly 11,000 since 2009.

## Eastern Hellbenders

The eastern hellbender, North America's largest salamander, lives in clear, cold streams in the north Georgia mountains. The species is state-protected and a previous candidate for listing under the Endangered Species Act.

As part of a larger Competitive State Wildlife Grant, more than 750 tissue samples and swabs collected from 2011-2018 were analyzed for the presence of several pathogens in Georgia's hellbenders, including Bd, Bsal and ranavirus. Bd, or Chytridiomycosis, is an infectious disease that affects amphibians worldwide and is caused by the chytrid fungus *Batrachochytrium dendrobatidis*. Bsal or "salamander chytrid fungus" (*Batrachochytrium salamandrivorans*) is a fungus known to cause mortality in multiple families of salamanders. Ranavirus, known as Rv, is a family of viruses that can cause severe infections in a number of cold-blooded animals, including amphibians, reptiles and fish.

Preliminary assessment of laboratory results have not shown Bsal but did reveal minimal detection of both Bd and Rv in Georgia hellbenders. These results will be used to compare pathogen prevalence over time and across the hellbender's range in Georgia, and with hellbender populations in other states.

In fiscal year 2021, staff did not conduct surveys because of limits imposed by the coronavirus pandemic. The plan is to continue surveys in 2022.

## Flatwoods Salamanders, Striped Newts and Tiger Salamanders

In updates for fiscal year 2021 regarding flatwoods and tiger salamanders and striped newts:

- Surveys for endangered reticulated flatwoods salamander conducted at Mayhaw Wildlife Management Area in spring 2021 detected larvae in two wetlands but none at another site that is typically reliable. Persistent rain in the latter half of calendar year 2020 apparently kept the wetland full of water, leading to successful colonization by fish, which can severely impact flatwoods salamander reproduction.
- The Amphibian Foundation, an Atlanta nonprofit focused on conserving amphibians, maintained a captive group of striped newts, all of which are thriving and have been reproductively active. The breeding colony consists of nearly 20 adult newts. The progeny will be used to restore sites in the wild. Striped newts are a candidate for federal listing.
- The Amphibian Foundation also keeps a breeding colony of frosted flatwoods salamanders, a federally threatened species. The colony consists of more than 40 animals, most of which are reaching an age and size where they would be reproductively mature.
- Striped newts were confirmed breeding at both Sandhills and Alapaha River wildlife



Surveying for striped newts (Cyndi Carter/DNR)



management areas in 2021. The striped newt population at Alapaha River, near Ocilla, appears to be responding positively to management activities at the site.

- Surveys for tiger salamanders and other pond-breeding amphibians were conducted on Alapaha River and Chickasawhatchee wildlife management areas (Chickasawhatchee is near Albany). While tiger salamanders are known from both WMAs, in 2021 the species was detected only at Alapaha River, even though a number of high-quality wetlands at each site were sampled. A tiger salamander was documented at Sandhills WMA using a remote detection system. Tiger salamanders had not been seen on this property in nearly two decades.
- In 2020, Wildlife Conservation began targeting wetland basins with prescribed fire in summer, a time at which many wetlands are at their driest and, allowing fires to carry through them and control unwanted woody vegetation. Four wetlands at Alapaha River WMA received summer fire treatments that year, although tropical weather limited the window for fire by filling most ponds with water earlier than anticipated.

## Suwannee Alligator Snapping Turtles

Recently described as a distinct species from western populations of alligator snapping turtles, the Suwannee alligator snapper is found only in Suwannee River drainage streams in Georgia and Florida. In response to apparent declines in populations, the U.S. Fish and Wildlife Service issued a proposed rule to list the turtle as threatened under the Endangered Species Act in 2021. The listing process highlighted the need for conservation to reduce fishing by-catch and deaths, and promote recovery of the species ravaged by harvest for the meat industry before protections were enacted in the late 1900s.

Alligator snapping turtles have been protected from harvest and other harm under Georgia's Endangered Wildlife Act since 1992.

Suwannee alligator snappers are long-lived and have delayed sexual maturity and limited reproduction. These characteristics, typical of freshwater turtles, make alligator snappers vulnerable to over-harvesting and snapper populations slow to recover.

## Spotted Turtles

The spotted turtle is a small, freshwater turtle species that is considered in decline across much of its range in the eastern U.S. These turtles rely on shallow wetlands with abundant cover in the form of herbaceous vegetation, coarse woody debris and leaf litter. A lack of published data and standardized inventory surveys makes assessing the status of spotted turtle populations difficult.

Previous surveys confirm that Georgia has abundant wetland habitat that is potentially suitable for spotted turtles. In 2021, the Wildlife Conservation Section also documented the first record of spotted turtles on Alapaha River Wildlife Management Area in Irwin County. Additional work is required for long-term population monitoring and a comprehensive survey of the species' range in the state.

Suwannee alligator snapping turtles assessed on the Alapaha River with help from Valdosta State students (Chris Coppola/USFWS)





## North Atlantic Right Whales

North Atlantic right whales are a critically endangered species that numbers only about 350 whales. 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 human impacts, including collisions with ships and entanglement in commercial fishing rope.

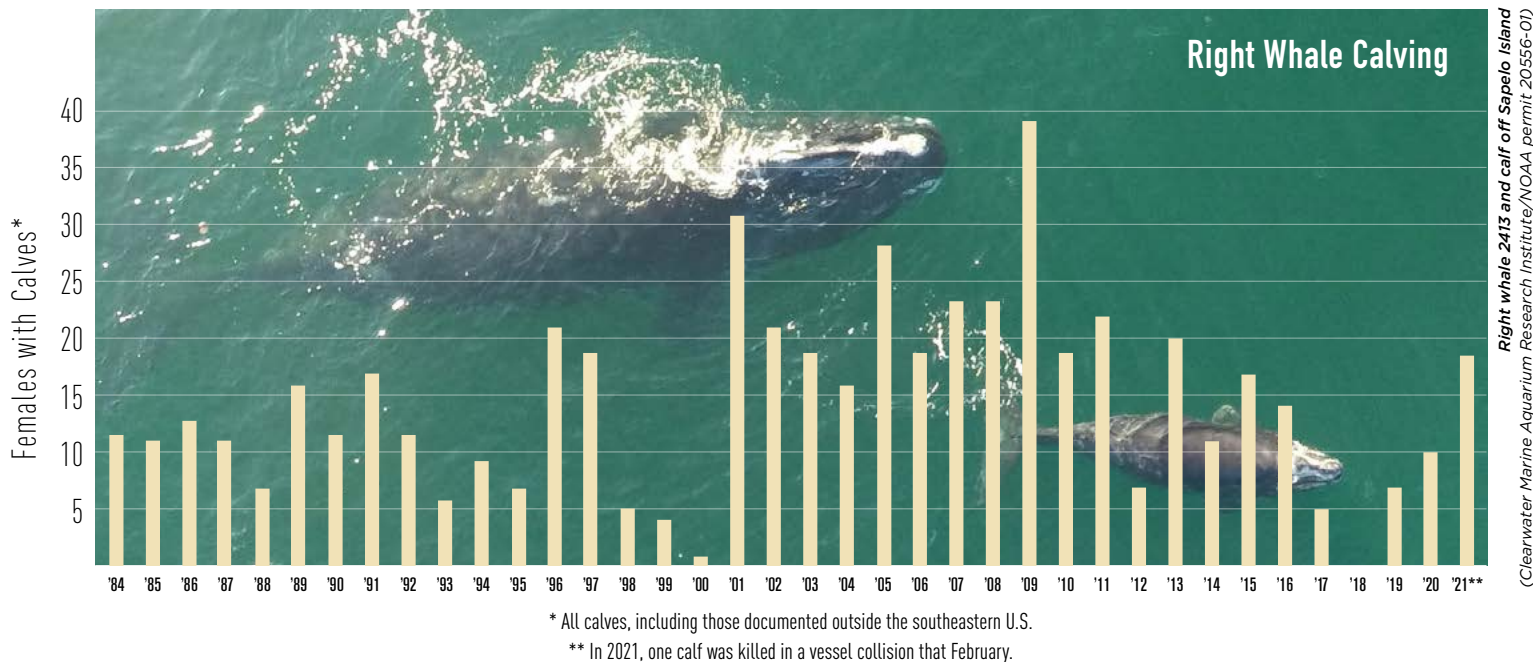
Right whales forage on zooplankton along the coast of New England and Canada. Each November through January, pregnant females migrate more than 1,000 miles to the coast of Georgia and northeast Florida, the species' only known calving grounds. Females nurse their calves for one to two months, until the calves are strong enough to migrate north during February to April. 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 most whales are dying from ship strikes and entanglement in commercial fishing gear. More than 80 percent of surviving whales bear scars from fishing rope entanglements.

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# MAMMALS





Florida officials measure the right whale calf killed in a February 2021 boat collision (Tucker Joenz/Florida FWC/NOAA permit 18786)



Even worse, females are dying at faster rates than males, probably because of the added energy that calving demands. Fewer than 100 calving females remain. The species is declining rapidly, and its future is uncertain. Data from the North Atlantic Right Whale Consortium placed the species at 356 whales as of 2020, down from a peak of 481 in 2011. The last time there were fewer was in 2003.

DNR works with scientists and managers from the National Oceanic and Atmospheric Administration, the Florida Fish and Wildlife Conservation Commission, Clearwater Marine Aquarium 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 done to monitor the whale population. Biologists use crossbows to collect genetic samples from calves and take photographs to 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 are active in 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.

During the 2021 calving season, survey teams identified 17 females with calves, 17 adult females without calves, 12 adult males and nine juvenile whales. An additional cow/calf pair was spotted in New England waters in spring 2021, upping the annual calf total to 18. The 2021 counts were a welcomed increase compared to recent winters, raising hope that the whales may finally be finding adequate plankton in New England and Canada. (No calves were seen in 2018, the first time none had been reported since surveys began in the 1980s.)

However, the 2021 calving season was far from perfect. One calf was killed and its mother injured when the pair were hit by a sportfishing boat near St. Augustine, Fla., in February. Two entangled whales were also spotted. Wildlife Conservation staff tried to free an adult male right whale from a lobster pot in January, but the whale evaded the boat and may now be dead. Another male was found entangled in heavy rope off Florida in February but died off the South Carolina coast before responders could help it. Both whales likely became entangled in fishing gear from New England or Canada.

Until calving rebounds to normal levels, reducing human causes of mortality is key to the species' survival.

## Marine Mammal Stranding Network

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 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 more than 75 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.

The network documented 26 cetacean stranding events in calendar year 2020. These included 23 bottlenose dolphins, two pygmy/dwarf sperm whales and one injured right whale calf. Cause of stranding could not be determined in approximately half of the cases – eight in all – because carcasses were either too decomposed or could not be recovered. Of the remaining cases, one bottlenose dolphin was accidentally struck and killed by a boat, seven dolphins died from disease, one dolphin died from an infected stingray barb and two neonate dolphin calves were found dead from natural perinatal causes. Three bottlenose dolphins that died from disease had scars from previous rope entanglements.

One dwarf sperm whale stranded alive at Sea Island and was euthanized chemically by Wildlife Conservation staff because it was out of its natural habitat and in poor body condition. Dwarf and pygmy sperm whales live along the continental shelf break (approximately 80 miles offshore of Georgia) and cannot be rehabilitated.

The injured right whale calf was struck by a vessel propeller somewhere off the Georgia coast. Wildlife Conservation staff and partners used a remote drug delivery system to administer antibiotics, but the calf was not seen again and likely died from its wounds. 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 approximately 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 but likely 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 a die-off of manatees along Florida's Atlantic Coast in fiscal 2021 has threatened that recovery. A collapse in seagrass resources in Brevard and nearby Florida counties led to the death of more than 650 manatees during January through May. 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 summer 2021 as manatees were able to disperse and find food in other parts of Florida and Georgia, but there is concern that mortalities will resume in 2022 when the water cools and manatees return to natural and artificial warm-water sites with poor forage. Wildlife Conservation 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 103 manatee mortalities in Georgia waters since 2000. The leading causes of mortality are watercraft collisions (28 percent) and cold stress/hypothermia (13 percent). Less common causes include drowning in commercial fishing gear, entrapment and gunshot. Ten manatee carcasses were found in Georgia during calendar year 2020 and the first half of 2021. Three died from starvation during the spring of 2021 – likely in connection with the seagrass die-off in Florida. Two manatees died from watercraft collisions. The cause of death could not be determined in the remaining cases.

Tagged manatee feeding with others (DNR/USFWS permit MA37808A-0)





## Small Mammals

A grant for bat and small mammal conservation awarded to the Wildlife Conservation Section in 2019 continued to support work on the species in fiscal year 2021.

Wildlife Conservation, the U.S. Fish and Wildlife Service, and the Georgia Department of Transportation continued statewide efforts to survey transportation structures for bats. Environmental surveys conducted by DOT ecologists and consultants for DOT maintenance and improvement projects provide the majority 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. 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. This training ensures more survey coverage throughout the state by qualified staff and is highly valued by partner agencies. The Georgia Bats in Bridges mobile app, available for download on [Android](#) and [iOS](#) devices, also continues to provide an effective field-data collection platform. Once enough data is collected, Wildlife Conservation anticipates that analyses performed using the dataset will be helpful and efficient because of the centralized data collection system.

In 2021, staff made 12 site visits and conducted one emergence survey at transportation structures with DOT to confirm the presence of significant bat roosts. This fieldwork allows Wildlife Conservation to provide advice on measures to avoid and minimize disturbance to bats during upcoming projects. Staff also continued to survey culverts and visit significant hibernacula at culverts this year as part of ongoing research for white-nose syndrome surveillance. As a result of the surveys, the agency began early coordination with DOT on a Columbus-area culvert that, while in disrepair, is a significant maternity colony site for southeastern myotis, a state-tracked species.

Wildlife Conservation and Fish and Wildlife Service biologists revisited the Interstate 20 culvert where federally endangered bat species were observed in 2020. The site has been designated an environmentally sensitive area because of the number of bats and species

diversity at the roost. DOT does not have any work scheduled for the culvert, but it remains an important monitoring site, providing the last reported observation of an Indiana bat in the state as well as the first known occurrence of an Indiana bat using a transportation structure in Georgia. It is also where the first known occurrence of gray bats using a culvert in the state was documented. These observations changed the species ranges for the state and underscored the need for interagency

coordination in gauging and addressing potential impacts from transportation projects. Neither species were observed at the site this fiscal year but its monitoring will continue.

Cave emergence count surveys were conducted in fiscal 2021 using manual counts and a thermal camera. These surveys used to occur annually but had to be discontinued because of technological issues. The goal is to monitor maternity bat colonies and see how colony numbers change



WNS cave survey crew (DNR)

over time. The surveys were conducted with Fish and Wildlife Service biologists at two north Georgia caves that had federally endangered gray bats and at two south Georgia caves where southeastern myotis bats occur.

The statewide Anabat surveys continued in fiscal 2021. Project volunteers drove 19 DNR mobile acoustic route and 12 North American Bat Monitoring Program route transects across the state collecting bat calls. DNR and U.S. Forest Service partners drove another 17 routes for these

surveys. Most routes (detailed at [georgiawildlife.com/AnabatProject](http://georgiawildlife.com/AnabatProject)) were run once or twice. Wildlife Conservation used software and visual identification to analyze Anabat survey calls collected in calendar year 2020, and then supplied the data to the [North American Bat Monitoring Program](#) to feed into range-wide monitoring for at-risk species. Through 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.

A citizen-science program started in 2014 to monitor summer bat maternity roosts in the state continued in 2021. This outreach encourages the public to count bats at bat houses, barns, and other roosts twice each summer. The effort mirrors programs in Pennsylvania and Wisconsin and allows the public to contribute to long-term monitoring of wildlife populations. Nearly 40 reports came in through the online survey and DNR staff followed up on roosts reported on public lands that might be available for public wildlife-viewing opportunities.

As of winter 2021, 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 four more counties. Biologists also documented a 93-percent decline in bat populations at known hibernacula in north Georgia.

Although tri-colored 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 2021, gray bats were seen during north Georgia winter surveys in one site. The gray bat is a species that seems to be resistant to white-nose syndrome, or WNS.

Data from summer mist-netting in the state also shows declines for tri-colored bats and *Myotis* bats, compared to pre-WNS summer mist-net surveys. In summer 2020, staff did not conduct any mist netting because of COVID-19 concerns. At that time, there was limited data available indicating whether native North American bats were susceptible to the virus. Although these sites were not sampled then, the goal is to sample them each year or as often as circumstances and other project priorities allow. With additional data showing that bats are unlikely to get COVID-19 from people, mist netting at the long-term monitoring sites continued in summer 2021, with staff taking more health-related precautionary measures. 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.

WNS has killed millions of bats. According to the Fish and Wildlife Service, at the close of fiscal 2021 the disease had been documented in 37



DNR's Lexie Dingsen checks an eastern red bat (Emily Ferrall/DNR)



states and seven 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 2021, 205 culverts were surveyed, 52 percent of which had bats. The most significant site found is in Chattahoochee County: This culvert had 324 southeastern myotis bats, 41 tri-colored bats and one big brown bat. Details on the WNS status of some sites are pending, but as of September 2021 two new sites tested positive for Pd. These results represent the second year in a row that Pd has been detected in culverts and marks a more southward progression of the spread of Pd in Georgia.

Wildlife Conservation biologists are working with the public and the caving community to promote awareness of WNS and support for bat conservation.

A grant from The Environmental Resources Network, or TERN, has supported Wildlife Conservation staff efforts to establish bat houses and native-plant bat gardens in public places across Georgia, including in Athens, Rutledge, Tifton, Macon and Columbus. Bats are using at least four of the five bat houses added. Biologists are planning educational events and wildlife-viewing opportunities in these areas to inform the public about bats, bat houses, and native plants for wildlife.

Staff conducted 13 bat education and outreach programs in fiscal 2021. The programs were given to school groups, garden clubs, Scout clubs and visitors at state parks and nature centers statewide.

In 2021, Wildlife Conservation continued surveying for eastern spotted skunks, another species of conservation concern in Georgia's State Wildlife Action Plan. The surveys targeted north Georgia wildlife management areas and the Chattahoochee National Forest. No eastern spotted skunks have been observed, although surveys have documented striped skunks, which is a good sign. An eastern spotted skunk sighting along the Appalachian Trail was reported to the agency via the [georgiawildlife.com/spottedskunkreporting](https://georgiawildlife.com/spottedskunkreporting) website.



Checking a bat box at Hard Labor Creek State Park (Trina Morris/DNR)



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.

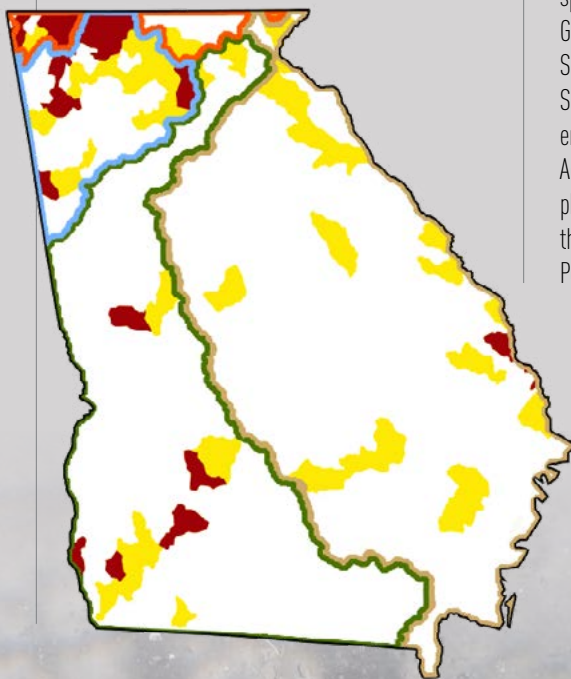
Important populations of rare aquatic species are distributed throughout the state. However, certain areas – such as the Coosa River drainage in northwest Georgia – support an exceptional number of common and rare species. As part of the State Wildlife Action Plan, experts prioritized Georgia watersheds 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.

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](http://georgiabiodiversity.org).



### River Basins and Priority Watersheds

#### River Basins

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

#### Priority Watersheds

- Highest
- High

# FRESHWATER AQUATIC SPECIES



## ■ 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 sampled for trispot darters at 39 sites where environmental DNA, or eDNA, samples from 2019 indicated the fish might be present. These surveys continued a project supported by a grant from the National Fish and Wildlife Foundation's Southeast Aquatics Fund and done in partnership with the Geological Survey of Alabama, the University of West Alabama and the Cawaco Resource Conservation and Development Council. The surveys discovered six new breeding sites for trispot darters, a significant increase considering that Georgia previously had only one known breeding location.

Wildlife Conservation also joined forces with the University of Georgia's River Basin Center to continue an annual fish and mussel monitoring program in Holly Creek, a major tributary to the Conasauga River. Fish and mussel surveys were conducted at 10 sites in 2021. Several rare fish and mussel species were detected, including blue shiner, trispot darter, bridled darter, finlined pocketbook, Alabama creekmussel, Coosa creekshell and Alabama rainbow.

The monitoring surveys are conducted annually, complementing a larger suite of conservation actions implemented in the Holly Creek watershed by partners from The Nature Conservancy, UGA's

River Basin Center, Limestone Valley Resource Conservation and Development Council, and the U.S. Fish and Wildlife Service. Like the trispot darter project, the Holly Creek work is supported by a grant from the National Fish and Wildlife Foundation's Southeast Aquatics Fund, with 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 2021, staff began 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 River in Tennessee and in Holly Creek, a Georgia tributary of the Conasauga.

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 species. 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. Once the juveniles are large enough (likely in 2023), they will be reintroduced at sites in Georgia or Alabama.

Endangered Coosa moccasinshells in Holly Creek (Ani Escobar/DNR)



Wildlife Conservation staff continued surveying across the Coosa moccasinshell's historic range in Georgia, trying to find the mussels and identify potential sites for reintroduction. Nineteen Coosa moccasinshells were documented in Georgia and Tennessee, an encouraging start for this project, which is funded by the Fish and Wildlife Service's Recovery Challenge program. Each mussel was tagged with a passive integrated transponder, or PIT, tag and swabbed for a genetic sample. The PIT tags increase re-capture rates, providing data for studying factors such as growth, survival and habitat utilization.

Another highlight from 2021: The Etowah bridled darter (*Percina freemanorum*) was formally described as a new species endemic to the Etowah River system in April 2021. The specific epithet (*freemanorum*) is named for University of Georgia ecologists Drs. Mary and Bud Freeman in recognition of their contributions to aquatic conservation in the Etowah system. The species description appeared in Yale University's Bulletin of the Peabody Museum of Natural History. Wildlife Conservation provided photographs, specimens and habitat data in support of the species description.

Formal description of Etowah bridled darter (*Percina freemanorum*) honored UGA's Bud and Mary Freeman (Brett Albanese/DNR)



## ■ 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.

In fiscal year 2021, the Wildlife Conservation Section and partners conducted a sixth consecutive year of fyke net sampling in Brasstown Creek. The sicklefin redhorse uses summer and winter feeding habitats in the mainstem Hiwassee in North Carolina, but can be intercepted by nets during their spring spawning migration. The favored method is setting fyke nets, which use side nets to funnel migrating fish into a central chamber, much like a weir ([video of DNR's fyke net in action](#)). Captured fish are weighed, measured, assessed for health and reproductive condition, and released in their direction of travel. All fish are injected with a passive integrated transponder (PIT) tag, which is used to track individual fish recaptured in fyke nets or detected when they swim 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.

During 2021, 77 adult sicklefin redhorse were captured or detected using a combination of fyke netting and the PIT antenna system. Forty-five were recaptures tagged during prior sampling years. The rest were first-time captures: Staff injected each with a PIT tag. The database now includes 319 individual sicklefin redhorse that have been tagged in Brasstown Creek. The number of tagged and untagged fish encountered each year is used to estimate annual survival, recruitment and population size. Preliminary estimates indicate that more than 1,000 adult sicklefin redhorse migrate into the creek each year. The population model is being updated and improved by the Georgia Cooperative Wildlife Research Unit at the University of Georgia through a grant from the Sicklefin Redhorse Conservation Committee.

Researchers from Tennessee Tech are studying the ecological significance of migratory redhorse suckers in Brasstown Creek. While suckers generally don't die after spawning like salmon do, they do add nutrients to streams through excretion and by depositing large quantities of eggs in the substrate that can be consumed directly or as larvae when they hatch. This study is aimed at quantifying these nutrient additions, which may be particularly important in nutrient-poor Blue Ridge mountain streams.



Tennessee Tech University student Ryan Hudson shows a sicklefin redhorse (DNR)



## ■ 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](http://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.

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.

A competitive State Wildlife Grant awarded to Georgia, South Carolina and North Carolina in 2016 powered a multiyear effort to identify and implement management actions needed to ensure the species' survival across its range. Over the past four years, the grant has allowed DNR's 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 works to improve management of range-wide data, prepare status reports and raise public awareness. Others

involved include Georgia Power, Georgia Southern University, the University of Georgia's Georgia Cooperative Fish and Wildlife Research Unit and River Basin Center, the U.S. Fish and Wildlife Service, and other agency and industry partners. A determination by the Fish and Wildlife Service on whether to list robust redhorse under the Endangered Species Act is expected in 2024.

During fiscal year 2021, partners continued a long-term study of the robust redhorse's Savannah population. Funded by the competitive State Wildlife Grant and Georgia Power, the study involves collaboration with the South Carolina Department of Natural Resources, UGA's School of Veterinary Medicine and Georgia Southern University. In 2018, partners and volunteers tagged and released 11 individuals with surgically implanted acoustic transmitters: Data has been transmitted and compiled. 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 that might become conservation priorities. In fiscal 2021, seven tagged robust redhorse were detected by the stationary receiver arrays. The location data is being analyzed.

Staff continued to maintain and refine the range-wide 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 also links genetic lineage information maintained by South Carolina DNR to data collected in the field.

Also in fiscal 2021, the robust redhorse team:

- Conducted visual spawning surveys on the Broad River.
- Met with Georgia Power and Fish and Wildlife Service representatives to begin drafting the renewal document for the Candidate Conservation Agreement with Assurances.
- Coordinated and led a virtual workshop of more than a dozen experts to write a status assessment document that summarizes data and conservation efforts.
- Worked with UGA River Basin Center colleagues on conservation actions and restoration priorities in the Ocmulgee.

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

Robust redhorse on the Savannah River (DNR)



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 2021, Wildlife Conservation conducted surveys to identify the distribution and abundance of four freshwater mussel species that could be listed under the Endangered Species Act. Staff surveyed lakes Jackson and Juliette, as well as associated areas of the upper Ocmulgee River at multiple depths using snorkeling and scuba. Species distribution and demographic data were collected and sites identified for future monitoring. Staff also held meetings with UGA faculty to begin a partnership conducting host fish identification and phylogenetic analyses for four mussel species of interest.

Staff managed contracted research, as well, 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 both species in the lower Altamaha River and estimating the number of adult Atlantic sturgeon

migrating into Altamaha tributaries – the Oconee and Ocmulgee rivers – for spawning.

During spring 2021, 407 Atlantic and 219 shortnose sturgeon were captured in the lower Altamaha, indicating successful recruitment into the juvenile population. Surveys for spawning Atlantic sturgeon are scheduled for fall 2021. The Altamaha and Savannah river populations of both species are among the largest within their overall ranges and are significant for the recovery of each fish.

## ■ 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.

In partnership with retired ichthyologist and DNR volunteer Dr. Camm Swift, Mansfield University geneticist Dr. Greg Moyer and University of Georgia ecology graduate student Christine Fallon, the Wildlife Conservation Section completed the manuscript "Diagnosis and Distribution of Florida Sand Darter, *Ammocrypta bifascia*, in the Flint River, Georgia." The paper, published

in the [Southeastern Fishes Council Proceedings](#) in December 2020, describes the discovery of the first sand darter species documented in Georgia.

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 2021, biologists completed surveys of four 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 trend 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 2021. However, this reach still provides habitat for common and rare species and remains a priority for monitoring and conservation.

Staff biologists took part in a pilot project with Albany State University, UGA and the Flint RiverQuarium to conduct host-fish trials for Flint River mussels. The trials will be conducted in space provided by the RiverQuarium and available for viewing by visitors, while the care of host fish and collection of mussel data will be handled by Albany State students and UGA. Unlike the majority of mussel host-fish identification studies, the project focuses on wild inoculated fish, as opposed to fish which have been exposed to mussel larvae in a lab setting. This method will allow researchers to not only identify fish species that are capable of acting as hosts for native mussels, but which fishes interact with these mussels in the wild. Initial results have been 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 2022.

In the Ochlockonee River basin, Wildlife Conservation biologists participated in the formation of a Ochlockonee moccasinshell Recovery Group. This group includes biologists from the Florida Fish and Wildlife Conservation Commission, the U.S. Geologic Survey and the U.S. Fish and Wildlife Service. The group will assess the status of the Ochlockonee moccasinshell in Georgia and Florida as well as available habitat in previously occupied reaches of the river for possible work to reintroduce the mussel to Georgia waters.



Collecting fish in Chokey Creek for a host-fish study targeting Flint River mussels (DNR)



## Rare Plant Conservation

Georgia is a global hotspot for botanical diversity. The Wildlife Conservation Section's botany team tracks populations of more than 780 plant species, 155 of which are protected in the state. Plant conservation depends on wisely chosen priorities and contributions from partners. In Georgia's State Wildlife Action Plan, plant conservation follows a multipronged approach: Surveys and monitoring, safeguarding genetic material, habitat stewardship, and fostering partnerships are all high priorities for protecting plant biodiversity.

In fiscal year 2021, Wildlife Conservation built on a foundation laid by its first natural heritage botanist, the late Tom Patrick, hiring three new botanists, creating a lead botanist position and – amidst on-the-ground conservation work – working to digitize the section's historical archives and update the flow of rare species data. The changes were critical to providing rare-plant

information for planning, research and education. Staff also connected with NatureServe to maintain a national standard for the agency's rare species data and conservation status assessments. Continuing in the footsteps of botanist Dr. Mincy J. Moffett Jr., who retired in fiscal 2021 and now works with the U.S. Fish and Wildlife Service, Wildlife Conservation also maintained an integral role with the Georgia Plant Conservation Alliance, or GPCA, a nationally recognized network that energizes effective plant conservation in the state.

A 2021 highlight was the awarding of nearly \$780,000 for a Wildlife Conservation-led partnership to sample, grow and save 14 imperiled plant species in Georgia. The U.S. Fish and Wildlife Service Recovery Challenge grant will also boost capacity to preserve the plants at the State Botanical Garden of Georgia in Athens, Atlanta Botanical Garden and the Chattahoochee Nature Center in Roswell, while spreading that horticultural expertise and support to the

members of the GPCA. The project will also establish a framework for working with the Fish and Wildlife Service at a national level.

Coordinated by DNR, the five-year grant will strengthen the GPCA by developing genetically sound plant collections – living and seed-banked – and increasing the depth of partnerships. New partners will be paired with veteran members to learn protocols and replicate collections, sharing the responsibility for living collections and building teams of plant conservation experts throughout Georgia. Safeguarding steps were initiated in fiscal 2021 for five target species: Alabama leatherflower, fringed campion, Morefield's leatherflower, swamp pink and Tennessee yellow-eyed grass. The other focus species are black-spored quillwort, Canby's dropwort, Coosa (or Mohr's) Barbara's buttons, dwarf sumac, hairy rattletweed, mat-forming quillwort, pondberry, smooth purple coneflower and Virginia spiraea.

DNR's Lisa Kruse and Stephanie Koontz assess endangered pondberry at Sandhills WMA (Nathan Klaus/DNR)

# PLANTS AND NATURAL HABITATS



## ■ 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. Work with endangered trillium species was a focal point in fiscal year 2021 in response to Fish and Wildlife Service efforts to assess the status of persistent trillium and relict trillium range-wide.

Persistent trillium has a narrow distribution: It is known only from steep slopes around Tallulah Gorge in northeastern Georgia and is closely associated with eastern hemlock. Wildlife Conservation discovered two additional areas on Tallulah Gorge Wildlife Management Area that had small but significant populations. Overall, a large-scale decline of persistent trillium has been documented. Throughout these populations, hemlock wooly adelgid, an invasive insect, has killed or defoliated more than 70 percent of the eastern hemlocks. The effect

on habitat health has been drastic, with early successional tree species such as red maple, tulip poplar and sweetgum replacing hemlocks. Surveys of persistent trillium in 2021 found 3,531 individuals compared to 20,028 plants in 1985, the previous count.

Staff also surveyed relict trillium statewide in preparation for a federal species status assessment. This included intensive surveys of 21 element occurrences of the federally endangered plant across the state's Fall Line, from Fort Gaines to Augusta. Populations were mapped and information on demography and habitat recorded. Staff found tens to hundreds of thousands of plants. Most sites featured rich herb layers, presumably spared from change because of the steep and sometimes rocky slopes. The data provided a better understanding of the plant's populations in the state and made new rankings possible for each occurrence. Nearly half of the 51 occurrences are now ranked excellent or good. Another 20 percent of known occurrences have not been surveyed in more than 20 years.

In another effort involving a species status assessment, Wildlife Conservation conducted statewide surveys for hairy-peduncled beaksedge, a species petitioned for federal listing. This plant, which grows on the banks of blackwater streams in the Coastal Plain, is rare and poorly understood, not having been documented in Georgia since 1995. Botanists visited all nine known sites and found hairy-peduncled beaksedge at three, all with few plants. The viability of the three sites ranked fair to poor.

Ongoing monitoring and recovery efforts continued in 2021 for several federally and state protected plants, including dwarf sumac, Canby's dropwort, Tennessee yellow-eyed grass, large-flowered skullcap and Radford's mint.

A complete census was made of two dwarf sumac populations where recent declines had been documented. One on property owned by the city of Covington had seemingly disappeared – no stems were found in 2018–2019 – likely due to overshadowing. However,



Relict trillium (Lisa Kruse/DNR)



staff found one stem in 2020, showing that the stand is not yet extirpated. At the other site, an introduced population on Georgia Wildlife Federation property near Covington, there were only two stems. The wet year had oversaturated the habitat, and possibly shown that the site is too mesic for the plant. However, at Lower Broad River Wildlife Management Area near Elberton, the dwarf sumac population is thriving, with more than 1,500 stems. The use of prescribed fire and mechanical control of hardwoods has made this site a restoration success story (as shown in [this video](#)).

Populations of Canby's dropwort, a federally endangered species, appeared vigorous in summer 2020, probably because of favorable rainfall quantities. The species was re-discovered for the first time since 2008 at The Nature Conservancy's Oakbin Pond Preserve in Dooly County. Staff counted about 200 stems. Hydrologic and vegetation restoration is ongoing at the preserve, led by The Nature Conservancy and the U.S. Agriculture Department's Natural Resources Conservation Service. On private property in Lee County, Wildlife Conservation botanists documented a new occurrence of Canby's dropwort, sporting about 100 stems and not far from the state-protected Neyami Savanna Tract. At Big Dukes Pond Wildlife Management Area, where the agency opened the tree canopy in 2010 and 2017-18 to restore Canby's habitat, monitoring of the vegetation structure and changes in the quantity of dropwort stems revealed that the quantity surged from a mean of 12.5 stems per 50-square-meter plot in 2015 to slightly more than 125 stems in 2020, a significant increase at the WMA just north of Millen. Wildlife Conservation also developed a monitoring protocol for Woodward Canby's Dropwort Preserve, with implementation planned for next year. The hundreds of thousands of stems at this private site in Vienna enjoyed a spectacular bloom during 2021.

In fiscal 2021, Wildlife Conservation staff 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

Monitoring Radford's mint (Eamonn Leonard/DNR)



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 2020 counted 6,237 individuals, down slightly from 7,000 the previous year.

In northwest Georgia, the Ridge and Valley physiographic province harbors unique plant diversity and rates as a priority for surveys. Work during fiscal 2021 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.

Large-flowered skullcap populations have been monitored at five sites in the region from 2016 through 2020. During that five-year period, populations gradually declined as browsing by white-tailed deer rose from 33 to 43 percent. In response, Wildlife Conservation began a pilot study at Resaca Battlefield Historic Site, home to one of the largest populations of the federally threatened plant. The goal: compare plots with deer fencing, deer repellent and no protection to help guide management. Preliminary results at the Resaca site show that the time of year the repellent is applied is a key factor.

The agency also began a partnership with the U.S. Forest Service this year to update rare species records on the Chattahoochee National Forest. The first surveys involved endangered small whorled pogonia orchid and other rare plants potentially found in forest stands targeted for timber management. No new orchid populations were found but other rare plants such as American ginseng and pink ladieslipper were.





DNR's Marylou Horan outplants rare species at Ochopee Dunes WMA (C. Mincy Moffett/DNR)

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 four years. Coupled with prescribed fire management in the adjacent uplands, the work has led to an increase in population size.

Safeguarding and restoration work continued on one of the GPCA's longest-running projects – smooth coneflower and mafic oak/pine woodland restoration on Currahee Mountain at Lake Russell Wildlife Management Area. The two marquee species here are federally endangered smooth coneflower and state-threatened Georgia aster. The safeguarding – taking place within the context of landscape-level restoration conducted by the U.S. Forest Service at the WMA near Cornelia – includes vegetation management and prescribed fire.

The numbers on other GPCA safeguarding this past year include:

- New populations found: two species and three element occurrences.
- Experimental outplantings: seven.
- Monitored: 28 imperiled species and more than 45 populations.
- Management workdays: 20 work sessions focusing on eight imperiled species.
- Seed collected: seeds of 12 species; 22 populations represented.
- Cuttings collected: two imperiled species, with two populations represented.
- Plants collected: one species, with 185 individuals, collected in a rescue operation.
- Endangered Species Assessment signs posted for roadside occurrences: three imperiled populations marked.
- Research projects completed: two for two imperiled plant species.
- Botanical Guardians volunteer assistance: 10 imperiled species helped by 25 people contributing more than 186 hours in situ.
- Conservation easement and ownership changes: new conservation protections on four populations, four species involved.

## ■ Safeguarding

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

In fiscal year 2021, the Wildlife Conservation Section's botany team began a pivotal project to safeguard multiple rare-plant wetland species at Ochopee Dunes Wildlife Management Area in Emanuel County. Populations are being restored in pitcherplant bog seeps, depression ponds and the Ochopee River floodplain swamps, all funded by a U.S. Fish and Wildlife Service Coastal Program grant. More than 500 plants including 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 pondspice were planted in other wetlands. The outplantings will be monitored to see if they establish self-sustaining populations.

At Charlie Elliott Wildlife Center near Mansfield, a new outplanting of dwarf sumac was created from both male and female clones collected from safeguarded populations at Lower Broad River Wildlife Management Area and Panola Mountain State Park. The plants at Charlie Elliott will serve as an educational display, while also conserving the species near one of its imperiled populations in Covington. Dwarf sumac also was planted at Panola Mountain State Park in a restored grassland. An earlier outplanting is thriving there but it had only one gender. The site now includes males and females, which will hopefully lead to natural recruitment.

At Lower Broad River WMA near Elberton, seedlings of Carolina trefoil proved a welcomed find in outplantings of this state-endangered species. This recruitment followed a year in which few of the planted seeds germinated and none reached maturity.

Wildlife Conservation also worked to protect sandhills lily in 2021. This GPCA priority plant is rare in Georgia, with only three known populations. Sandhills lily grows along the ecotones of fire-maintained uplands and blackwater stream floodplains. Staff and volunteers installed protective cages around the lilies at The Nature Conservancy's Broxton Rocks Preserve in Coffee



## Habitat Restoration

Imperiled rare plant populations often require targeted stewardship to achieve recovery needs that are finer than broad-scale prescribed fire or timber management programs can address. These approaches include localized control of woody or invasive vegetation, excluding herbivores and small-scale controlled burning and hydrologic repairs.

In fiscal year 2021, the Wildlife Conservation Section worked on restoring habitat for federally endangered Canby's dropwort, Tennessee yellow-eyed grass and persistent trillium, and also for state-tracked sandhills lily. These efforts were done in partnership with the Georgia Plant Conservation Alliance and DNR's Georgia State Parks and Historic Sites Division.

As mentioned in "Surveys and Monitoring," Wildlife Conservation has partnered with the Georgia Department of Transportation long-term to restore a population of Tennessee yellow-eyed grass on a DOT site along Interstate 75 called Interstate Hypericum Springs. DNR led DOT and GPCA volunteers in removing noxious vine species and woody competition – expanding habitat suitable for the grass species – while also collecting seeds and planting them in newly opened areas. Also for the species, plantings added to an introduced population at Crockford-Pigeon Mountain Wildlife Management Area near LaFayette.

Staff worked with Atlanta Botanical Garden and State Parks to clear invasive plants from a 5-acre persistent trillium population on Tallulah Gorge State Park near Tallulah Falls. English ivy and other woody invasives had overtaken the area. It will be replanted with natives and maintained by park staff.

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 state-protected mountain bog plants include mountain purple pitcherplant (petitioned for federal listing), broadleaf white meadowsweet, Carolina bog laurel, Canada burnet, Cuthbert's turtlehead, marsh bellflower and various orchid species.

Work to restore and maintain mountain bogs is spearheaded by the Georgia Plant Conservation Alliance, with Wildlife Conservation Section playing key roles. In calendar year 2020, GPCA

held 25 workdays totaling 1,100-plus hours of labor and involving nine mountain bogs as well as seven upper-Piedmont prairie/woodland sites in northeast Georgia.

Wildlife Conservation's focus in fiscal year 2021 included maintaining and monitoring remediation that addressed feral hog damage in bogs (and measures to keep hogs out), collecting seed for maternal line tracking and seedbanking efforts, and assessing habitat management. These efforts are being used as models of success for the Southeastern Grasslands Initiative and its Piedmont Prairie Partnership, the Bog Learning Network, and the newly formed Southeastern Plant Conservation Alliance.



Swamp pink (Alan Cressler)

## 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.

Inventoring high-quality bog sites in the Coastal Plain has been an ongoing since 2018. The aim is to prioritize bogs for habitat restoration and permanent protection, resulting in the recovery of multiple high-priority plant and animal species. A database of 58 Coastal Plain pitcherplant bog 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 year 2021, 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. In this first season, Flood collected 248 plant specimens, including many of rare species such as Tracey's dew-threads, Stokes' aster, purple honeycomb head, feather-bristle beaksedge and hartwrightia.

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. (State legislators renamed the park, formerly called Gordonia-Alatamaha, for the late state senator from Reidsville in June 2020.) 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, Georgia Botanical Society and the Georgia Native Plant Society.

In spring 2021, the Interagency Burn Team conducted a 35-acre burn at one of the bogs, the sixth burn on the property. At a different site, monitoring of 300 pitcherplants outplanted in 2019 revealed an encouraging rate of survival, with many pitchers flowering. The plants will be counted again in the coming year. Staff work closely with Georgia Power at the site, including in fiscal 2021 when Georgia Power contractors helped botanists rehabilitate an area where mowers left minor ruts in the bog.

Wildlife Conservation also teamed with the Open Space Institute on a Wayne County tract that features populations of endangered hairy rattlesnake. The site has an extensive but fire-suppressed hooded pitcherplant bog, as well. Staff held a work day to cut back woody competition at the bog, which rates as a suitable site for outplanting



Native Plant Society members with pitcherplants bound for Reed Bingham State Park (Lise Kruse/DNR)



other Coastal Plain bog species in peril. (See “Habitat Conservation and Monitoring” for more on protection and management of the tract.)

Also worth noting, a University of Georgia crew working on gopher tortoise conservation found a coastal-region bog with state-threatened parrot pitcherplants near a mining site in Brantley County. With the imminent mining activity posing a risk to the plants, Wildlife Conservation worked with the mining company on a rescue. In October 2020, DNR and UGA staff, along with volunteers from the Georgia Native Plant Society’s Coastal Plain Chapter, rescued more than 500 plants. Native Plant Society members Amy Heidt and Paul Sumner safeguarded the plants until they could be outplanted in the spring. Most were moved to the Open Space Institute’s hairy rattlesnake tract in Wayne County. Forty of the pitcherplants were planted at Laura Walker State Park near Waycross.

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 105 imperiled plant species. All are state-listed, 25 are federally listed and 14 are under federal review. Seventy-nine of the species are critically imperiled in the state (an S1 ranking), reflecting GPCA’s standard of prioritizing the recovery of Georgia’s imperiled populations. As of fiscal year 2021, 97 are in safeguarding programs at botanical gardens, arboreta and seed banks, and 55 have been successfully reintroduced into the wild. GPCA has 12 safeguarding partner institutions that hold and manage ex-situ collections for recovery and study.

Pondspice (Alan Cressler)



Even in a pandemic year with travel restrictions and other limits, the GPCA – with leadership from Wildlife Conservation Section’s botany team – achieved several conservation milestones:

- Discovering two new rare-plant populations, ciliate-leaf tickseed and pond spice.
- Conducting seven experimental outplantings, varying from Carolina trefoil to yellow flytrap, plus in northeast Georgia 63 Carolina hemlocks, a species threatened by hemlock woolly adelgid.
- Collecting seeds or cuttings from 14 imperiled plant species and representing the safeguarding of 24 populations. Of these, Georgia’s only known population of Kentucky ladyslipper set fruit in the wild, the first time that has been documented.
- Monitoring 45 populations of 28 rare species. Priorities include checking for threats such as hog damage, overcrowding and invasive species, and signs of success, from flowering to seedlings.

- Holding 20 work sessions involving eight plant populations. This work included prescribed fire and hand-clearing for dwarf sumac, monitoring and maintaining Georgia’s 11 mountain bog safeguarding sites, and clearing habitat for Tennessee yellow-eyed grass.
- Completing two research projects: a U.S. Forest Service-sponsored hybridization study of rare Smith’s sunflower and its common congener small woodland sunflower, and a habitat modeling study sponsored by the U.S. Fish and Wildlife Service to help guide population surveys of Carolina bogmint.

GPCA contributions to plant conservation since the alliance’s start have amounted to an estimated \$2.7 million in direct and indirect support. More than \$1.9 million was supplied by non-DNR members supporting high-priority species and habitats identified in Georgia’s State Wildlife Action Plan. A significant portion of contributions came from GPCA’s trained volunteers, the Botanical Guardians.

## Public-private 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.

In fiscal year 2021, pink ladyslipper was a primary target for the Wildlife Conservation Section's partnership with DOT. Along with Atlanta Botanical Garden, the agencies are planning to safeguard one of Georgia's largest populations of the state-rare species. The Ga. 400 site has thousands of plants. Yet

improvements to the highway will mean the population cannot persist. DOT is providing financial support to complete a safeguarding project that includes genetic analysis, seed banking and relocation. Also for pink ladyslipper, staff botanists joined with the Georgia Native Plant Society to rescue a population from a private development and move the plants to Don Carter State Park near Gainesville.

Wildlife Conservation also worked with DOT to relocate or protect Georgia aster, relict trillium and Atlantic white cedar. Staff provided consultation on rare plants and their habitats to improve DOT rare plant surveys and relocations required by construction. Both agencies teamed with the Georgia Native Plant Society to enlist volunteers to help with relocations.

DNR has had a formal partnership with the U.S. Fish and Wildlife Service since 1985. This collaborative 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 2021, Wildlife Conservation gave the Fish and Wildlife Service input for species status assessments and five-year status reviews for Canby's dropwort, fringed campion, Georgia bully, hairy-peduncled beaksedge and large-flowered skullcap. In turn, the service provided consultation to DNR about range-wide concerns and upcoming conservation priorities for Georgia-listed plant species.

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 year 2022.



Native Plant Society's Dave Gregory helping rescue pink ladyslippers (Lisa Kruse/DNR)





## 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 a larger, multisite data-collection 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.

There are also unanswered questions about monarchs that remain in Georgia and other Southeastern states during winter. Wildlife Conservation partnered with other organizations researching 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, a call that yielded more than 5,800 reported sightings. The group is continuing this project and is asking for observations with additional data during winter 2022.

## ■ 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 2020, the dealer-reported wild ginseng harvest in Georgia totaled slightly more than 167.8 pounds dry weight. This is lower than the 10-year average harvest of about 255 pounds. On average, dealers paid \$654 a pound for Georgia-harvested ginseng that year, the same as in 2019.

In 2017, Georgia's ginseng program benefited from a \$65,000 grant from the Fish and Wildlife Service and the North Carolina nonprofit Friends of Plant Conservation. The grant recognized DNR Law Enforcement efforts regarding ginseng regulations. Since summer 2018, Wildlife Conservation has used the funds for a conservation status survey of wild ginseng in Georgia, the first such assessment in the state since the 1990s. 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 in decline 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 harvest have influenced the ginseng decline on the forest.

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

Georgia DNR collaborated with Open Space Institute to protect the 2,400-acre Baptisia Tract in fiscal year 2021. Formerly owned by Southern Power and adjacent to the protected Wire Road Tract on Sansavilla Wildlife Management Area



Chapman's fringed orchid (DNR)

near Hortense, the property contains rare wildlife species, including the easternmost known population of federally endangered hairy rattlesnake. Wildlife Conservation staff worked with Open Space on beneficial habitat management, including removing invasive sand pine, thinning timber and planning prescribed fires. In summer 2021, staff completed a proposal for a federal National Coastal Wetlands Conservation grant in hopes of permanently protecting the property.

Staff also conducted the annual mowing of seven roadside populations of Chapman's fringed orchid in southeast Georgia. This critically imperiled species, a high priority in Georgia's State Wildlife Action Plan, only exists in a handful of road right of ways in the state's southeastern corner. Chapman's fringed orchid is a fire-adapted plant that needs sunlight and moist soils. Carefully mowing roadside habitats approximates fire, reducing woody competition and helping maintain the open wet-flatwoods habitat.

In Camden County, Wildlife Conservation began working with Forest Investment Associates on a DNR Forestry for Wildlife Partnership project that will benefit the orchid. Forest Investment manages 18,000 acres in the heart of the plant's range. The company has agreed to allow surveys on the property in late 2021 and to manage for the species. The primary goal is to restore pine flatwoods habitat for the orchid. Doing so will expand the orchid's habitat beyond the roadside edges, where it is limited.

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 Little St. Simons, a privately owned 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 for Cannon's Point, a conservation tract of more than 700 acres on St. Simons Island.

### ■ 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.

As discussed under "Surveys and Monitoring," in fiscal year 2021 Wildlife Conservation began a long-term monitoring study of the effects of climate change, prescribed fire and hemlock woolly adelgid on persistent trillium populations at Tallulah Gorge Wildlife Management Area near Tallulah Falls. Staff also expanded a statewide fire-photo monitoring program, adding new partners. In place since 2008, this project with DNR's State Parks and Historic Sites Division measures long-term effects of DNR's prescribed burning program using qualitative, standardized photographs and burn history information from site managers. This year, staff trained partners involved in prescribed fire management to collect data through a new ArcGIS Survey123 electronic data collection form. This tool led to the inclusion of new properties in the program and renewed monitoring of sites ahead of important burns. Program photos not only record management outcomes, they are used in news releases and presentations to highlight the benefits of prescribed fire.

Wildlife Conservation continued a vegetation monitoring project in fire-maintained uplands at Altama Plantation Wildlife Management Area. The focus is determining the effects of management methods on longleaf pine restoration sites at the Glynn County WMA. Methods include prescribed fire, tree thinning and planting longleaf. Gopher tortoises are a focus of restoration at Altama. Monitoring will help determine if management is improving habitats the tortoises and other priority species need.

### ■ 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 third grant were completed in fiscal year 2020, while work powered by the fourth grant began.



DNR received the first grant, for \$1 million, in 2009 to work with Alabama, Florida and South Carolina on restoring high-priority sandhills. DNR and state wildlife agencies in Florida, Alabama, Mississippi and Louisiana were awarded a \$981,000 State Wildlife Grant in 2011 for additional habitat restoration on the targeted habitats. In fall 2015, Georgia, Florida, Alabama, South Carolina, Mississippi and Louisiana began phase 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, which was completed at the end of fiscal 2013, 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). In phase 2, finished in fiscal 2015, restoration goals were again exceeded, 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.

In phase 3, a three-year focus, 50,653 acres of sandhill or upland longleaf habitat were restored or enhanced 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, including at Alligator Creek, Ochoopee Dunes and Moody Forest wildlife management areas in south Georgia, and The Nature Conservancy's Cabin Bluff property in Camden County.

For phase 4, the four states combined will treat more than 20,000 acres with prescribed fire, restore more than 100 acres of native groundcover, control hardwoods and invasive species on 691 acres, and plant 385 acres of longleaf pine. In 2020, the first full year of work for this phase, Georgia contracted with The Orianne Society to complete prescribed burning on 6,184 acres of high-priority upland longleaf habitats, including on Moody Forest WMA in Appling County, Ochoopee Dunes WMA in Emanuel County and the Orianne Indigo Snake Preserve in Telfair County.

## ■ 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 2021 the Wildlife Conservation Section, along with The Orianne Society and The Nature Conservancy, harvested southern wiregrass seed from Broxton Rocks Nature Preserve and private land in Wheeler County. The seed was used in wiregrass restoration efforts and groundcover donor plots on private and state lands.

Staff also drilled wiregrass seed on 9 acres of powerline right of way at Townsend Wildlife Management Area near Townsend. The area will be used as a donor plot for wiregrass seed collection for future restoration efforts along the lower Altamaha River corridor. Remaining seed was used to start wiregrass donor plots and restore disturbed areas on the Orianne Indigo Snake Preserve in Telfair County.

The west-central Georgia fire crew grew nearly 1,800 plugs of 18 species important for pollinators and other wildlife and outplanted them on seven properties across middle Georgia. They also raised and outplanted 18,000 little bluestem and lopsided indiagrass plugs on

Sandhills Wildlife Management Area East 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 been recipients of 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 September 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 began converting a former 5-acre vegetable garden into a native groundcover nursery. More than 40 different native forbs, legumes and grasses are being 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

Planting wiregrass at Altama Plantation WMA (Eamonn Leonard/DNR)





Altamaha Conservation Corridor. A shade house completed in January 2021 will be 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 were installed in June 2021. Private donations proved crucial to funding the shade house and the irrigation updates.

The seed collected at Altama Plantation will first be grown in plugs, then transplanted into planting rows. The mix of species will flower 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. A grant from The Environmental Resources Network, or TERN, friends group of Wildlife Conservation, will pay for additions such as drip irrigation and planting supplies.

## Prescribed Fire

Prescribed fire remains one of the most effective tools for conserving and restoring fire-adapted habitats and helping numerous species of conservation concern. While DNR uses other land-management techniques to improve natural habitats on state lands – such as removing invasive species, planting native species and thinning timber – prescribed fire is the most vital. It is a safe way to apply a natural process, ensure ecosystem health and reduce the risk of wildfire.

While the coronavirus pandemic understandably raised concern about the health effects of smoke on people suffering or recovering from COVID-19, prescribed fires lower fuel loads that can feed wildfires, typically emit much less particulate matter than wildfires and are conducted with careful smoke management. In fiscal year 2021, fire managers factored local COVID statistics and hospitalizations in nearby

communities into decisions about when and where to burn.

As in fiscal year 2020, prescribed burning this year proved challenging because of the pandemic and uncooperative weather. However, DNR's Wildlife Resources Division still recorded a record year, burning 68,422 acres. This smashed the 60,000-acre mark the division has been striving to break for decades. And with 2020 registering the third-lowest acreage burned in 10 years, the division had a significant backlog of fire.

In other news, the fire program of the Georgia State Parks and Historic Sites Division, which the Wildlife Conservation Section has been helping grow for two decades, also enjoyed a record year. Parks topped its previous 3,000-acre high by burning 3,356 acres and – even more impressive – worked on 44 burn operations. Wildlife Conservation has trained park staff, led burns on parks across the state and mentored the division's resource unit. In fiscal 2021, prescribed fires were conducted

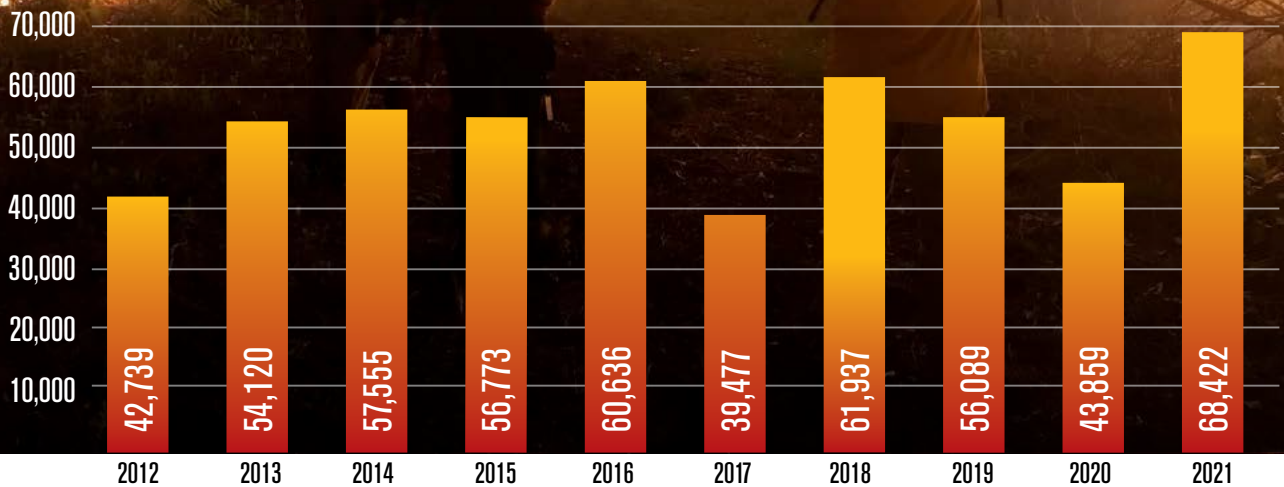


Burning at Sprewell Bluff WMA (Hal Massie/DNR)



## DNR-MANAGED ACRES BURNED 2012 - 2021 *Totals by fiscal year*

Prescribed fire at night (Garrett Anderson/DNR)



on 22 parks, with Wildlife Conservation and the Interagency Burn Team helping with many of the burns. The section also proved instrumental in returning fire to Seminole State Park after Hurricane Michael tore through southwest Georgia in 2018, and burned a challenging unit at Crooked River State Park in Camden County that had not seen fire in more than three decades.

To keep fire crews safe, pandemic protocols continued this season. Briefings were held outdoors, crews and equipment were kept separate, and plans were put in place to isolate sick crew members. For public safety, Wildlife Conservation was vigilant in choosing burn units and managing smoke.

The Interagency Burn Team posted another strong year. Wildlife Conservation helped the U.S. Forest Service on a number of large-scale burns on the Chattahoochee-Oconee National Forest. The section also contracted with a longtime fire practitioner and snake researcher to help the Wildlife Resources Division on habitat restoration burns totaling about 1,100 acres in the mountains.

Despite logistical issues raised by COVID-19 and the wet weather, Interagency Burn Team member The Nature Conservancy logged 129 burns totaling 58,269 acres, including 7,933 acres on state lands. Even more encouraging, the data of the burns suggests that The Nature Conservancy's assistance is shifting to later in March and April, providing needed help on important growing-season burns. Another highlight for the nonprofit was burning about a third of the burnable acres on Alligator Creek Wildlife Management Area in three months. The effort included pushing included pushing fire into several units at the Lumber City WMA that had been planted in longleaf in recent years. The Nature Conservancy also planted longleaf pine on about 90 acres at Alligator Creek in fiscal 2021.

Wildlife Conservation also supported The Orianne Society's seasonal fire crew via a multistate Sandhills State Wildlife grant. Orianne Society recorded 48 burn days while helping burn 1,670 acres on four WMAs and four high-priority state parks, plus 3,867 privately owned acres involving priority habitat for rare species.

### ■ Seasonal Fire Crews

Since 2009, seasonal fire crews have carried out the bulk of the Wildlife Conservation Section's prescribed fires. Always on call and working statewide, members have helped improve efficiency each year, although the number of acres burned fluctuates annually according to the weather. Wildlife Conservation began hiring two separate seasonal crews in



DNR's gopher tortoise fire crew member Connor O'Bryant with a black racer (Marylou Horan/DNR)



2016. This fiscal year, the agency added a third. Called the gopher tortoise crew, it centered on burning high-priority gopher tortoise habitat.

The southeast Georgia crew was housed at Altama Plantation Wildlife Management Area near Brunswick, the west-central Georgia crew at Sandhills West Wildlife Management Area near Butler and the gopher tortoise crew at Richmond Hill. The crews typically worked independently of each other, with the west-central crew focusing on the Fall Line sandhills and Pine Mountain regions, and the southeast Georgia and tortoise crews on properties across the Coastal Plain but particularly in the Fort Stewart-Lower Altamaha River significant geographic area.

A National Fish and Wildlife Foundation grant, provided through The Longleaf Alliance, and a State Wildlife Grant for habitat restoration funded the southeast Georgia crew. (Wildlife Conservation staff also helped in another successful application for a \$275,000 grant from the Fish and Wildlife Foundation to support a technician on Ochopee Dunes Wildlife Management Area and longleaf planting on

adjacent high-priority private lands, helping build a conservation buffer around the Emanuel County WMA.)

In fiscal year 2021, the southeast Georgia crew conducted 51 burns covering a total of 4,309 acres. While the acreage is slightly lower than the annual average, the crew did not help with any large-scale aerial burns. Four of five members returned from the 2020 team. The experience and leadership proved key to the crew's independence, its competency in taking on more complicated challenges and members' capability to provide leadership to younger wildland "firelighters." Over the past six years, the team's median burn unit has ranged from 70-95 acres, with about a third of the units varying from 10-50 acres, another third from 50-100 acres and the remaining third 100-250 acres. While this analysis helps fire leaders measure efficiency, achieving ecological objectives is as important as the acreage totals burned.

The southeast Georgia 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, Clayhole Swamp, Moody Forest, Ochopee Dunes, Penholoway Swamp and Townsend WMAs, as well as Crooked River, George Bagby, George L. Smith and Seminole state parks. Members also assisted with prescribed fires on priority private lands, such as Broxton Rocks Preserve in Coffee County and the Orianne Indigo Snake Preserve along the Ocmulgee River in south Georgia. Wildlife Conservation also provided fire leadership for The Orianne Society this season as the organization searched for a new fire manager.

The west-central Georgia crew burned 11,199 acres in fiscal 2021, more than double the 4,210 acres totaled the previous year when the coronavirus pandemic and rainy weather shut down half of the burn season. Significant burns included helicopter-ignited operations on Spirewell Bluff Wildlife Management Area near Thomaston, a second and third burn with the Wildlife Resources Division's Game Management Section and other partners on Big Lazer Wildlife Management Area near Talbotton and West Point Wildlife Management Area near LaGrange, and a large helicopter



West-central Georgia fire crew (Hal Massie/DNR)





burn on Tallulah Gorge State Park and Wildlife Management Area near Clayton, the fourth such burn on that rugged site. Significant smaller burns included growing-season fires done in May through July around wetlands on Sandhills Wildlife Management Area in Taylor County to accommodate gopher frog migrations.

With extra funding from the Knobloch Family Foundation, fiscal 2021 marked the first year the west-central crew attempted a six-month season, with the first two months focused on tasks such as control of exotic invasive species and trash cleanup. In addition to 30 burn days and as many for fire prep, members logged 236 days clearing invasive species, 63 days planting groundcover and 11 days picking up trash and cleaning up illegal dumps on state lands. The crew also celebrated a milestone: removing the last sand pines from Sandhills WMA. Sand pine is a stubborn and destructive invasive exotic species plaguing Georgia. Over the last eight years, thousands of acres and hundreds of thousands of the trees have been removed from Sandhills, near Butler. The crew also cleared about a third of Montezuma Bluffs Wildlife Management Area in Macon County of exotic invasive species, including dense stands of Chinese privet, *Elaeagnus* and *nandina* that were taking over habitat occupied by the federally listed relict trillium and other rare plants. Members also hauled away 10 truckloads of illegally dumped

trash from Montezuma Bluffs and spent several days picking up roadside litter on Sandhills WMA.

As noted, this fiscal year also saw the creation of a new prescribed fire crew. Funded by a gopher tortoise State Wildlife Grant, the gopher tortoise team comprised of two members and a crew boss recorded 36 burn days and helped burn 5,202 acres on private lands, the Orianne Indigo Snake Preserve and high-priority state parks and WMAs. Sites included Ochopee Dunes, Canoochee Sandhills, Flat Tub, Alapaha River, Altama Plantation, Sansavilla, Penholoway Swamp, Clayhole Swamp, Alligator Creek, Big Dukes Pond, Townsend, Griffin Ridge and Ossabaw Island WMAs, along with George L. Smith State Park. Of the acres burned, 3,638 ranked as high-priority gopher tortoise habitat. The plan for fiscal 2022 is to add a crew member and extend the season by a month to allow for more growing-season burns.

At Canoochee Sandhills WMA near Groveland, staff created burn units and burn plans, installed property-line firebreaks, and conducted the first prescribed burn since the state acquired the WMA.

Wildlife Conservation also cooperated with Wildlife Resources' Game Management Section to accomplish almost 5,000 acres of controlled burns on southwest Georgia WMAs. Conducted between February and June, the burns peaked in April, with 1,600 acres receiving the restorative

fires. The work benefited red-cockaded woodpecker groups on Silver Lake WMA near Bainbridge and at River Creek, the Rolf and Alexandra Kauka WMA near Thomasville. Most growing-season burns at the two WMAs targeted longleaf pine stands with extensive native groundcover. At Doerun Pitcherplant Bog Wildlife Management Area in Colquitt County, 196 acres of longleaf forest were burned during the growing season, including several of the site's most significant bogs.

## ■ Training and Outreach

COVID-19 made 2021 a challenging year for training. The Interagency Burn Team transformed parts of its required fire training to virtual platforms or a combination of virtual and hands-on. Developing new material and employing creative techniques, leaders trained Wildlife Conservation Section, Game Management Section and State Parks and Historic Sites staff, plus Interagency Burn Team partners and volunteers. Wildlife Conservation held six RT-130 Annual Fire Refreshers involving 218 people, three FFT2 Basic Wildland Fire Academies that trained 35 and S-212 Wildland Power Saws and ATV Safety sessions. All were safely conducted. Staff also proved pivotal in helping the Georgia Prescribed Fire Council run two statewide virtual meetings, reaching 800-plus people from 24 states and four countries.

To promote prescribed fire awareness and education, Wildlife Conservation continued work with The Longleaf Alliance and its Burner Bob mascot, delivering messaging in creative and engaging ways. The educational campaign placed second in the U.S. in the Association for Conservation Information's Education Category in September 2020. Wildlife Conservation and Longleaf Alliance staff also received funds from The Environmental Resources Network (Wildlife Conservation's friends group), the National Fish and Wildlife Foundation, the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program and private donors to create an educational video series. The Interagency Burn Team and seasonal fire crews joined with youth, drones, snakes and others to begin filming two videos – a pilot for Friends of Burner Bob and another targeting fire and private landowners. Landowner and fire advocate Reese Thompson and Crooked River State Park provided venues for filming burns.



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 are introduced, intentionally or accidentally, into areas outside their natural ranges and cause environmental or economic harm. 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 information resources to help control invasives, along with promoting the appropriate use of native plant species by public and private land managers.

Argentine black and white tegu hiding on a truck in Tattnall County (Special to DNR)



## ■ Coastal Georgia

During fiscal year 2021 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.

# INVASIVE SPECIES



- Held a native tree giveaway in November 2020 to promote the use of native trees instead of invasive species. Supported by a partnership between DNR, McIntosh County Middle School, UGA Cooperative Extension and Coastal WildScapes, 500 trees representing five species were handed out to the public during the socially distanced drive-through event at Altama Plantation Wildlife Management Area near Brunswick. Each tree included information about the species, how to properly plant it and common invasive trees to look for and remove.
- Worked with residents in Kingsland to treat water hyacinth in their neighborhood ponds. The residents did the bulk of the work to remove the plants by hand but needed additional help in areas they could not reach.
- 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. Wildlife Conservation staff planted more longleaf pines where invasive sand pines had been clear-cut. The goal: safeguard the mint species while converting sand pine stands to longleaf.
- During the 2021 National Invasive Species Awareness week, coordinated a series of virtual lectures and a socially distanced volunteer opportunity. Lecture topics included invasive exotic reptiles and amphibians, invasives in the home garden, native alternatives to invasive species, and how to report invasive species. The volunteer event targeted removing invasive catclaw vine from the grounds of the mansion at Butler Island, on Altamaha Wildlife Management Area near Darien.
- 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 and the WMA's ecological value. Using funds from The Environmental Resources Network, 60 native trees and vines were planted in 2019 as a demonstration of alternatives to commonly

used invasive species. Descriptive signage marks each 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 Eamonn Leonard served as vice chairman of 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 in native grasslands, clearing about 450 acres of the invasive plant at Panola Mountain State Park near Stockbridge, Joe Kurz Wildlife Management Area near Gay and Flat Creek Public Fishing Area near Perry. Staff also worked to clear 120 acres of Vasey and Johnson grass from Panola Mountain State Park. This site is part of a larger effort to restore grassland and woodland bird habitats at the Rockdale County park.
- Staff spot-treated Japanese climbing fern at many spots on Sprewell Bluff Wildlife Management Area near Thomaston again this year. Middle Georgia is on the leading edge of this species' spread. New infestations show up each 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. Staff also continued a Wildlife Conservation research project started in 2018 to explore chemical types, rates and timing to control climbing fern.

Musk thistle (Missouri Department of Conservation)



- At Sandhills Wildlife Management Area near Butler, staff finished the eighth 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.
- Wildlife Conservation tried to control or eradicate beefsteak plant on about 10 acres at Sprewell Bluff WMA. Those efforts have been pulled back and focused on control of minor infestations of the plant at Sprewell Bluff and Camp Thunder Voluntary Public Access area near Molena. 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 and Joe Kurz WMA.

## ■ 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 and a candidate for listing under the Endangered Species Act. 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.

In summer 2018, the Wildlife Resources Division and DNR's Law Enforcement Division

began investigating reports of Argentine black and white tegus in the wild in eastern Toombs and western Tattnall counties. A few of the reported sightings preceded 2018. A partnership with the U.S. Geological Survey and Georgia Southern University resulted in the capture of nearly 20 adult tegus from the Toombs/Tattnall 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 2021, 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.

Working with Wildlife Resources' Wildlife Conservation Section, the division's Region 4



Young Argentine black and white tegu (Daniel Solenberger/DNR)



Game Management office dedicated a wildlife technician on a part-time basis to conduct tegu trapping in the area in spring 2019. Later in that fiscal year, the division partnered with the Geological Survey's Invasive Species Task Force to initiate a large-scale trapping effort in Toombs and Tattnall counties using contracted students from Georgia Southern. In summer 2020 and for most of summer 2021, that included a Geological Survey technician and GSU students baiting and monitoring approximately 95 traps, setting up camera traps, and, with the aid of outreach materials from Wildlife Conservation, meeting landowners in the area to gather information on sightings to guide and expand trapping.

In late summer 2021 and leading into the start of the next fiscal year, changes in funding sources led coordinators to shift the project's approach toward engaging area landowners to help with trapping following verified sightings. Soon after, the effort resulted in the capture of at least one tegu.

Wildlife Conservation has raised awareness of tegus with area residents through emails, direct mail, flyers, news releases, social media, advertising campaigns and online and face-to-face contacts. In fiscal 2021, those efforts included:

- Conducting an e-survey to gauge residents' awareness about the tegu issue

and establish a baseline to gauge the effectiveness of future communications.

- Providing tegu flyers and cards to project partners and local outlets.
- Coordinating the response to intense media interest sparked by a social media post on tegus.
- Conducting an email and social media ad campaign in spring 2021 to inform local residents and encourage the reporting of sightings.

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

### ■ Other Efforts

At Doerun Pitcherplant Bog Wildlife Management Area, a Colquitt County WMA long recognized as a regionally important site for plant diversity and conservation, invasives such as Japanese climbing fern, Chinese tallow tree, tung oil tree and camphor tree have required vigilant monitoring. In fiscal year 2021, staff continued applying herbicides with backpack sprayers – primarily for Japanese climbing fern – and used hack-and-squirt techniques to control invasive trees and shrubs. Staff also

mowed scores of patches of showy rattlebox, then sprayed the areas, resulting in a clear downward trend for this invasive plant. Showy rattlebox, common mainly in old-field planted pine stands, is an annual plant and does not resprout after mowing.

The Wildlife Conservation Section helped respond to the discovery of zebra mussels on a boat hauled from near Chattanooga, Tenn., to Lake Lanier. These small mollusks native to eastern Europe but now established in many U.S. waters multiply fast, foul boats, clog water intake pipes, filter out algae that native wildlife need and outcompete native mussels. The agency also worked with the University of Georgia and others when Oriental weather loaches were found in an Athens-area creek that feeds into the Middle Oconee River. This aquarium fish originally from Asia had not been documented before in Georgia. Its spread could spell trouble for aquatic systems across the state.

During fiscal 2021, staff gave talks to groups varying from garden clubs and Audubon chapters to forestry experts, local colleges, master naturalist classes and nonprofits such as Coastal WildScapes about identifying invasive species, emerging threats, native plant alternatives, resilient native plants and connections between invasives and birds.

DNR's Anna Raney collects zebra mussels from a boat near Lake Lanier (Matthew Rowe/DNR)







# 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 2021 (also see: Land Acquisitions and Conservation Easements).

Staff answered landowner questions and visited sites to give management advice. Landowners were advised of cost-share and grant opportunities and guided through procedures for using programs such as the U.S. Fish and Wildlife Service's Partners for Wildlife and the Natural Resources Conservation Service's Environmental Quality Incentives, Conservation Stewardship, Wetlands Reserve Easements and Working Lands for Wildlife programs.

## 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 2021, making it project-focused and open to more landowners. Forestry for Wildlife Partnership is a voluntary, flexible, non-competitive and participant-driven effort that:

- Enhances wildlife conservation on the holdings of large landowners.
- Helps deliver wildlife technical assistance, training and outreach.

- Recognizes partners for their wildlife conservation achievements.

Coordinated by Game Management and Wildlife Conservation biologists, this public-private partnership provides opportunities to enhance wildlife conservation on private lands. Companies are 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 new 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 – when COVID-19 doesn't intervene – photos with the governor.

CatchMark Timber Trust, Georgia Power and Weyerhaeuser were the Forestry for Wildlife Partners for calendar year 2021. These

corporations are among the largest landowners in Georgia, directly affecting wildlife habitat on about 1 million acres. In fiscal 2021, DNR also solicited new partners and began work with several that will likely gain partner status.

Highlights of partner conservation efforts in 2021 included 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 (WMAs include Blanton Creek, Rum Creek, and Oconee). The company is also restoring longleaf pine habitat in support of conservation partner landscape goals and participates in DNR's Safe Harbor Program for endangered red-cockaded woodpeckers. Several bald eagle nests are monitored and protected on company lands and lakes.

At plants Hatch and Vogtle, near Baxley and Waynesboro, respectively, Georgia Power

manages habitat for gopher tortoises. The company is a participant in the statewide Gopher Tortoise Conservation Initiative and the multistate Candidate Conservation Agreement for the eastern population of gopher tortoise, a candidate for listing under the Endangered Species Act. Tortoises and their burrows are protected during construction and timber harvest on Georgia Power lands and during construction and maintenance on power delivery rights of way.

Georgia Power also is developing a Habitat Conservation Plan for the gray bat, Indiana bat and northern long-eared bat, all of which are federally protected. As mitigation for potential construction impacts on forested habitat, favorable forest management practices are being implemented on company lands within the ranges of these species. These practices include maintaining travel corridors, foraging openings, and roost trees. Also, conservation measures are being implemented on properties within the Altamaha River system to enhance water quality and benefit rare freshwater mussels as part of a Candidate Conservation Agreement.





*Digitized image of a red-cockaded woodpecker at a nest cavity (Joe Burnam/DNR)*

Georgia Power lands and transmission rights of way provide habitat for several species of rare plants, including 11 federally listed as threatened or endangered. A tract along the Chattahoochee River contains officially designated critical habitat for Georgia rockcress. Drummond Swamp at Plant Bowen in Bartow County provides habitat for the world's only known population of Georgia alder. And a transmission right of way in Wayne County harbors the endangered hairy rattlesnake, a plant whose entire range is restricted to only two Georgia counties. Georgia Power participates with other partners in a Candidate Conservation Agreement for Georgia aster, a wildflower that grows well in transmission rights of way and open woodlands, and likely would have been federally listed without the agreement. The company is also exploring ways to identify and enhance native meadow habitats on powerline corridors to benefit pollinating insects and monarch butterflies.

Through grants it provides, Georgia Power supports conservation projects to restore longleaf pine habitats, conserve populations of bats, shorebirds and imperiled aquatic species, and improve water quality in impaired streams.

Conservation and wildlife habitat improvements by **CatchMark Timber Trust** in fiscal 2021 included:

- Supporting an existing 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.
- Granting DNR access to company lands in Long, Brantley and McIntosh counties for annual surveys of swallow-tailed kite nests. Sites are documented in the company's GIS database.

- **Teaming with DNR** to harvest timber on a company timber lease at Sprewell Bluff Wildlife Management Area, work that is advancing plans to reintroduce red-cockaded woodpeckers to the Thomaston WMA. CatchMark left natural longleaf stands at a targeted basal area, thinned about 400 acres of loblolly pine to make way for adding cavity nest boxes, and after hitting harvest and other targets, will turn the remaining timber over to DNR to finish the transition.
- Cooperating with the Georgia-Alabama Land Trust in maintaining a conservation easement in Long County. This easement 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.
- Working with the U.S. Fish and Wildlife Service to protect habitat for endangered fringed campion on company sites in Talbot County, and with DNR and other botanists by permitting surveys for the plant to identify and verify existing or potentially new sites.
- Continuing work with DNR involving bird surveys on lands with different site preparation prescriptions to determine possible effects of varying treatments on birds' use of the areas.
- Practicing silvicultural treatments that promote conservation of gopher tortoises and their habitat.
- Adding prescribed fire to the management regime in situations where fire makes sense as a tool. Fire is used in site preparation and mid-rotation applications when there is little to no social impact and wildlife communities benefit. About 3,000 acres were burned in 2021.
- Sponsoring and holding hunting events with youth groups and organizations for the disabled to provide opportunities for these groups to learn about hunting and enjoy the outdoors.
- Allowing universities access to company lands for research, such as Virginia Tech's pine growth study. CatchMark is also a member the University of Georgia's Plantation Research



Management Cooperative and is helping develop foresters by letting Auburn University conduct training and classes via field trips on CatchMark property.

- Continuing an integrated harvest planning system that considers landscape-level diversity. One example is robust thinning of pine plantations that improves wildlife habitat and forest health.
- Monitoring and treating company lands for invasive species.
- Recording and managing known populations of Georgia's rare and threatened species according to state and federal guidelines.
- Maintain and offering the use of portable skid and truck bridges for logger's use to minimize stream crossing impact.

As an original member of the Forestry for Wildlife Partnership, **Weyerhaeuser** is committed to Sustainable Forestry Initiative standards and integrates conservation into its forests. Areas the company has focused on in recent years include the following.

Conserving gopher tortoises is a key initiative. 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 U.S. 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.

Weyerhaeuser is managing several unique ecological areas in northwest Georgia, including the Coosa Valley Prairie property (permanently protected under a conservation easement held by The Nature Conservancy); a cave that is home to a bachelor colony of gray bats, federally listed as endangered; and rock outcrops that shelter the cliff-dwelling green salamander.

In the Piedmont, the company 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 centered

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. In the Coastal Plain and Piedmont, Weyerhaeuser has taken part in a pollinator ecology study to assess plant-pollinator interactions in varied canopy and understory conditions.

## Community Wildlife Project

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

- Fostering wildlife conservation stewardship and education in Georgia communities.
- Promoting respect and appreciation for wildlife in combination with community beautification.

- Improving the quality of life for Georgians living in these communities.

More than 750 communities, cities and counties have been awarded full certification, with more than 600 in different stages of completing certification standards. Since 2005, the Backyard Wildlife Certification survey has added about 4,000 certified backyards, 610 of which were certified with two or more adjoining neighboring yards for Neighborhood Backyard Certification.

The pandemic limited participation in fiscal year 2021. Organizers canceled the program's biannual workshop. Plans are to hold it in 2022.

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.

Cloudless sulphur (Todd Schneider/DNR)



During fiscal year 2021, 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 1,604 at-sea personnel hours, including 461 of boat patrols. Game wardens recorded 130 hours on TED inspections, plus 46 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, helped 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, the U.S. Geological Society 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 485 hours supporting wardens and the division's core mission of protecting natural resources. This effort 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 as well. Along with enforcement of state wildlife laws, DNR Aviation also assisted local agencies as requested in search and rescue on land and water.

Game Warden 1st Class John Rhodes was named DNR's 2021 Game Warden of the Year. Although assigned to Hancock County, Rhodes often also works boating enforcement on Lake Oconee. He received the region's Boating Safety Officer of the Year in 2019. Game Warden 1st Class Tyler Lewis from Cobb County received the James R. Darnell Award as Warden of the Year runner-up. Lewis, whose work section includes Cobb, Bartow and Cherokee counties, also received the North American Wildlife Enforcement Officers Association Torch Award for Georgia and the Southeast in 2020.

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

# LAW ENFORCEMENT

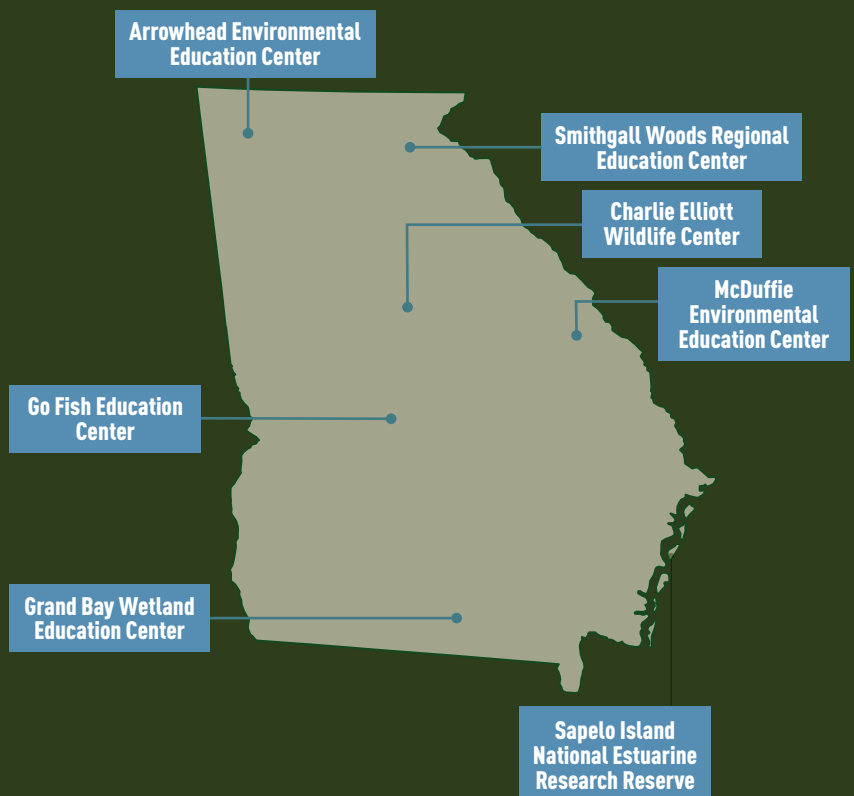


## Regional Education Centers

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 DNR, started the Junior Ranger Program. More than 25,000 children took part that year, conducting nature surveys, planting wildlife food plots and helping "senior rangers" – in short, learning and practicing conservation.

Elliott's vision of a conservation education program is reflected through Wildlife Resources' seven regional education centers and continuation of the Junior Ranger Program in the DNR State Parks and Historic



Sites Division. Wildlife Resources operates the centers with 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, Arrowhead Environmental Education Center near Armuchee, Grand Bay Wetland Education Center near Valdosta and Sapelo Island National Estuarine Research Reserve.

More than 42,000 youth and adults took part in programming virtually or in person in fiscal year 2021.

### ■ Charlie Elliott Wildlife Center

Charlie Elliott Wildlife Center continued to expand its educational opportunities as staff developed and implemented virtual learning options and on-site school, public and outreach programming. For school children in fiscal year 2021, this included virtual, grade-appropriate outreach experiences where an educator using one of the center's animal "ambassadors" discussed that animal, including giving fun facts about it. For example, kindergarteners through second-graders learned about the animal's basic needs, how it reproduces and what it eats. Third- through fifth-graders explored food webs, ecoregions and habitats, and human impacts.

The Charlie Elliott team also used social media to connect with audiences. To increase interactions, staff created and used Facebook hashtags such as #Wildlife Word of the Week and #Trivia Tuesday. The center worked with the Wildlife Resources Division's Urban Wildlife Program and the Public Affairs unit to produce monthly Talking Nature Tuesday videos, specifically "Life on a Log," "Stranger Things," "Sea Turtles" and "Owls." The series highlighted different species and key concepts related to the division's work. Shared through Facebook and YouTube, the videos averaged more than 1,000 views each.

In keeping with COVID-19 precautions, Charlie Elliott switched the 2021 Keeping GA WILD family festival to a successful virtual event. The center's Facebook page featured videos from the Georgia Wildlife Federation on wildlife identification, plus daily how-to videos by staff on outdoor recreational activities. Do-it-

yourself crafts to get youth outdoors, as well as two Facebook Live events and a virtual photo contest were included. A public tree climb and kids fishing event were held on-site. The social media posts reached more than 18,000 people.

Georgia's Becoming an Outdoors Woman program held eight in-person programs across the state, including introduction to hand guns and rifles classes, a foraging and edible plants identification hike, turkey hunting, and canoeing and kayaking 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 40 women who took part in 19 fishing, shooting and wildlife activities. Feedback was extremely positive: Participants were happy to be outside and safely engaging with others.

As with the school programs, teacher workshops were largely virtual in fiscal 2021. Using Project WILD, a K-12 interdisciplinary conservation and environmental education program that emphasizes wildlife, state coordinators and other trained facilitators reached 211 educators through 19 workshops across Georgia. State coordinators also held three training workshops for 43 facilitators on best practices when teaching virtually. In June 2021, Project WILD partnered with Project Learning Tree and Project WET on a joint workshop centered on forestry and natural resource management. To meet recommended COVID safety guidelines, the workshop at Charlie Elliott Wildlife Center featured several virtual activities including visits to lumber mills, paper mills and logging sites. Georgia Forestry Commission and Wildlife Resources staff led field trips at Charlie Elliott focused on forestry and wildlife management.



Learning about trees at the Georgia Teacher Conservation Workshop (Kim Morris-Zarnke/DNR)





Camper and his catch at Charlie Elliott (DNR)

Smithgall Woods spurred a variety of continuing education and professional development opportunities, all resulting in improved programs for the center's constituents.

Smithgall Woods provides programs on-site, online and as outreach. On-site programming offers participants the chance to enjoy the beauty of Smithgall Woods State Park while learning about that natural environment. While participation dipped in fall 2020, reservations trended up in the spring.

Outreach programming also decreased from fall to spring in fiscal 2021, although the drop-off was not as sharp. After the first of the year, schools began allowing outreach programming as long as social distancing protocols were followed. The result was an increase in programs in spring 2021, a trend expected to continue into the fall of fiscal year 2022, resulting in more normal numbers for the school year.

Unlike the center's on-site and outreach efforts, online programming remained busy throughout the year. Participants could experience live programming through Zoom meetings, pre-recorded programming and programs through social media sources such as YouTube and

During fiscal 2021, the center also offered eight summer day camps – four in July 2020 and four in June 2021. All were run as a day camps, primarily held outdoors and designed to allow for social distancing to better ensure the safety of campers and staff. The July 2020 camps varied from Shooting Sports to Wilderness Survival for ages 9-16, while the summer 2021 camps ranged from a Charlie's Tracker Camp to an Outdoor Team Challenge for ages 6-16. Participants and parents appreciated the camp-centered opportunity for children to get outside and connect with nature in a safe manner.

Ten Hunt and Learn programs were scheduled at Clybel Wildlife Management Area and Charlie Elliott Wildlife Center during the year. The programs included youth hunts for dove, deer, rabbit, turkey and falconry, and adult hunts for dove, deer, squirrel and turkey. Two of the adult hunts were women-only. Eight of the 10 sessions were held, providing 36 people the opportunity to experience hunting.

Also noteworthy, those 36 Hunt and Learn participants represented only about a third of applicants. The significant interest led to forming Georgia SHARP (Safe Harvest and Responsible Practices), a program aimed at providing hunting newcomers with background knowledge and the basic skills needed for the sport. SHARP began in spring 2021 with two turkey events including 40 participants. The series will continue in fiscal 2022, helping recruit, retain and reactivate Georgia hunters.

## ■ Smithgall Woods Regional Education Center

Smithgall Woods Regional Education Center enjoyed a rich year of learning experiences in fiscal 2021. While the pandemic again provided an unprecedented year, one result was unexpected advancements and experiences in programming development, implementation and evaluation. Changes in programming at



Hands-on lessons at Smithgall Woods (Linda May/DNR)

Facebook. Staff first recorded the most popular programs, then created others. For reservation-based events, 352 programs were presented to 9,584 participants.

Smithgall Woods used public online programming to reach the center's base constituency and connect with new customers. Twenty-five videos have been created and shared on the Facebook pages for State Parks and Smithgall Woods, as well as the Wildlife Resources Division's YouTube channel. Those videos totaled 27,493 views and posted a reach of 102,674.

Plans for fiscal 2022 include continuing to provide virtual programming along with in-person outreach and on-site field trips. Through flexibility and continuing professional development, the center will offer up-to-date, wildlife-based educational programs in whatever format is appropriate.

### ■ Arrowhead Environmental Education Center

Arrowhead Environmental Education Center on Arrowhead Wildlife Management Area uses the 337-acre WMA as a window into nature. During the 2020-2021 year, the education center reached 8,000-plus children and adults through field trips, outreach, public events and technology-based instruction. Arrowhead educators worked to fulfill the center's mission of providing instruction in the classroom and outdoors that furthers understanding, appreciation and conservation of Georgia's natural resources.

Students visiting the center were invited to examine a collection of live Georgia snakes, turtles, frogs and fish, and other live and mounted wildlife. They walked interpretive trails highlighted by beaver ruins, wetlands, ponds and streams. The waterfowl ponds provided a robust environment to see plant and animal diversity, and observe firsthand the life cycles, habitats and food chains studied in school.

Arrowhead's Outreach Program also brought live animals, artifacts and science-based stories into schools to illustrate lessons, coordinating with teachers to integrate the natural world into curriculum. Arrowhead took part in eight field days at Rome and Floyd County schools, helping schoolchildren better understand environmental issues and learn about solutions. The center also connected with students digitally and partnered

with Sara Hightower Regional Library System and the Rome-Floyd County Commission on Children and Youth to provide environmental experiences to youth in summer 2021.

The northwest Georgia magazine V3 featured the center in the June 2021 issue. The article "[Hands on, Minds on](#)" explained that at Arrowhead, children venture beyond the classroom to discover science through exploring habitats, investigating wildlife and discovering how to conserve natural resources.

### ■ Sapelo Island National Estuarine Research Reserve

Sapelo Island National Estuarine Research Reserve Education Program offered a range of environmental educational programming during the 2020-2021 school year. As part of the COVID-19 pandemic, however, almost all in-person programming was canceled because of restricted ferry capacity and the inability to provide adequate social distancing on the state ferry and island buses.

At the request of the DNR commissioner, the education program conducted an in-classroom session about Georgia's biomes for 182 students at Arthur Williams Middle School in Wayne County. Staff also contributed to a University of Georgia program involving 16 university students studying an experimental gopher tortoise colony on Sapelo. The reserve's education coordinator helped students design and conduct short-duration field projects researching aspects of the small population of tortoises. The education coordinator also held a program for 21 Boy Scouts camping on Cabretta Island.

Sapelo Island Reserve sees seasonal ebbs and flows in K-12 participation. However, data show a marked increase in student participation during the past 10 years. Of course, the pandemic significantly affected operations during fiscal years 2020 and 2021. Following a surge in student enrollment during January and February 2020, numbers essentially flatlined after Georgia's shelter-in-place order was issued. Ferry capacity shrank and with social distancing nearly impossible, programs were paused. Area schools were not allowed to go on field trips, nor was staff allowed to visit schools for programming. Full operations were initially targeted to resume after Labor Day 2021.

Despite the inability of teachers and students to visit Sapelo and staff's inability to go to schools, the reserve continued working with teachers. Staff partnered with Oglethorpe Point Elementary on St. Simons Island, the Golden Isles Career and College Academy in Brunswick and Chatham County's STEM Academy at Bartlett to conduct the reserve's Sowing the Seeds of Estuary Health program. As part of this program, students harvest small numbers of spartina plants and seeds and conduct experiments in greenhouses provided by the state. The students then plant the excess spartina at selected sites, providing a sense of ownership and stewardship of Georgia's salt marshes. Staff also conducted a program for 32 residents of a Sun City retirement community.

The Sapelo education program held professional development workshops for 15 teachers and environmental educators through two teacher workshops meeting national Teachers on the Estuary standards. The workshops focused on coastal ecosystems and issues and sea turtles, as well as science, technology, engineering and math. The education coordinator also helped conduct the Georgia Association of Managers of Education conference virtually. About 30 educators statewide took part. The coordinator gave a public virtual lecture to 18 people on Georgia's wild turkeys, as well.

Sapelo Reserve continued to provide valuable leadership through the DNR Leadership Academy. The 2021 version included 25 staff and involved a commitment of 175 hours. On the mainland, the Visitor Center reported 7,073 walk-in guests who were not associated with state education programs.

In addition, the reserve's educator coordinator served in a number of positions benefiting coastal resources and education efforts. Those included:

- As the Wildlife Resources Division's representative on the Golden Ray shipwreck disaster response in St. Simons Sound. The coordinator was a trained member of the Shoreline Clean-up and Assessment Technique team, patrolling area beaches and marshes with a Coast Guard official and others to assess oil and debris from the capsized cargo ship affecting ecosystems.



- As a member of the Estuarine Juvenile Fish monitoring team, which involved helping with regular otter trawl surveys in waters around Doboy Sound – activities that could then be translated to student and public programs.
- Maintaining 10 “picture post” sites on Sapelo so students and the public can observe changes occurring at the sites.
- Expanding the impact of the reserve’s education programs by serving on committees and boards including the Georgia Association of Managers of Education, Georgia Coastal Education Group, Cannon’s Point Education Task Force, Georgia Independent College Association advisory board, 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 2021, 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 and delivered by three certified teachers.

McDuffie saw a limited number of students, teachers and parents during the 2020-2021 school year because of the pandemic. However, leaders worked with small groups as conditions allowed and coordinated with Wildlife Resources Division Fisheries Management staff to hold a hands-on aquatic education program for students at Martinez’s Augusta Prep. The center also coordinated with local Cub Scout groups.

Before their retirement on July 1, 2021, McDuffie leaders Dot and Steve Kay stayed busy, organizing the center’s extensive collection of supplies, updating lesson plans and developing new ones, and catching up on grounds maintenance, all to make it easy for the new staff member to pick up where they left off. Though retired, the Kays are volunteering with DNR and continue to help at the center.

Staffing shortages involving their retirement temporarily closed the center. Although previously staffed with part-time employees, in early fiscal 2022 McDuffie hired a full-time employee to lead the education program and the center reopened that fall.

## ■ Go Fish Education Center

The Go Fish Education Center provides quality environmental education programs focused on fishing and aquatic resource conservation. Over the past several years, the center’s primary focus has been guided field trips and tours for schools, youth groups, daycares, churches and others. In fiscal year 2021, the center held several in-person field trips, along with tours, workshops and educational programs.

Three sessions of summer fishing day camps were held for children ages 7-15. Camps were configured to comply with federal recommendations regarding COVID-19. Participants learned about casting, bait, safety and cleaning and handling fish. Other educational programs and outreach included fishing workshops, seminars, kids fishing events, hatchery tours and a homeschool program. Staff held one virtual program, titled “Casting for Conservation,” as part of a World Ocean Day event.

The Georgia division of Wildlife Forever’s State-Fish Art contest, which Go Fish plays host to each year, was renamed the Georgia Fish Art Contest. Many contest rules and limitations were lifted permanently to promote participation. The center received 128 entries from kindergarten through 12th-grade students across Georgia. New fish species and award categories were introduced this year, including awards for fish habitat writing and western native trout. Entries



McDuffie aquatics program for Augusta Prep students (Greg Abercrombie/DNR)

were judged based on creativity and demonstrated knowledge of fish and habitats. Georgia's winning entries were displayed at the center.

In addition to educational programming, the Go Fish Center remained open to the public Fridays through Sundays year-round. However, visitor capacity inside the building and around the casting pond was limited until May 2021. Visitors were able to catch and keep fish in October and March. Dozens of self-guided group tours and organization meetings and events were also held at the center. Despite many limitations and cancellations, the Go Fish Center reached more than 11,000 people in fiscal 2021.

Goals for 2022 include creating videos to incorporate into the Go Fish experience, while staff continue to focus information and education efforts on recruiting, retaining and reactivating anglers in Georgia.

## ■ Grand Bay Wetland Education Center

Grand Bay Wetland Education Center followed an alternative program structure for the 2020-2021 school year. About 500 students and 200 adults attended day classes at the center, a partnership between DNR's Wildlife Resources Division and the Coastal Plains Regional Educational Service Agency.

Visiting primary students took part in hands-on exercises in and out of the classroom. The children observed and learned about wildlife, from apex carnivores such as American alligators to unusual plants such as the hooded pitcherplant, as well as how the animals and plants interact within Grand Bay's ecosystem. Visits typically ended with a boardwalk hike and climbing the observation tower.

Secondary education students performed exercises involving water quality and wildlife identification and collection. The students were provided lab equipment and supplies for performing scientific methodology. Experiments included a turbidity test, pH readings, dissolved oxygen, nitrate level testing, and nomenclature usage with identification. Collecting and identifying non-endangered 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.

Staff also visited local public and private schools, reaching about 1,750 students in this outreach exploring native wildlife and other natural resources. For example, one program focused on Georgia fishes, with students completing a video lesson and staff then visiting the school to provide activity stations exploring native species, nuisance species and fishing gear.

Grand Bay Wetland Education Center also began a new partnership with Valdosta State University. Supported by the Harley Langdale Jr. Foundation, Grand Bay staff and Valdosta State's Mass Media Program created virtual lessons for educators to use. As of the close of fiscal year 2021, approximately 2,000 students had viewed the video lessons either at home or with an instructor in class.

A completely refurbished boardwalk and observation tower allowed all patrons to enjoy Grand Bay's beauty. The nature trails, boardwalk and tower remained open to public and educational groups throughout the year. Video lessons about the boardwalk and other areas of Grand Bay were created for guests to further experience the site's unique ecosystems.

## Youth Birding Competition

Although the 15th annual Youth Birding Competition was scheduled for April 24-25, 2020, the coronavirus pandemic led to postponing and later canceling the event. The 2021 competition, tentatively set for April 23-24, was also postponed before being changed to a virtual event that fall.

During a traditional Youth Birding Competition, teams of pre-K through 12th-grade birders representing schools, Scout troops, science clubs and other groups compete with teams of similar-aged youth to identify as many bird species as they can in the state within 24 hours. The primary difference for 2021's virtual birdathon is that teams could use any 24-hour period from Sept. 24-Oct. 3.

The revamped event drew 21 teams and some 70 youth. More than half of the teams had not taken part before. Awesome Osprey, a trio of siblings from Cornelia, led with 148 species, a strong count for fall.

In 2019, the last time the Wildlife Conservation Section held an in-person Youth Birding Competition, a record 171 species were seen or

heard. That same year the young birders raised almost \$4,000 for conservation projects, pushing the total raised since the competition began to about \$26,000.

Although the 2021 birding competition was postponed, the Youth Birding T-shirt Art Contest took place in spring 2021. Pre-K through 12th-graders from 47 public, private and home schools statewide submitted 155 drawings and paintings of native Georgia birds. Owen Li, a 16-year-old from Duluth, landed the grand prize with his loggerhead shrike artwork, earning a \$100 Amazon gift card and the honor of having the shrike featured on the 2021 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 Society. Volunteers also are critical, helping with the art contest and awards banquet.

## Camp TALON

The 11<sup>th</sup> annual Camp TALON (Teen Adventures Learning Ornithology and Nature) was scheduled for June 2020 but was postponed until mid-July and then canceled because of the pandemic. However, the 2021 camp was held June 5-10.

Camp TALON's foremost goal is to teach 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 into the work of biologists are invaluable. This impact is evidenced by the return of many youth to the camp in subsequent years and TALON participants who go on to study wildlife, ornithology and biology in college.

With Epworth by the Sea, the camp's long-time base, unavailable in 2021, participants stayed at the 4-H Center on Jekyll Island. Campers





Award-winning Give Wildlife a Chance poster by Funston Elementary's Darina Ramirez-Mireles

## 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. Successful applicants have created and enhanced conservation-centered opportunities to see wildlife around the state, from a viewing platform at Davidson-Arabia Mountain Nature Preserve in metro Atlanta to bat boxes on an Athens-Clarke County greenway and a viewing scope at 4-H Tidelands Nature Center on Jekyll Island.

The 2021 cycle fielded 12 proposals. Six were funded, totaling \$15,875 in grants. Projects included:

- Signage and outreach for an expanded wildlife trail through prescribed fire demonstration areas, plus signage for the existing swamp trail at the Alcovy Conservation Center in Covington. Recipient: Georgia Wildlife Federation; grant amount, \$3,000.
- Two viewing platforms along Coahuilla Creek nature trails at Prater's Mill in Varnell (Prater's Mill Foundation; \$2,938).
- Trail work to improve access at Wolf Creek Trout Lily Preserve near Cairo (Wolf Creek Trout Lily Preserve/Grady County; \$2,844).

traveled by bus or boat to birding and outdoor classroom destinations. Sites included Sapelo, Little St. Simons, Jekyll and Cumberland islands, plus Harris Neck National Wildlife Refuge, Fort Stewart Army base, Cannon's Point Preserve and Altamaha Wildlife Management Area.

Camp leaders included a dozen teachers from state, federal and nonprofit agencies, as well as retired university faculty. The majority of students were from Georgia, but others came from states including Florida, Michigan and California, a sign of the camp's national visibility. Students counted and learned about the biology of the 114 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 helped a Utah State University graduate student with bird banding and removing painted buntings and other species from mist nets.

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 Society.

## Give Wildlife a Chance Poster Contest

Kindergarten through fifth-grade students submitted about 1,100 posters for the 2020-21 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 more than 30 years.

Students from 22 public schools, private schools and homeschool groups participated, taking to heart the theme of this year's contest, Nature is Everywhere! Artwork was judged based on aspects such as theme, originality, quality and impact.

The winning artwork was showcased in a [video](#) by the State Botanical Garden of Georgia and posted on the DNR Wildlife Resources Division's [SmugMug site](#) and Facebook page. Each state winner received an award ribbon, a tote bag featuring the 2020-21 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.





Rain-soaked DNR staff check out Wildlife Viewing Grant upgrades at Prater's Mill (Prater's Mill Foundation)

support. The effort has built a solid foundation for moving Southern Rivers to the new platform and adding other trails.

Public Affairs' Lavender and Quillian helped shape a national wildlife viewer survey led by an Association of Fish and Wildlife Agencies working group and Virginia Tech, with funding primarily from a 2021 Multistate Conservation Grant. The Wildlife Resources Division's involvement includes sampling an additional 1,000 Georgians to better inform the agency about wildlife viewers as part of its constituency. Survey results will be available in fiscal year 2022.

Other wildlife-viewing highlights in fiscal 2021 included Wildlife Resources GIS specialist Liz Morata developing a dashboard that tracks eBird reports on DNR properties, Quillian writing Colonial Coast trail-related articles for Explore Georgia magazine and Lavender kick-starting with Wildlife Conservation and Game Management Section staff an assessment of birding opportunities on DNR voluntary public access areas where that recreation is appropriate.

## 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 152,530 likes through June 2020, the end of the fiscal year. Twitter had 10,500 followers and Instagram 16,600. Wildlife Resources' YouTube channel fielded more than 262,000 views during fiscal year 2021, bumping viewership since the start of the channel to nearly 1.15 million views. The division's blog logged 465,722 views during the fiscal year.

Popular Facebook posts involving rare and other “nongame” animal and plant species included:

- DNR's alert about invasive **zebra mussels** found in a product sold in pet stores around the state, which produced more than 3,400 shares and 200 comments.
- A profile of **trapdoor spiders**, native Georgia arachnids that are architecturally gifted and obviously interesting – drawing 305 engagements, 240 shares and nearly 90 comments.

- Wetland bird ID signage at Constitution Lakes Park in Atlanta (Georgia Audubon; \$1,996).
- Two wildlife viewing gardens with native plants at Burton 4-H Center on Tybee Island (Georgia 4-H Foundation; \$3,000).
- Replacing the trail boardwalk at ABAC's Nature Study Area in Tifton (ABAC Foundation; \$2,097).

Final reports for fiscal year 2021 projects are due in December. Considering the importance of wildlife viewing in Georgia, the Wildlife Conservation Section plans to offer the grants again in 2022.

Also in 2021, Wildlife Conservation and Public Affairs continued updating DNR's two birding

trails, expanding their scope to encompass wildlife in general and adding infrastructure to accommodate other trails. The project led by Public Affairs' Beth Quillian and featuring a new website ([georgiabirdingtrails.com](http://georgiabirdingtrails.com)) and logo by webmaster and graphics designer Amanda Hrubesh culminated in the September 2020 launch of a revamped Colonial Coast Birding Trail, first opened in 1999.

In addition to Colonial Coast Trail upgrades, including adding the trail to the Go Outdoors GA app, Quillian began work with site partners to update the Southern Rivers Trail. A committee including DNR's Dr. Bob Sargent, Tim Keyes, Todd Schneider and Rick Lavender and TERN Executive Director Terry W. Johnson provided oversight. DNR's Information Technology staff contributed





Instagram "Ask a Biologist" series

After mid-March in 2020, the agency did not staff most events because of the pandemic. However, biologists provided scores of interviews with media. Outlets ranged from large to local, from Associated Press, National Geographic and HuffPost to WABE-FM Atlanta, WMAZ-TV Macon, Savannah Morning News and The (Vidalia) Advance. Topics varied from nesting sea turtles and finch irruptions to wintering monarchs and invasive species such as zebra mussels and Argentine black and white tegus.

Outreach is mentioned throughout this report. However, notable examples include:

- Botanists Lisa Kruse and Carlee Steppe and project partners took a [Georgia Public Broadcasting](#) reporter on a field trip highlighting work funded by a newly awarded \$780,000 federal grant to conserve 14 imperiled plant species.
- Senior wildlife biologist Clay George provided interviews about the dire state of North Atlantic right whales. He also served as the key source for a Wildlife Resources Division [blog post](#) exploring the death of an adult whale from entanglement and of a calf hit by a boat.
- Staff factored into invasive species coverage about [zebra mussels](#) on a boat at Lake Lanier, [weather loaches](#) in a stream near Athens, [Cuban treefrogs](#) along the coast and the ongoing hunt for tegus in the wild in Toombs and Tattnall counties (plus scattered reports across the state).
- Outreach coordinator Linda May and wildlife biologist Anna Yellin organized and awarded a \$1,000 grant to Banks County teacher Wendy Fuschetti, who led students in creating a wildlife habitat and outdoor learning area at Banks County Elementary in Homer. 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.
- Yellin also handled media calls from [HuffPost](#) and others about a partner-powered project asking the public to report monarchs overwintering in coastal southern states to understand changes in the butterfly's migration, and hopefully help conserve the species.

- The first two North Atlantic right whale [mom-and-calf pairs](#) spotted in winter 2020-2021, a post shared 262 times.

Wildlife Resources also held a Facebook Live event with outreach coordinator Linda May discussing [bird-nesting basics](#) in March 2021. A monthly Talking Nature Tuesdays series created by Charlie Elliott Wildlife Center staff and the division's Urban Wildlife Program and Public Affairs staff drew more than 1,000 viewers per post (also see: Charlie Elliott Wildlife Center under Regional Education Centers).

The year's top three Instagram posts all featured reptiles: [hognose snakes](#) (519 likes), a "Snakes You Don't Know" video with retired senior biologist John Jensen (more than 2,600 views) and a Georgia Wild [lizards video](#) featuring Linda May (nearly 2,500 views). An "Ask a Biologist" series also proved popular.

The Georgia Wild e-newsletter, which focuses on Wildlife Conservation's work, added readers in fiscal 2021, as in previous years. Circulation increased by 12 percent, or 9,337 subscribers, to 119,226. The annual reader survey showed consistent support of the content and format. According to respondents:

- Nine out of 10 had told someone at least once about an item in the newsletter.
- 93 percent agreed the newsletter informs them about conservation and in an easy-to-understand way.

- Eighty percent had been spurred to learn more about a wildlife species or issue, and 21 percent to financially support wildlife conservation in Georgia.
- More than half— 60 percent — did not know until they subscribed that the Wildlife Conservation Section depends largely on fundraisers, grants and contributions.

The 14-year-old newsletter features a variety of contributors, from staff, partner agencies and TERN Executive Director Terry W. Johnson — who writes the well-read "Out My Backdoor" column — to project contractors such as Dirk J. Stevenson of Altamaha Environmental Consulting and 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 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.



# GEORGIA

## BIODIVERSITY PORTAL

- Staff improved the Georgia Biodiversity Portal, at [georgiabiodiversity.org](http://georgiabiodiversity.org). The site averaged 1,632 visits a day in 2021, providing scientists, educators and the public with range maps, photographs and profiles of plants, animals and natural communities of conservation concern. Upgrades involved integrating information pages for freshwater fishes, mussels and crayfishes, using a QR code to quick-link to the site, and adding details for crayfishes such as identification keys with species profiles and range maps for common species.



- Wildlife Conservation Program Manager Dr. Bob Sargent and Charlie Elliott Wildlife Center held the fifth annual Youth Christmas Bird Count, which attracted 20 young birders and their parents on Dec. 12, 2020. The event introduces ages 8-16 to the Audubon Society's Christmas Bird Count, yet minus that count's long and often cold day in the field. Participants received a brief presentation about identifying birds and then divided into teams led by expert birders for a three-hour adventure on Charlie Elliott's trails. The birders observed 37 species. After lunch, the youth led a species countdown, learned how to enter data into eBird, received prizes such as field guides and enjoyed a raptor show.
- Wildlife Conservation staff took part in videos, including senior wildlife biologist Daniel Sollenberger discussing reticulated flatwoods salamanders, Linda May talking about wildlife careers and habitats for Georgia Public Broadcasting's teaching resource "Virtual Learning Journey: Georgia Forests II," and Fire Management Officer Shan Cammack explaining prescribed fire in clips supporting a South Carolina ETV feature on [William Bartram's travels](#).

- May also created videos for the Wildlife Resources Division's [Talking Nature Tuesday](#) series, including on biodiversity, coyotes and foxes, invasive exotic species and summer frog calls. The last two videos were featured on the Farm Monitor, a weekly Georgia television program.
- News releases by Public Affairs' Rick Lavender varied from 2021's first loggerhead sea turtle nest – on Little Cumberland Island, where loggerhead nest monitoring began in North America – to explaining the spring 2021 finch irruption and what homeowners who feed birds should do. Releases by Public Affairs' Beth Quillian announced the expansion of a partner project [mapping pollinator habitats](#) from Atlanta to statewide as well as news about the effort to monitor monarchs in winter. She also produced a [blog post and video](#) on restoring endangered dwarf sumac at Lower Broad River Wildlife Management Area near Elberton, and helped coordinate promotion of a Tallulah Gorge visit by NatureServe President Sean O'Brien as part

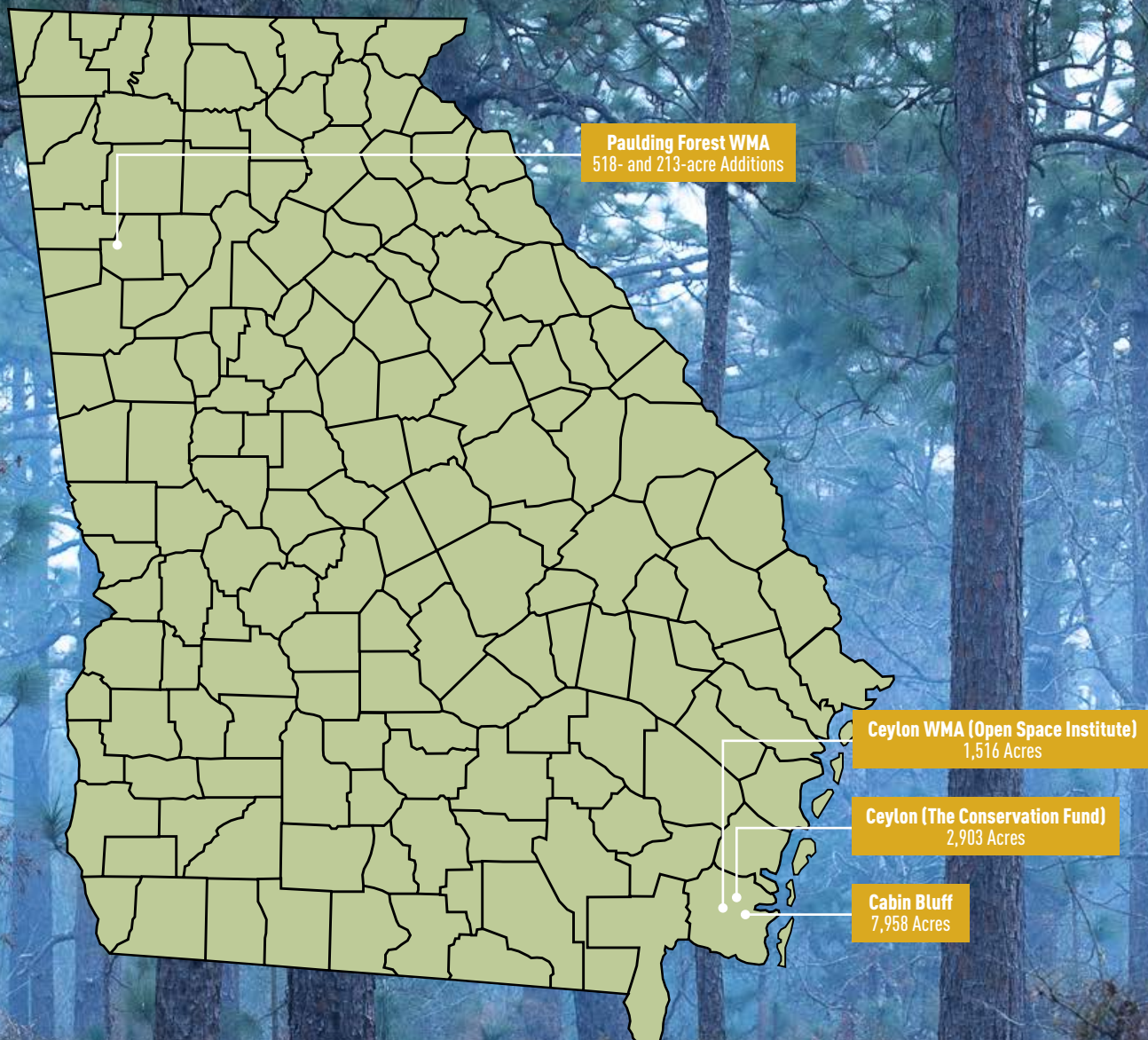
of his cross-continent van tour of rare species and habitats.

- Enjoy! Cherokee magazine profiled wildlife biologist Emily Ferrall in the fall 2020 article "[Bat Woman Works to Save the Environment](#)." A Wildlife Resources Division Instagram story explored biologist J.T. Pynne's research of [pocket gophers](#), or "sandy mounders."
- Linda May led outreach efforts on many fronts, including holding in-person classes for homeschoolers on bird nesting basics and plant identification at Panola Mountain State Park, providing a virtual presentation on [Georgia frogs](#) for the 2020 Adopt-a-Stream Confluence, and helping coordinate the Environmental Education Alliance's first virtual Outdoor Learning Symposium ([where she also gave a presentation](#)).
- Staff members also wrote popular articles and published research. Retired senior wildlife biologist John Jensen co-authored with Piedmont College professor Carlos Camp a study in [Herpetological Conservation and Biology](#) documenting 19 years of salamander abundance in the "twilight" zones of Georgia caves on state lands. Wildlife biologist Fletcher Smith's work with whimbrels contributed to a paper on the [Arctic Animal Movement Archive](#) in Science. Biologists Ani Escobar, Neely Keeton and Matthew Rowe contributed articles to the newsletter of the American Fisheries Society's Georgia Chapter.



NatureServe's Sean O'Brien and Jackie Alpert view persistent trilliums at Tallulah Gorge with DNR's Carlee Steppe (Beth Quillian/DNR)





Through its Real Estate Office, DNR acquired fee ownership of several properties for public recreation and wildlife conservation in fiscal year 2021. The acquisitions established one wildlife management area and added to another. The tracts were targeted in Georgia's State Wildlife Action Plan to increase public recreation and expand conservation efforts across DNR-managed lands.

## Acquisitions

Here are more details about each land purchase.

### Paulding Forest WMA Additions

DNR expanded Paulding Forest Wildlife Management Area in Paulding and Polk counties by purchasing 518 acres from TIR Hubble on Aug. 31, 2020, and 213 acres from the Jones family on Sept. 14, 2020. Both tracts eliminated edge-holdings, improved management and increased public recreation opportunities on the WMA.

The purchases were made using DNR bond funds, a U.S. Fish and Wildlife Recovery Land Acquisition grant, a Recreation Pittman-Robertson Program grant and support from the Knobloch Family Foundation.



## Cabin Bluff and Ceylon Phase 1 Tracts

DNR purchased 7,958 acres at Cabin Bluff in Camden County from the Nature Conservancy and Open Space Institute on Feb. 25, 2021. Also in Camden, the agency closed on two parts of the adjacent Ceylon Wildlife Management Area, acquiring 1,516 acres from the Open Space Institute on Dec. 17, 2020, and 2,903 acres from The Conservation Fund on Feb. 25, 2021. The Cabin Bluff lands will be included as part of Ceylon WMA.

Both sites include longleaf pine uplands, maritime forest, freshwater wetlands and tidal saltmarsh wetlands. Protecting these lands not only provides for the expansion of a fire-managed longleaf pine ecosystem beneficial to gopher tortoises and other

imperiled species, it allows DNR to offer more recreation lands to the public and serves as a buffer for Naval Submarine Base Kings Bay.

The tracts were purchased with state bonds, funding from the Georgia Outdoor Stewardship Program and the U.S. Navy, a U.S. Fish and Wildlife Service National Coastal Wetlands Conservation grant, and private funds from Open Space Institute and The Conservation Fund.

## 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.

Of the seven applications in four counties received in fiscal year 2021, six were approved by the State Properties Commission and received the tax credit. One application received pre-certification for the program and submitted a final application.

In addition to the six certified applications, three applications received before the fiscal year started were certified in 2021. These nine certifications protected a total of 9,766 acres using bargain sales and conservation easements donated to qualified organizations.



Ceylon WMA shoreline (Mac Stone/Mac Stone Photography)



## 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 2022. Staff applied for and was awarded a State Wildlife Action Plan enhancement grant in fiscal 2021. The funding, which begins in fiscal 2022, will support 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 will also support

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. Developing, revising and implementing the plan are required to receive State Wildlife Grants. Georgia's apportionment of State Wildlife Grant funds for federal fiscal year 2021 was \$1,467,060.

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 year 2021, 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, a candidate for listing across its eastern range in parts of Alabama, Georgia, Florida and South Carolina. The service is coordinating with states to provide federal Section 6 funding for surveys and to develop proactive conservation agreements.

This 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.



Turkeybeard (Hal Massie/DNR)

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 fiscal year 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 September 2021. It will be coordinated by Atlanta Botanical Garden, 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. More than 1,500 rare species and natural communities are tracked in the database, represented by 19,600-plus element occurrence records (i.e., geographic locations of species and communities).

During fiscal year 2021, Wildlife Conservation added 526 element occurrence records and updated thousands of existing ones. A summary of the records and species in the Biotics database is below.

Taxonomic Group	Records	Tracked Species
Amphibians	892	32
Birds	1,629	53
Fishes	3,186	103
Invertebrates	2,107	311
Mammals	678	36
Natural Communities	1,461	200
Plants	7,990	782
Reptiles	1,675	38
Total	19,618	1,555

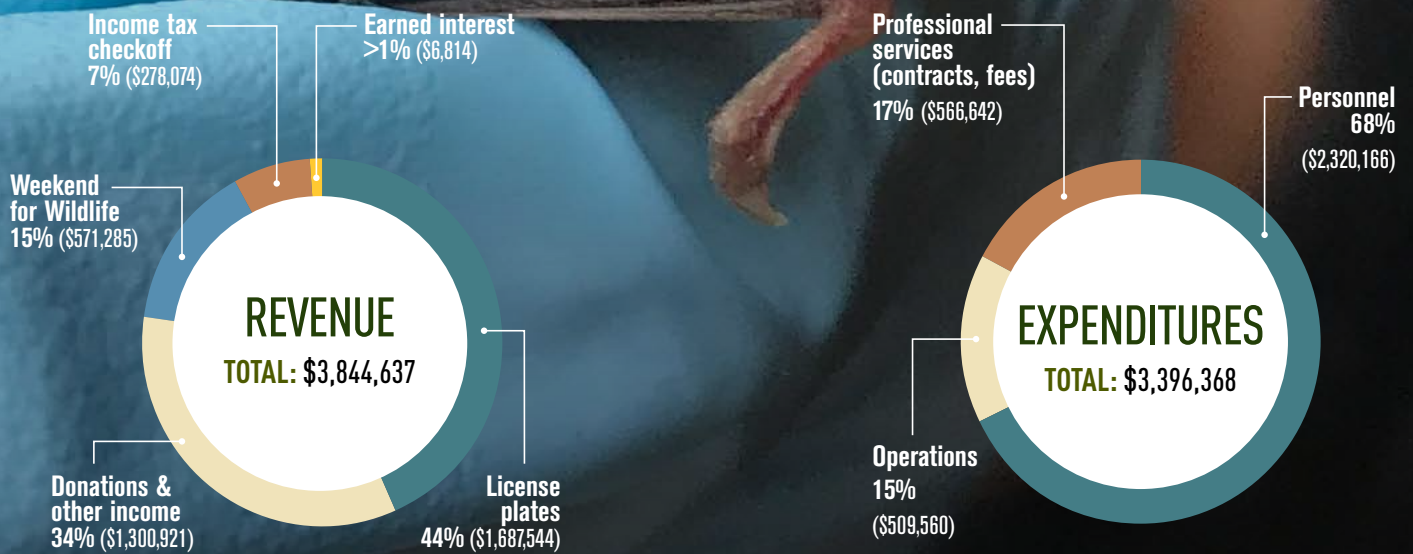
Significant efforts were made to update information on species proposed for listing under the Endangered Species Act. Many are under federal review and updating database records allows for a more accurate species-review process.

Funded in part by an agreement with the Georgia Department of Transportation, staff also reviewed ecological reports and responded to 1,190 formal requests for site-specific data.



Striped newt, a regional species of greatest conservation need (Pete Pattavina/USFWS)





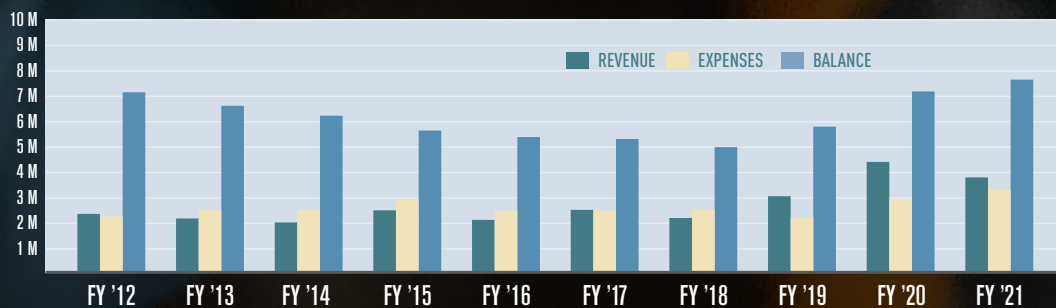
Does not include federal and other grants, or state appropriations for the Wildlife Conservation Section.

Expenditures paid through the Nongame Fund.

\*Includes revenue from the 2021 Weekend for Wildlife disbursed by the Georgia Natural Resources Foundation to the Nongame Conservation Fund in fiscal 2022.

## 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 2021. While the section spent approximately \$791,000 in state funds – including support for positions at Charlie Elliott Wildlife Center – these funds represented only about 6 percent of the total research, conservation and education budget for fiscal 2021 (which also involved federal and other grants).

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](http://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 \$4.4 million in revenue in fiscal 2020:

- \$1,687,544 in license plate sales and renewals.
- \$1,300,921 in donations and other income.
- \$571,285 from the 2021 Weekend for Wildlife.
- \$278,074 via the state income tax checkoff.
- \$6,814 in earned interest.

Revenue decreased 13 percent, or \$561,990, from 2020. This change is primarily attributed to last year’s total including the income from two Weekend for Wildlife fundraisers – 2019 and 2020. Income from the 2021 event is reported this year although distributed to the fund after fiscal 2021 closed. Wildlife Conservation Fund revenues do not include federal and other grants or state appropriations.

About \$3.4 million in expenses were paid through the fund. The largest share – 68 percent, or \$2,320,166 – involved personnel expenditures. Seventeen percent (\$566,642) went to professional services, a category that includes contracts and fees. Operations accounted for the remaining 15 percent, or \$509,560. Annual spending over the last 10 years averaged \$2.6 million. Expenditures in fiscal 2021 rose 13.6 percent compared to 2020.

The 2021 fund balance of \$7.6 million was up 6 percent over 2020 and the third straight annual increase following six years of declines. Fiscal 2021 also marked a 10-year high. The fund topped \$7 million only twice during the period (in 2012 and 2020) and dipped to a low of \$5 million in fiscal 2018.

## Nongame License Plates

Specialty license plates have been a standard of support for the Nongame Wildlife Conservation Fund for more than two decades. In fiscal 2020, 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, continued in 2021. Vehicle owners can

keep and annually renew any nongame plate, even those no longer sold at county tag offices.

For fiscal 2021, nongame tag revenue exceeded \$1.6 million, with 13,021 plates issued (or sold) and 62,131 renewed. Compared to 2020, totals were higher in all categories, with revenue up 4.5 percent, sales 38 percent and renewals less than 1 percent. Overall, there were 75,152 eagle, monarch and hummingbird plates on the road in Georgia at the end of fiscal 2021. That is 3,634 or about 5 percent more than the previous year. This increase in circulation is the first for nongame plates since 2018.

Note that 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 – \$61,020 in fiscal 2021.

License plates are usually the Nongame Wildlife Conservation Fund’s leading fundraiser, providing as much as two-thirds of annual revenue. That share was 44 percent in 2021, versus 32 percent in 2020 (when including the proceeds from two Weekend for Wildlife events tipped the percentages toward that fundraiser).

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 been dedicated to conserving 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 a vibrant-colored pollinator plate in September 2019. The latter design featuring a monarch butterfly on a Georgia aster replaced the hummingbird tag. In fiscal 2021, nearly 4,000 pollinator plates were issued and 2,499 renewed. The eagle designs continued as the most popular specialty plates in Georgia, with 9,028 issued and more than 48,000 renewed.

The highpoint for nongame tags was 2010, when 347,401 eagle and hummingbird plates were 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, the trend toward stabilizing and increasing nongame plate sales and renewals is promising, particularly in light of 2021's gains in both areas. Tag revenue has topped \$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.

However, in response to the COVID-19 pandemic, DNR and the Georgia Natural Resources

Foundation held the first virtual Weekend for Wildlife. The event, anchored by an auction live-streamed from DNR offices in Atlanta, proved a solid success, raising more than \$740,000. (For comparison, the in-person fundraiser in 2020 topped \$1 million.) Excluding expenses and fees, directed giving for programs and money raised by TERN, the virtual event returned \$561,990 to the Nongame Wildlife Conservation Fund.

Weekend for Wildlife returned to the Cloister in 2022.

## 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. Over the last 10 years, the checkoff's net contributions – collected by calendar year – have averaged \$212,556.

Contributions to what is commonly called the Give Wildlife a Chance checkoff hit new lows from 2016 to 2018, with the \$113,606 in 2017 setting a record for the least amount raised. However, contributions have rallied since, to \$225,151 in 2019 and \$294,916 in 2020 before dipping in 2021 to \$278,074. Two decades ago, the checkoff registered an all-time high of \$510,910 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](https://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.

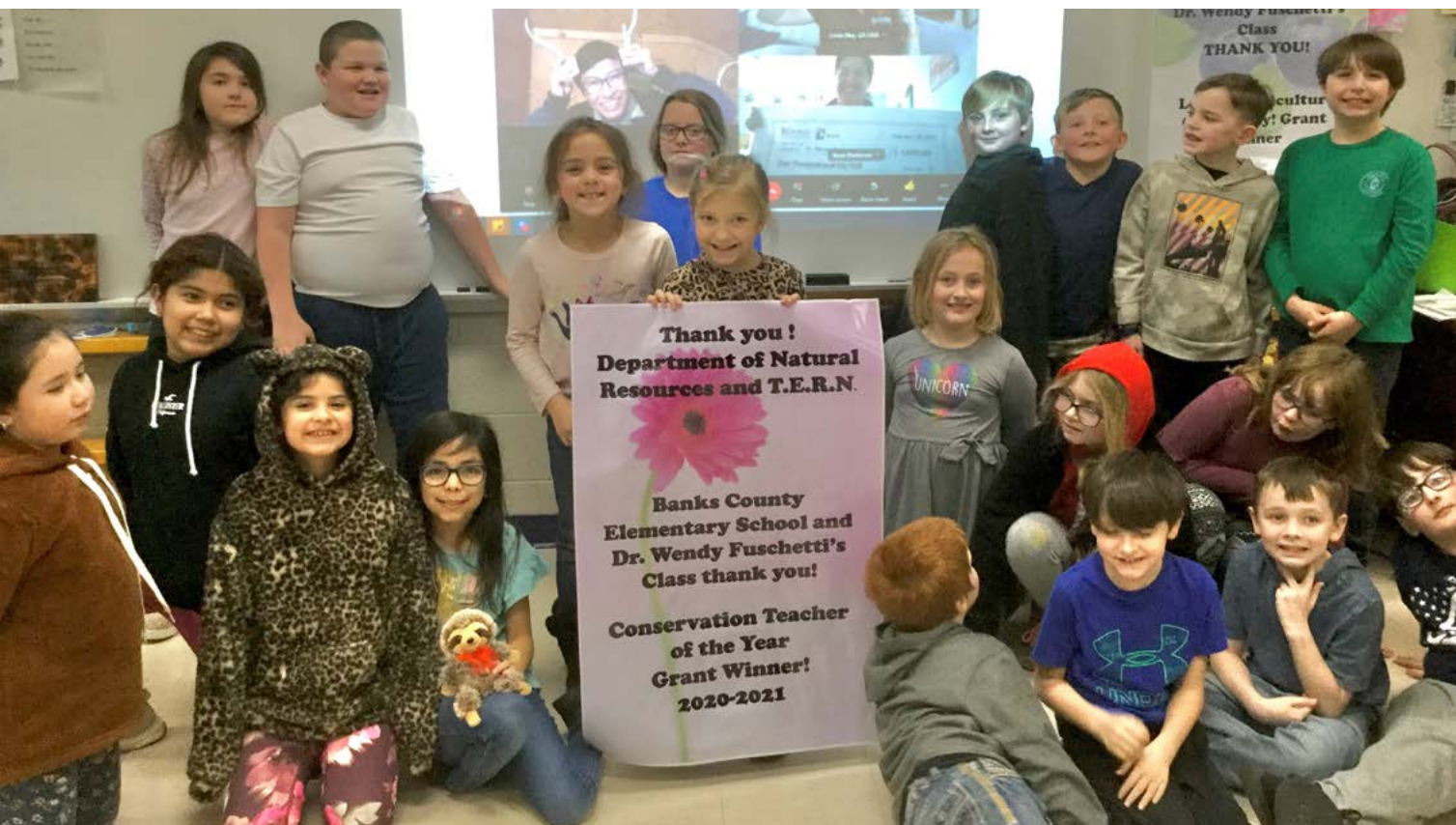
Donations online and, in smaller amounts, through other license venues such as DNR offices, the Brandt Information Service help desk and private vendors have grown each year, from \$36,332 in fiscal year 2018 (the option was added only that March) to \$113,527 in 2019, \$146,395 in 2020 and \$185,778 in 2021.

The roundup remained by far the most popular option in fiscal 2021, with 62,806 users giving a total of \$151,407. Another 1,854 people gave \$5 each (\$9,270 total), 930 gave \$10 apiece (\$9,300), 260 donated \$25 (\$6,500), 57 contributed \$100 (\$5,700) and 72 people gave \$50 (\$3,600).

Donors new to [gooutdoorsgeorgia.com](https://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](https://tern.homestead.com), raises most of its funds through membership dues and through auction, raffle and sale items at Weekend for Wildlife.



Banks County Elementary students celebrate Wendy Fuschetti receiving TERN's conservation teacher grant (DNR)

In fiscal year 2021, TERN funded nine proposals totaling \$45,762 from Wildlife Conservation, including:

Passing the Torch - \$6,625

Indigo snake awareness/Burner Bob - \$6,500

Youth Birding Competition - \$5,515

Coastal native groundcover - \$12,300

Give Wildlife a Chance poster contest - \$2,500

Urban wildlife viewing - \$2,625

Equipment protection facility - \$6,407

Window into the Woods - \$1,990

Outstanding Conservation Teacher Award - \$1,300

Additionally, TERN Board Chairman Joey Slaughter offered Georgia Power's support of \$5,048 to fund a Tallulah Gorge conservation education signs project.

TERN provided financial support, as well, to several other projects and related conferences throughout. The nonprofit has paid or obligated more than \$1.4 million to Wildlife Conservation since 1992.

TERN officers in 2021 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 \$22.3 million in federal and other grants during fiscal year 2021 to support projects that benefit nongame wildlife and habitats. Expenditures involving grants, bonds and other funds totaled nearly \$12.9 million, including \$4.3 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 and the U.S. Department of Defense. Use of these 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 2021 apportionment of federal State Wildlife Grants was \$1,467,060, about 6 percent more than in 2020 but 26 percent (\$513,921) 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 is part of a national survey of wildlife viewers led by an Association of Fish and Wildlife Agencies working group and Virginia Tech. That effort also includes sampling an additional 1,000 Georgians to better inform the agency about its wildlife-viewing constituency. Survey results will be available in fiscal 2022.

## 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, this 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 in 2019 and 2021 by revisions of the [Recovering America's Wildlife Act](#). The bipartisan effort proposed a funding model aimed at preventing more than 12,000 species from becoming endangered or threatened. As of fiscal 2021, [House Resolution 2773](#) listed Georgia cosponsors including Reps. Buddy Carter (R-Pooler), Hank Johnson (D-Decatur) and Austin Scott (R-Tifton) and, for the [Senate companion bill 2372](#), Sen. Jon Ossoff. In 2021,

Georgia's General Assembly unanimously approved a resolution urging Congress to pass the act.

The legislation would redirect \$1.4 billion annually from the U.S. Treasury fund to facilitate states' and tribal nations' ability to conserve species of greatest conservation need in a voluntary, non-regulatory manner. The act would not add new taxes, instead directing fees and penalties assessed for environmental violations and not already targeted for existing environmental funds to the effort. Funding to states would total \$1.3 billion a year, with \$97.5 million going to tribal nations. Georgia would be eligible to receive an estimated \$27.8 million, 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.



Restoring Canby's dropwort habitat with fire at Oakbin Pond Preserve (Lisa Kruse/DNR)



Proposed Georgia projects that could be achieved through Recovering America's Wildlife Act are explored at [georgiawildlife.com/WildlifeActionPlan](http://georgiawildlife.com/WildlifeActionPlan). Learn more about the nationwide effort at the Alliance for America's Fish and Wildlife website, [ournatureusa.com](http://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](http://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 2021, the second round of projects were selected for the final part of the application process. If all nine projects are approved, they will provide \$20.5 million to benefit local parks and trails systems and state-owned lands. The Conserve Georgia grantees would leverage another \$40 million in matching funds from project partners.

Those projects include:

- Chattahoochee Nature Center, \$997,501 to replace an aging boardwalk, build a pedestrian bridge, remove invasive species and re-vegetate the surrounding wetlands.
- Greene County, \$2.1 million to build nearly seven miles of the Firefly Trail, a 39-mile rails-to-trails project connecting Athens and Union Point.
- North Georgia Mountains Authority, nearly \$2.6 million to replace Amicalola Falls State Park's visitor center and renovate the outdoor education area at the Approach Trail to the Appalachian Trail.
- Tall Timbers Research, \$635,620 to buy a 444-acre conservation easement on Birdsong Nature Center in Grady County, protecting high-priority species and providing wildlife-viewing opportunities.
- The Nature Conservancy, \$1.9 million to acquire and begin restoring a 2,351-acre addition to the Dugdown Corridor, an area that harbors multiple threatened and endangered species.

- Troup County, \$1.8 million to build Oakfuskee Conservation Center, a multi-use conservation facility at Pyne Road Park on West Point Lake.
- DNR Parks and Historic Sites Division, \$2.6 million to upgrade and modernize 90 campsites at Vogel State Park, one of Georgia's oldest and most popular parks.
- DNR Parks and Historic Sites Division, \$3.2 million to relocate and build a new visitor center at Wormsloe State Historic Site in Chatham County.
- DNR Wildlife Resources Division, nearly \$4.6 million to acquire 11,600 acres in Camden County as the second phase of Ceylon Wildlife Management Area.

The pre-application period for the 2021-2022 funding cycle opened Aug. 2, 2021. The Georgia Outdoor Stewardship Program is managed by an 11-member board of trustees.

## Administration and Personnel

The Environmental Education Alliance of Georgia presented Wildlife Conservation Section Outreach Coordinator Linda May the group's annual award for Outstanding Service to Environmental Education by an Individual. The awards were announced during the alliance's virtual conference in May 2021.



Georgia Magazine cover featuring DNR's Linda May



Dr. J. Mincy Moffett Jr., a former Wildlife Conservation botanist who has left DNR to work for the U.S. Fish and Wildlife Service, was named the Georgia Recreation and Park Association's Volunteer of the Year. The organization recognized Moffett for installing, maintaining and promoting a Connect to Protect garden at Veterans Park in Oconee County.

DNR and others marked the passing and the legacy of Eleanor "Sandy" Torrey West, the matriarch of Ossabaw. West died on Jan. 17, 2021, her 108<sup>th</sup> birthday. Her parents bought the island in 1924, and in 1978 West and her family sold it to Georgia, creating the state's first heritage preserve.

Wildlife Conservation's Joe Burnam, Tim Keyes, Anna Yellin and Daniel Sollenberger were chosen by administration as Wildlife Resources Division champions in fiscal 2021. The selections recognizing employees' exemplary work are announced quarterly.

Changes this fiscal year within Wildlife Conservation included the promotion of senior wildlife biologist Trina Morris to program manager. She is responsible for operations at the section's Wildlife Resources Conservation

Center office. Program Manager Brett Albanese moved from that office to headquarters, where he continues to oversee programs for freshwater aquatic research and conservation, along with other responsibilities. Amanda George was promoted to conference center coordinator at Charlie Elliott Wildlife Center.

Key administrative changes at Wildlife Resources Division headquarters during the fiscal year included the retirement of Director Rusty Garrison, the subsequent appointment of former Assistant Director Ted Will as director and the promotion of Thom Litts from Fisheries Management Section chief to assistant director. Scott Robinson was promoted from assistant fisheries chief to head of the section.



Ossabaw matriarch Eleanor "Sandy" Torrey West (Mark Dodd/DNR)



DNR's Daniel Sollenberger discusses snakes with a Reptile Day visitor at Fernbank Museum (Linda May/DNR)





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WILDLIFE RESOURCES DIVISION WILDLIFE CONSERVATION SECTION**

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**Dr. Brett Albanese, Jason Lee, Katrina Morris, Kim Morris-Zarneke, Dr. Bob Sargent** ■ *Wildlife Conservation Program Managers*

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