

This is your window into the work of the Georgia Department of Natural Resources' Nongame Conservation Section.

Our mission at Nongame Conservation is straightforward and critical: Conserve the more than 95 percent of native Georgia wildlife species that are not legally fished for or hunted – called nongame – as well as rare plants and the habitats these plants and animals need.

That work affects us all, whether it's acquiring lands along the Altamaha River for conservation and recreation, sizing up the alligator snapping turtle population in Spring Creek or teaming with partners to keep Georgia aster off the Endangered Species list.

Conserving nongame species and restoring and preserving wildlife habitats are central to making sure this natural heritage is available for our children and their children to enjoy.

Besides helping maintain our quality of life, these programs support our economy. In 2011, some 2.4 million people spent a total of more than \$1.8 billion watching wildlife in Georgia!

This report details nongame research, surveys, conservation programs, education, land acquisition and habitat management during the fiscal year from July 1, 2013, to June 30, 2014. Included are our successes and our challenges.

Conserving Georgia's Nongame Wildlife 2014



FISCAL YEAR REPORT

One continuing challenge is funding. We do not receive state appropriations for conserving nongame. Instead, we depend on grants, contributions and fundraisers, such as the eagle and hummingbird license plates.

And 2014 featured some good news regarding license plates. A law change made this year holds great promise for turning around a three-year decline in wildlife tag sales and renewals, our primary fundraiser.

Report copies, including a six-page summary, and video highlights are available at www.georgiawildlife.com/conservation/AnnualReport.

Thank you for your interest in conserving Georgia's nongame wildlife and natural habitats. If you have questions or comments, please email me at jon.ambrose@dnr.state.ga.us.

Jon Ambrose
Chief, Nongame Conservation Section



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Bog turtle (Todd Pierson)
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Wood storks (Mary Ellen Urbanski/USFWS)
Disentangling a right whale (FWC /NOAA permit 15488)

Waterbird Conservation Initiative

Georgia's barrier island beaches, coastal salt marshes and freshwater wetlands support 86 species of seabirds, shorebirds and wading birds, collectively known as waterbirds. The Waterbird Conservation Initiative includes:

- Protecting important colonial waterbird nesting habitats.
- Conducting surveys 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 efforts include protecting and managing five sand islands for beach-nesting and migratory birds. While this effort is especially valuable for seabirds, resident and migratory shorebirds also benefit from protecting critical nesting and resting areas that are free from disturbances. One of the areas, a dredge-spoil island near Brunswick, supports one of the largest colonies of nesting seabirds on the South Atlantic Coast.

The summer of 2014 was a good one for beach-nesting birds. The relatively few extreme tide events and storms during nesting season allowed for solid productivity among most beach-nesting birds. Although Little Egg Island Bar had a small mixed seabird colony that was partially washed over, a colony of 450 brown pelicans returned to Satilla



Banded American oystercatcher chick on St. Catherines Island (Tim Keyes/GaDNR)

River Marsh Island after abandoning it for several years. Overall pelican nesting numbers were still low, however, compared to records from five-10 years ago.

Nongame staff and partners tracked seabird colonies on Little Tybee Island, Ogeechee Bar, Ossabaw Island, Little Egg Island Bar, Little St. Simons Island, Pelican Spit, Brunswick Dredge Island, Satilla Marsh Island, Little Cumberland Island and Cumberland Island National Seashore. Several rooftop colonies also were monitored, mostly in the St. Mary's area. Significant productivity was noted on Pelican Spit and Brunswick Dredge Island. These two sites are free from mammalian predators, a factor that often leads to high productivity.

Created by the U.S. Army Corps of Engineers in 2007 and owned by the state, the dredge-spoil island near the Brunswick shipping channel is an important nesting site for waterbirds. In 2014, 6,473 royal tern nests were documented, along with 50 sandwich tern nests, 90 black skimmer nests, three for gull-billed terns, 250 for least terns, five for brown pelicans and 250 for laughing gulls. The Nongame Conservation Section is working with the corps to

keep the site free of vegetation, promote beach-nesting seabirds and discourage nesting by gulls.

In other updates:

- DNR and partners including the University of Georgia, St. Catherines Island, Little St. Simons Island and the U.S. Fish and Wildlife Service were awarded a National Fish and Wildlife Foundation grant to control predators at a number of key nesting sites for American oystercatchers. Partners completed the field component of the project in summer 2014. This project not only led to higher nest productivity for oystercatchers than DNR has documented recently, but should provide an adaptive management tool to help managers determine when predator control efforts are needed. Two trappers hired by Nongame Conservation removed 87 raccoons, 17 feral hogs and two coyotes from Little St. Simons, Egg Island and Little Egg Island Bar. Thanks in part to those efforts, most of the 32 oystercatcher chicks documented during 2014 are presumed to have fledged. The summer not only provided the highest count of oystercatcher chicks in Georgia, a record 28 chicks were banded.
- DNR coordinated the second year of a major new migratory shorebird survey based on a regional study by shorebird researchers with the Conserve Wildlife Foundation of New Jersey and the U.S. Geological Survey. Repeated surveys were conducted at 23 sites during fall 2013 and spring 2014. A combination of DNR and Fish and Wildlife Service

Georgia volunteers Pat and Doris Leary help survey shorebirds (Brad Winn/Manomet Center for Conservation Sciences)



Birds

staff, island managers, and volunteers conducted the surveys, which are aimed at helping generate more accurate population and trend data for a number of Arctic-nesting shorebirds.

- Researchers documented 121 pairs of American oystercatchers on the Georgia coast.
- A graduate student completed her first field season working with Wilson's plover on Cumberland Island National Seashore during summer 2014. The student studied nesting ecology, including how males and females respond to different nest predators.
- Three whimbrels are still transmitting radio signals since being tagged in spring 2012 and 2013, a project supported by The Environmental Resources Network (TERN) and other partners. Seven whimbrels have been tagged in Georgia since 2007. Researchers are learning about whimbrels' use of the Southeast's coast, as well as the tremendous migrations the birds repeat annually. Our longest transmitting whimbrel, named Postel, has been transmitting for 855 days and has flown 67,517 kilometers (or nearly 42,000 miles) during that time. A Georgia-tagged whimbrel nicknamed Wolf flew 3,300 miles without resting, flying from Arctic nesting grounds to the British Virgin Islands. ([Follow the flights.](#))
- DNR and partners continued a sharp-tailed sparrow banding project, providing data on the winter distribution of two species – Nelson's and saltmarsh sparrows – and five subspecies of these little-known birds. Blood samples from seaside sparrows were also collected for an analysis of mercury contamination.
- DNR and several coastal partners continued leading the Georgia Shorebird Alliance. Involving state, federal and private groups, the new organization is making significant progress in management, monitoring, research and education regarding shorebirds on the Georgia coast.

Red-cockaded Woodpecker Recovery

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 still live on a number of private properties.

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 targets landowners in southwest Georgia, where plantations managed for the northern bobwhite also support a significant population of red-cockaded woodpeckers. Safe Harbor involves a landowner's commitment to beneficially manage habitat for the 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 occupying a cluster of cavity trees. The group can range from a single bird to a breeding pair plus one to three helpers – typically male offspring from previous years that help feed younger siblings. In exchange for maintenance of this baseline number of family groups, the landowner's responsibility will not increase if the woodpecker population increases.

In Georgia, 176,593 acres are enrolled in Safe Harbor management agreements covering 105 baseline groups of red-cockaded woodpeckers and supporting 38 surplus groups, or additions to the woodpecker populations. Most of these properties are in the Red Hills Region near Thomasville. The Red Hills area supports the largest population of red-cockaded woodpeckers on private lands. Since the inception of Safe Harbor in 2000, this population has stabilized at about 180 groups.

The Nongame Conservation Section continued work with Safe Harbor participants in 2014 to monitor and band woodpeckers and install artificial nest cavities. Staff also continued to work with the Joseph W. Jones Ecological Research Center to restore the red-cockaded woodpecker population at Ichaaway Plantation in Baker County. These 29,000 acres supported a single male in 1999. In part through the translocation of 71 young birds, Ichaaway Plantation has 26 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. In 2013, DNR entered into an agreement with the U.S. Army Corps of Engineers to manage the woodpeckers on corps land that DNR leases for Lake Seminole Wildlife Management Area. The property is adjacent to the Silver Lake population and features quality longleaf and wiregrass habitat, some of which red-cockaded

woodpeckers already use as foraging habitat. Over the coming years, recruitment clusters will be installed in suitable places at Lake Seminole WMA to encourage the expansion of red-cockaded woodpeckers.

To supplement the red-cockaded woodpecker population at Silver Lake, Nongame Conservation staff translocated six woodpeckers from Apalachicola National Forest to the WMA in 2013 and will translocate six more from Fort Stewart in fall 2014. The Silver Lake population has grown, with 28 family groups documented in 2013 and 2014. Last year, 35 nestlings fledged.

Through more frequent controlled burning, installing additional recruitment clusters and careful forest management, Silver Lake WMA will eventually sustain about 50 family groups.

Nongame Conservation staff also translocated a pair of red-cockaded woodpeckers from Fort Stewart to new recruitment clusters on Moody Forest Wildlife Management Area in Appling County during calendar year 2013. Planned habitat management activities at Moody Forest, including timber thins, should create more woodpecker habitat in the near future.

Partners in Flight

In Georgia, the international bird conservation effort Partners in Flight continued to focus on the 33 priority bird species identified in the State Wildlife Action Plan. Research and survey questions and conservation needs identified during stakeholder meetings for the plan were condensed into bird conservation programs funded by a State Wildlife Grant. Meetings in 2013 and 2014 informed stakeholders of progress and updated conservation priority species.



Southeastern American kestrel chick (Ashley Harrington/GaDNR)

In the most recent fiscal year, Nongame Conservation Section projects included the following:

Three species of secretive marshbirds the black rail, king rail and least bittern – are high-priority species in the State Wildlife Action Plan due to factors including small numbers, habitat loss and alteration, a lack of sufficient information about the birds' distribution, and population trends in Georgia.

In spring 2014, Nongame Conservation conducted a fourth year of standardized marshbird surveys using the Continental Marsh Bird Monitoring Program survey protocol. This standardized methodology allows data collected to be shared, aggregated and analyzed at many different levels, including by habitat or wetland type, physiographic province, state, region, country and continent.

Sites surveyed in 2014 included areas of Altamaha Wildlife Management Area near Darien. The Altamaha WMA surveys were conducted at 31 survey points known as stations. Staff documented a significant number of king rails and least bitterns at Altamaha, as well as a few purple gallinules, another uncommon species.

No black rails were detected during 2014, though 25 stations at four sites were surveyed.

Surveys started four years ago for Henslow's sparrow

Henslow's sparrow is a small songbird that nests in grasslands of the Midwest and Northeast and winters in grassy areas of pine flatwoods, pitcherplant bogs and powerline corridors in the Southeast's Coastal Plain. Over the past several decades, the species has declined precipitously, likely because of habitat loss on its 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, and little is known about its distribution and populations across most of its range, including in Georgia.

To better understand the species' status in the state, the Nongame Conservation Section has monitored Henslow's sparrows since winter 2010-2011. Using a technique called flush netting, birds were captured in mist nets along several powerline corridors at



Henslow's sparrow (Todd Schneider/GaDNR)

Paulks Pasture Wildlife Management Area in Glynn County, Townsend Wildlife Management Area near Ludowici and Moody Forest WMA. The birds were banded with numbered leg bands for identification.

From January through March 2014, 86 Henslow's sparrows were captured and banded, the most in any season since the start of this project. In addition, several individuals banded the previous year were recaptured at these WMAs, and a bird originally banded two years ago was also recaptured. However, in the most significant recapture, a bird first banded at Paulks Pasture during the 2010-2011 field season was netted this year very close to that original capture site.

Surveys will continue at these sites. Other areas with suitable habitat will be surveyed as well to look for new populations. In addition, work to identify micro-habitat, determine site fidelity and gauge the species' response to habitat management will be started.

Another 30 nest boxes were erected for southeastern American kestrels, bringing to 140 the number of nest boxes monitored by the Nongame Conservation Section. Work with kestrels also included a fourth year of surveys by ground and air of known populations across the state.

Summarized in summer 2014, these surveys revealed some disappointing trends. Of the two populations surveyed along powerlines – the Fall Line sandhills and Tifton populations – the Fall Line population showed an annual decline of about 7 percent. An estimated 25 breeding pairs remained on the powerline between Macon and Columbus, and 10 other known nesting pairs were using nearby nest boxes. Nest box use has also declined precipitously in this population, making its long-term fate uncertain at best, in spite of the intensive nest box program and substantial land acquisition and management by The Nature Conservancy and the DNR.

On the bright side, the Tifton population, located between Plant Mitchell and the small town of Offerman, experienced a 17 percent annual



King rail (Todd Schneider/GaDNR)

increase averaged across four years and included an estimated 302 nesting pairs in 2014. It is believed this population is heavily using powerline structures owned by Georgia Power for nest sites, helping increase the number of birds. The Fall Line Sandhills population lost these structures in 2005 when they were modernized.

A group of cooperators continues to install kestrel boxes at Fort Benning, following a pilot project that detected at least four nesting pairs on the Army base near Columbus. Students from the Columbus area built 50 nest boxes. Nongame Conservation staff worked with Fort Benning to install about 30 of the boxes in fall 2013. Ten kestrel pairs successfully nested in these boxes in 2014.

Nongame Conservation also continued its involvement in the National Audubon Society's Important Bird Areas Program. Projects included native grass restoration and monitoring, loggerhead shrike telemetry, and a barn owl box program.

Native grass restoration efforts continued at Panola Mountain State Park near Stockbridge with excellent growth of Indiangrass and almost complete elimination of exotic invasive species on the 40 acres planted in 2014. About 500 plugs of native forbs raised by park staff from nearby seed sources will be added to the restoration areas to enhance habitat for birds and butterflies in fall 2014.

Native grass restoration efforts have yielded a large number of rare birds and attracted bird watchers. In July 2014, a new nesting population of Bachman's sparrows was confirmed in a grass restoration area planted in 2005 at Joe Kurz Wildlife Management Area in Meriwether County. The hunting community has recognized the habitat value of native grasses, garnering wider public support for restoration projects.

On Brawley Mountain in northeast Georgia's Fannin County, habitat restoration was completed for the only remaining population of golden-winged warblers in the state. Brawley Mountain was burned in spring 2014 to further enhance the habitat, most of which was too young for golden-winged warblers to use until 2014.

The bad news is that Georgia's golden-winged warbler population has faltered. Biologists detected one lone male in 2013 and no birds in 2014, meaning this species may be extirpated from Georgia. Efforts continue to try to "shortstop"

migrating golden-winged warblers at suitable habitat on Chestnut Mountain in Fannin.

Two solar-powered play-back devices have been deployed in suitable habitat in the north Georgia mountains to try to attract additional warblers. This technique has lured other species into novel habitats. However, golden-winged warbler populations are in such steep declines throughout their range that the technique is considered a long shot. It is unlikely there are "excess" birds in the eastern U.S. looking for new habitats.

The Brawley Mountain project, however, will provide almost 300 acres of early successional habitat. This controversial project on the Chattahoochee National Forest was in the planning process for more than 10 years. During that time, Georgia's golden-winged warblers dwindled from five populations to one.

Bird Surveys

■ Wood Stork Nests

Wood storks were listed as endangered in 1984 following dramatic declines in breeding colonies in southern Florida. Wood stork nests were first documented in Georgia in 1965. By the 1980s, the birds were nesting here in increasing numbers.

Georgia now supports about 20 percent of the U.S. nesting population, which is about 9,500 breeding pairs. The recovery plan for the wood stork in Georgia includes monitoring reproductive success of nesting colonies and identifying potential threats.



Volunteer Debbie Dineen helps band a juvenile wood stork (Tim Keyes/GaDNR)

The Nongame Conservation Section conducts aerial surveys each spring to identify and monitor nesting colonies. Stork nesting effort – the number of pairs that attempt to reproduce – fluctuates annually. 2014 was a record nesting year for wood storks in Georgia, with 2,932 nests in 22 colonies. Water levels were favorable for both nesting and foraging, and the colonies monitored for productivity had high nest success. A new small colony was also discovered in Brooks County.

More good news: On June 24, 2014, Secretary of the Interior Sally Jewell announced that the U.S. Fish and Wildlife Service was [down-listing the wood stork](#) from endangered to threatened under the Endangered Species Act, reflecting a highly successful conservation and recovery effort spanning three decades. Jewell made the announcement at Harris Neck National Wildlife Refuge, home to the largest wood stork rookery in Georgia.

With more than 75 percent of all wood stork rookeries located on private land, continuing the success of conservation efforts for this species depends on landowners' willingness to ensure the protection of viable freshwater wetland nesting sites

■ Bald Eagle Nests

Once fairly common in Georgia, the bald eagle declined in abundance during the mid-20th century and was no longer nesting in the state by the early 1970s. But, bald eagle populations rebounded here and elsewhere, helped by a ban on the use of DDT in the U.S. in 1972, habitat improvements following enactment of the federal Clean Water and Clean Air acts, protection through the Endangered Species Act, increased public awareness, and the restoration of local populations through release programs.

Following federal de-listing in 2007, primary legal protection for nesting eagles comes under the Bald and Golden Eagle Protection Act. Georgia's ongoing conservation efforts include monitoring all known eagle nests and working with landowners to protect nest sites from disturbance.

During the 2014 nesting season, the Nongame Conservation Section documented 188 occupied nesting territories. Of these, 150 were successful, fledging 238 eaglets. These numbers were up from the 171 occupied territories, 150 successful nests and 238 eaglets the previous year. In further comparison, there were 139 known nesting



territories in 2010, 55 in 2000, nine in 1990 and only one in 1980. Biologists continued to work with landowners to manage nesting areas, including providing assistance with federal incidental take permits for development projects that might infringe on recommended buffer zones.

Nongame Conservation staff also is working with partners at the University of Georgia Warnell School of Forestry and Natural Resources, the Southeastern Cooperative Wildlife Disease Study, the Army Corps of Engineers, the U.S. Fish and Wildlife Service and the American Eagle Foundation to study avian vacuolar myelinopathy, a mysterious disease that has caused significant mortality in American coots and bald eagles. Often referred to as AVM, the disease apparently is caused by an unidentified toxin produced by a cyanobacterium that grows on the surfaces of submerged plants, especially hydrilla, in

some sites in middle Georgia and in a few other southeastern states.

J. Strom Thurmond Reservoir, also called Clarks Hill Lake, on the Savannah River north of Augusta has been plagued with the disease for several years. There has been a dramatic decline in eagle territories there. Fall surveys indicate that numerous eagles arrive at Thurmond in the fall, probably attracted by the large numbers of coots drawn by the reservoir's extensive hydrilla beds. However, the number of eagles dwindles by January when the only remaining eagles are associated with a couple of territories on the northern end of the lake, farther away from the hydrilla. Telemetry studies are planned to determine how much of the late-fall decline is attributable to AVM.

In a more positive development, eagle nest web cameras have become very popular. Nongame

Conservation biologists helped with the installation of a camera at Berry College near Rome. That cam attracted millions of viewers through the nesting season until the single eaglet fledged in May. Biologists also assisted with an installation on Skidaway Island scheduled to go online in fall 2014.

■ Swallow-tailed Kite Nests and Roosts

The swallow-tailed kite has suffered a significant range reduction since the 1880s when it bred in 21 states. These elegant raptors are now found in seven southeastern states, where they nest in bottomland forests along some large rivers. Most nests in Georgia are on private land, particularly industrial timberlands.

Nongame Conservation Section 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 working on protected lands where kites nest to ensure suitable habitat management, 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. Mary's – and almost all rivers that drain into the Gulf of Mexico, including the Suwannee, Alapaha, Aucilla, Flint, Little Ochlockonee and Withlacoochee. While densities are highest in the lower stretches of these rivers, kites nest well into the upper Coastal Plain on the Ocmulgee and Oconee rivers.

Kite numbers appear stable in Georgia, but little re-colonization 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.

DNR held a working group meeting for partners throughout the breeding range of swallow-tailed kites in fall 2014 to help refine population estimates, coordinate management guidelines and prioritize future conservation and research efforts.

Sea Turtle Conservation and Research

The loggerhead sea turtle is found in Georgia's coastal waters year-round and nests on all barrier island beaches. In accordance with the U.S. Fish and Wildlife Service and federal recovery plan for loggerheads, DNR management efforts focus on surveying and protecting loggerhead nests and managing nesting beach habitat. The Nongame Conservation Section coordinates the Georgia Sea Turtle Cooperative, a group of volunteers, researchers and government employees that conducts nest protection and management activities on Georgia beaches.

Nest management strategies such as nest relocation, installation of protective screens and removal of predators help ensure high nesting success. Since comprehensive surveys began in 1989, loggerhead nesting has been highly variable, with an average of 1,215 nests per year. In 2014, 1,201 loggerhead nests were documented on

Georgia beaches. The total ended a four-year run of consecutive nesting highs but did not cause concern among researchers.

Long-term nesting data shows a significant decline in nesting from the mid-1960s through the early '90s. More recent data, however, shows an increasing trend, suggesting that the loggerhead population is in a recovery period. According to the recovery plan by NOAA (National Oceanic and Atmospheric Administration) Fisheries, loggerheads may be considered recovered if the population shows a 2 percent annual increase for 50 years, resulting in a statewide total of 2,800 nests annually. Cooperators found 2,241 and 2,291 nests in 2012 and 2013, respectively, consecutive nesting records for the state.

To develop a comprehensive understanding of the number and relatedness of loggerheads nesting on Georgia beaches, DNR and the University of Georgia have developed a catalog of unique genetic profiles for Georgia's nesting female turtles. A UGA researcher working with the DNR has identified more

than 1,175 loggerhead females using the Georgia coast for nesting from 2010-2012.

One of the significant findings of this study is that at least 60 mother/daughter pairs nest on our barrier beaches. Because it takes at least 30 years for a loggerhead to begin nesting, that means no fewer than 30 of our turtles are at least 60 years old, nesting alongside their 30-year-old daughters.

Sea Turtle Stranding Network and At-sea Recovery

The Nongame 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 conducted to evaluate causes of mortality. Periodic aerial surveys are flown to determine distribution and abundance of marine turtles during migration.

Loggerhead sea turtle returning to the ocean (Mark Dodd/GaDNR)

Reptiles and Amphibians



Sea turtle strandings are the primary index of threats to sea turtles in Georgia's coastal waters.

In 2014, 108 dead or injured turtles were documented on Georgia beaches, roughly half the 25-year average of 200 strandings per year. Recent patterns in strandings strongly correlate with shrimp trawling effort off the Georgia coast, suggesting that commercial fishing activity is a significant source of mortality for sea turtles.

Results from necropsy examinations indicate that boat collisions and disease also are significant sources of mortality. They accounted, respectively, for 35 percent and 16 percent of strandings in fiscal year 2014.

Bog Turtle Conservation

The federally threatened bog turtle – North America's smallest turtle species – inhabits Georgia mountain bogs generally found along slow-flowing spring creeks and seepages in low mountain valleys.

During the past year, Nongame Conservation staff teamed with Clemson University to deploy 424 traps in 15 mountain bog sites – including six with known bog turtle occurrences and nine potentially suitable sites. The latter were identified through developing a species distribution model as well as an extensive review of aerial photography using Geographic Information Systems software. More than 100 mountain wetland sites were ground-truthed and evaluated in the field to identify sites targeted for surveys.

As a result of this work, two previously undocumented bog turtle populations were discovered, increasing the total number of extant sites in Georgia to 10, and doubling the number of sites thought to possess populations with long-term viability. This year's survey effort, totaling 21,334 trap days, resulted in 39 captures (of 22 different bog turtles) at the six sites with known populations, and 24 captures (15 different bog turtles) in the two previously undocumented sites. Overall, the turtles trapped accounted for approximately 45 percent of all bog turtles known from the wild in Georgia.

Four bog turtles within newly discovered populations were tracked using radio telemetry



Bog turtle hatchling (Grover Brown/GaDNR)

to determine microsite preferences and habitat utilization. In cooperation with Clemson University, a study to determine the feasibility of using baited traps was initiated and modified traps deployed in six Georgia sites with known bog turtle populations.

Nongame Conservation staff also drafted a Georgia bog turtle "recovery plan." The hope is to expand this plan to encompass the southern bog turtle population and help coordinate conservation actions across state lines. Staff also initiated the cooperative development of a standardized written protocol for bog turtle head-starting among conservation partners, a protocol that is expected to improve head-starting activities.

In cooperation with a mountain bog landowner, Nongame Conservation and the U.S. Department of Agriculture Natural Resources Conservation Service established a 30-year conservation easement within one of the largest mountain bog wetlands in Georgia through the federal Wetlands Reserve Program. The easement at the bog, known to harbor bog turtles, marks the first such agreement in Georgia outside of the Coastal Plain.



Alligator snapping turtle study on Spring Creek (Kitty Spivey)

Alligator Snapping Turtle Population Study

Because of their large size and the relative ease of baiting them into hoop-traps and onto set-lines, alligator snapping turtles were targeted by commercial collectors in the 1960s and '70s. This commercial harvest supported a demand for turtle meat used predominately in soups and caused severe population declines of the species in Georgia and throughout the southeastern U.S. In light of the declines, alligator snappers are now protected in Georgia and other states where they occur. But the long-term effects of commercial harvest remain unclear.

In 1997, the Nongame Conservation Section undertook a long-term capture-mark-recapture study of this species in Spring Creek in southwest Georgia. Because a previous survey by staff had shown that this population had the highest capture rate of surveyed alligator snapper populations in Georgia – suggesting it may be among the state's largest populations surveyed – Nongame Conservation sought to characterize demographics here as a reference for historically harvested populations. That data potentially could be used for comparison to evaluate recovery in a population.

The study ended in 2014, totaling 163 captures of 71 individual turtles in a 2.5-mile stretch of the creek. Nongame Conservation staff and Auburn University researchers are analyzing capture-mark-recapture data from the 16-year period to examine population demographics, growth rates and longevity.

Gopher Tortoise and Eastern Indigo Snake Conservation

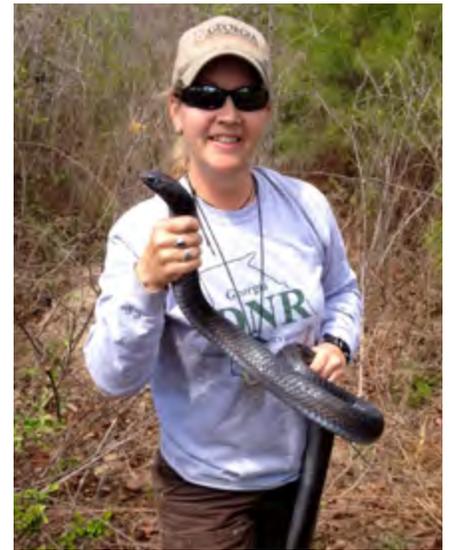
Both the gopher tortoise – Georgia’s state reptile – and the eastern indigo snake, which is federally listed as threatened, are priority species in Georgia’s State Wildlife Action Plan.

During the most recent fiscal year, the Nongame Conservation Section conducted gopher tortoise population inventories at 11 sites to determine tortoise population sizes and demographics. This work, done before by contractors, was handled this time by a three-person DNR crew focused on gopher tortoise inventories. As in previous years, line-transect distance sampling was used to derive tortoise density and abundance. Sites were also evaluated for habitat suitability and their potential for receiving tortoises through relocation.

Six of the sites surveyed in 2013-2014 had estimated populations exceeding 250 tortoises, a number the U.S. Fish and Wildlife Service has established as the minimum to ensure a long-term, sustainable population. This past year’s resurvey of Fall Line Sandhills Wildlife Management Area revealed twice as many tortoises as the baseline survey six years earlier, adding this population to the list of those that meet the sustainability threshold. This dramatic increase is no doubt a result of the ongoing intensive habitat restoration work at the WMA near Butler.

At Yuchi Wildlife Management Area near Waynesboro, a site with extensive suitable habitat but a small remnant population of gopher tortoises, Nongame Conservation has been augmenting the population with adult tortoises displaced by development elsewhere and – beginning in 2014 – with juvenile tortoises hatched and head-started from eggs collected at stable populations. Twelve juvenile tortoises with attached radio-transmitters were released in soft-release pens for a three-week period, then allowed free roam once they became well-acclimated to the site. Researchers with the University of Georgia are tracking the free-ranging juveniles to evaluate growth, habitat use, home range and survivorship. Also, the detection of nearly 20 nests at stable donor sites this year resulted in 142 hatchlings being raised in captivity for release in spring 2015.

In another study funded and supported by the DNR, The Orianna Society, a nonprofit organization dedicated to conserving rare reptiles and amphibians, continued occupancy monitoring of imperiled eastern indigo snake habitat to determine population trends. In southern Georgia, indigos overwinter in xeric sandhill habitats where they den in the burrows of gopher tortoises. The study is focused on the Altamaha River Basin, considered a population stronghold for eastern indigos. Staff surveyed 40 sandhill sites on public and private lands in the basin, detecting indigos at 34 percent of the sites. The degree of detections in 2014 did not differ significantly from that in



DNR's Joyce Klaus with eastern indigo (GaDNR)

the previous three years, suggesting that the population remains stable in the study area.

Gopher Frog Restoration

State-listed as rare, gopher frogs depend on intact sandhill habitats where adults survive within the burrows of their namesake host, the gopher tortoise. However, these frogs also require nearby fishless wetlands where they breed and their tadpoles develop. Because of widespread upland and wetland habitat alteration throughout their range, gopher frogs are now limited to fewer than 10 sites in Georgia.

In 2007, the Nongame 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 but high-quality protected site at Williams Bluffs Preserve in Early County, which is within the species’ historical range. The goal: Establish a self-sustaining breeding population of gopher frogs, a range-wide first for this imperiled amphibian.

Throughout the Fall Line sandhills region of the Southeast, biologists reported scant breeding by gopher frogs during the 2014 season. This observation was certainly the case in Georgia, where no egg masses were found at donor populations despite extensive searches, and no froglets were produced for release. The cause of this reduced or non-existent breeding is unknown, but hopefully is an anomaly.

In late February, however, multiple male gopher frogs were heard calling in the Early County



Gopher tortoise hatchlings prepped for release (John Jensen/GaDNR)

release pond and a spent egg mass of the species was found. Despite the lack of breeding in the Fall Line sandhills populations, breeding in this reintroduced southwest Georgia population was documented for the second year in a row, indicating continued stability.

North American Amphibian Monitoring Program

The Nongame Conservation Section coordinates the state's participation in the North American Amphibian Monitoring Program, which is directed nationally by the U.S. Geological Survey. Patterned after the highly successful Breeding Bird Survey, the amphibian monitoring program is structured to use data collected largely by citizen scientists to analyze population trends of frogs and toads on state, regional and national levels. State coordination involves recruiting and retaining volunteers, training, and compiling data.

Volunteers are asked to drive pre-established routes (there are 73 in Georgia) three times a year, record the number of frog species heard and assign each an index of abundance at 10 wetland stops along the way. To ensure that volunteers are qualified to recognize frog species by their unique vocalizations, participants must pass an online quiz that challenges them to identify species from mixed-species choruses in a number of recordings.

In 2014, approximately 60 surveys were conducted by about 20 volunteers. While the monitoring project is relatively young in Georgia, the public can review the richness of frog species on [these state routes](#) marked with a frog symbol.



Barking treefrog at Fall Line Sandhills WMA pond (GaDNR)

Eastern Hellbender Conservation Surveys

The state-protected eastern hellbender, North America's largest salamander, inhabits clear cold-water streams in the north Georgia mountains.

During summer 2014, Nongame Conservation staff conducted surveys for hellbenders in 25 streams through conventional techniques – snorkeling and flipping rocks. Researchers caught 93 hellbenders, weighing, measuring, photographing and marking each with a Passive Integrated Transponder tag for future identification. Genetic tissue samples were collected from 84 hellbenders for the Georgia Museum of Natural History genetic archive collection and for use in other genetics research. Chytrid fungus (Bd) and Ranavirus samples were also collected from each hellbender caught. Results from the analysis of these and future samples will help in a range-wide assessment of the health of the species. Abundance, size and mass data are used to determine the health of hellbender populations.

In cooperation with The Orianne Society, the Nongame Conservation Section also conducted a hellbender survey throughout much of the north Georgia mountains using environmental DNA. Through this technique, also called eDNA, the presence or assumed absence of hellbenders is assessed through analyzing stream water samples for hellbender DNA.

In September 2013, 150 water samples were collected from 98 streams, including some that had not been sampled before, plus streams with known hellbender populations, streams with historical occurrences and several streams outside of the species' known distribution in Georgia (the Tennessee River drainage). Hellbender DNA was not detected in any of the sampled streams in northwestern Georgia or any of the streams outside of the Tennessee River drainage, with the exception of one previously documented site. However, the DNA was detected in 12 streams where hellbenders had not been documented.

Although eDNA can be used to determine presence or absence of hellbenders, study results indicate that the technique cannot be used to determine abundance: Hellbender density and age-class distribution can only be determined through conventional survey techniques. However, the results do demonstrate the utility of eDNA, which detected

hellbender DNA in 11 streams where conventional survey techniques failed to find the amphibians.

Also in fiscal 2014, Nongame Conservation hellbender surveys were filmed by crews from Discovery Channel and the British Broadcasting Corp. A resulting segment on Discovery Channel's Daily Planet promoted the conservation of hellbenders in Georgia, bringing attention to the conservation of this imperiled species worldwide (the program airs in 172 countries). A portion of the BBC documentary "How the Wild West Was Won with Ray Mears," also aired internationally, included a segment on wildlife encountered by Appalachian settlers and focused on hellbender ecology and current conservation challenges.

In cooperation with the University of Georgia's Savannah River Ecology Laboratory, Nongame Conservation staff initiated research intended to determine how loads of fine sediment suspended in the water column affect the ability of larval and juvenile hellbenders to absorb oxygen from the water.

Striped Newt Restoration

DNR's nongame conservation efforts have even extended beyond Georgia's state line. Fall Line Sandhills Wildlife Management Area harbors what is believed to be the only healthy population of "western clade" striped newts, a candidate for listing under the federal Endangered Species Act. Efforts to repatriate this highly imperiled salamander to areas of Florida where it once flourished rely on a captive propagation, rearing and release project led by the Coastal Plains Institute, the Memphis and Jacksonville zoos, and other partners, including the Nongame Conservation Section.

A small number of striped newt larvae collected from the Fall Line Sandhills breeding pond by Nongame Conservation staff and others were added to stock collected earlier at the site to increase the genetic diversity of the captive population. As a result, 490 larvae produced in captivity were released in Apalachicola National Forest wetlands the past two springs. Researchers later documented emigration of fully developed land-bound newts, 33 of them this year.

Both the release and emergence of striped newts produced in captivity are firsts for this species, and hopefully mark the beginning of its recovery in the region.

North Atlantic Right Whale Conservation

The North Atlantic right whale is one of the most endangered marine mammals in the world. Commercial whaling in the late 1800s nearly drove the species to extinction. Since whaling was banned in 1935, the population's recovery has been slowed by mortality from ship collisions and entanglement in commercial fishing gear.

Each winter pregnant right whales and small numbers of non-breeding whales migrate from waters off the northeastern U.S. and Canada to calving grounds along the coast of Georgia and northeastern Florida. An average of 16 calves has been documented per year since 1990. The species' population now numbers at least 455 whales and is increasing at a rate of 2.8 percent a year. Despite recent gains, however, there are fewer than 100 breeding females.

The DNR collaborates with NOAA Fisheries, the Florida Fish and Wildlife Conservation Commission, Sea to Shore Alliance and others to conserve North Atlantic right whales in the southeastern U.S. Management actions focus on reducing human-related mortality, monitoring the whale population and protecting right whale habitat. From December through March, aerial surveys are flown along the Georgia and northeast Florida coast to document calf production, collect photo-identification data and warn ships about whale locations. At the same time, boat surveys are conducted to collect photo-identification data and genetics samples, and document injured and entangled right whales.

Together, aerial and boat teams documented 52 individual right whales in the Southeast during the 2013-2014 calving season. The count included 10 new calves. Boat teams collected genetics samples from 16 right whales, eight of them calves, and responded to one entangled whale.

More than 480 feet of rope was removed from the entangled juvenile whale over two days in February ([video](#)), an effort that drew international media coverage.

Since 2003, Nongame Conservation staff has helped disentangle 10 right whales entangled in commercial fishing gear. Most of the fishing gear removed from right whales in the southeastern U.S. appears to be from trap/pot fisheries in the northeastern U.S. and Canada. Entanglement in gillnet and longline gear has also been documented.

The Nongame Conservation Section also works to protect right whales and their habitat through involvement in the Right Whale Southeast Implementation Team, the Atlantic Large Whale Take Reduction Team and the North Atlantic Right Whale Consortium. The agency receives considerable support from DNR's Coastal Resources and Law Enforcement divisions in education and outreach, policy efforts, and enforcement of federal right whale protections. (Also see the Law Enforcement for Nongame section.) Most funding for DNR right whale conservation efforts is provided through grants with NOAA Fisheries.

Mammals





Georgia Marine Mammal Stranding Network

The Georgia Marine Mammal Stranding Network was created in 1989 to coordinate marine mammal stranding response in Georgia. The Nongame Conservation Section coordinates the Marine Mammal Stranding Network with help from NOAA Fisheries, other agencies and private organizations.

Network goals are to investigate human impacts on marine mammals, monitor population health, provide rapid and humane response to live stranded marine mammals, contribute to marine mammal research, and educate the public about marine mammal issues.

From 2000 to 2013, the network documented an average of 32 stranded dolphins and whales per year. The network was able to examine 90 percent of reported cases and conduct necropsies on 37 percent. Bottlenose dolphins were the most commonly stranded species, making up 77 percent of strandings, followed by pygmy and dwarf sperm whales (13 percent combined). Other species documented include Stenella dolphins, rough-toothed dolphins, Atlantic white-sided dolphins, Risso's dolphins, pygmy killer whales, false killer whales, short-finned pilot whales, humpback whales, North Atlantic right whales and beaked whales.

Human-related causes of mortality and injury have included entanglement in commercial fishing gear, watercraft collisions and ingestion of marine debris.

During calendar year 2013, the network documented 76 strandings, the most ever in a single year. In November and December alone, 38 dead bottlenose dolphins were found along the Georgia coast during an outbreak of dolphin morbillivirus, often referred to as DMV. The network also rescued four dolphins during 2013, including two entangled in commercial crab pot gear ([video](#)). The Georgia Nongame Wildlife Conservation Fund and a NOAA Fisheries grant provided funding for stranding network activities last year.

Florida Manatee Conservation

Endangered 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 at least 5,000, with approximately half of the population found along Florida's Gulf Coast and the remainder along the Atlantic Coast. Each spring and summer, an unknown number of manatees migrate into Georgia and return to Florida in the fall as water temperatures cool.

The Nongame Conservation Section cooperates with the U.S. Fish and Wildlife Service, the U.S. Navy and the Florida Fish and Wildlife Conservation Commission to conserve manatees in Georgia. Management focuses on reducing human-related mortality and protecting manatee habitat. Recovery tasks include documenting causes of manatee mortality and injury, rescuing injured and out-of-habitat manatees, monitoring manatee distribution and habitat use, educating boaters about watercraft impacts, and reviewing permits and policies that may impact manatees and their habitat.

Fifty-two manatee mortalities were documented in Georgia waters from 2000 to 2013. Of those, 16 mortalities, or 31 percent, were due to watercraft-related impacts. Less common causes of mortality include drowning in commercial fishing gear and hypothermia when manatees fail to migrate south



Manatees feeding in Cumberland Sound (GaDNR)

during winter. Two manatee mortalities were documented in Georgia in 2013; cause of death could not be determined in either case.

From 2007 to 2013, the Nongame Conservation Section conducted aerial surveys with funding from the Navy to estimate manatee abundance in Cumberland Sound, near Kings Bay Naval Submarine Base. Surveys found that abundance is greatest during June and July, but the number of manatees varies year to year. As many as 40-50 manatees were estimated in Cumberland Sound during June and July of 2009-2011, while peak estimates during 2012 and 2013 were much lower, at 10-30 manatees.

Analysis of manatee aerial surveys in the Savannah area from 2012 to 2014 are pending. Preliminary counts suggest that abundance is much lower there than in Cumberland Sound. Nongame Conservation staff conducted the Savannah-area surveys using Fish and Wildlife Service funds.

Many manatees are identifiable by unique scars from watercraft collisions and other injuries. In the previous year, Nongame Conservation staff contributed photos of 105 manatees to the U.S. Geological Survey's Manatee Individual Photo-Identification catalog. Photos are taken during aerial, boat and land-based surveys, and also solicited from the public. The catalog is the primary means of estimating manatee survival rates and other population metrics. Some manatees have been sighted numerous times in Georgia over 20 years or more.

Bottlenose Dolphin Contaminants Project

The bottlenose dolphin is Georgia's only year-round marine mammal resident, inhabiting coastal estuaries and Atlantic Ocean waters. Bottlenose dolphins are ideal sentinels for coastal ecosystem health because they are long-lived predators and tend to accumulate persistent environmental contaminants in their lipid-rich blubber.

Since 2006, the Nongame Conservation Section has cooperated with NOAA Fisheries, the National Ocean Service and other organizations to study the effects of contaminants on resident bottlenose dolphins in the Brunswick area. Research revealed extremely high levels of polychlorinated biphenyls, or PCBs, in the blubber of Brunswick dolphins. The findings are consistent with a rare PCB mixture used at a contaminated industrial site in Brunswick. A health assessment study in 2009 found that dolphins with high PCB blubber concentrations were more likely to suffer from anemia, hypothyroidism and reduced functional immune response. Dolphins with high PCB blubber concentrations were also found more than 20 miles north of Brunswick at Sapelo Island, indicating that PCBs are being transported via the food web. If so, this research may have implications for human and ecosystem health.

Nongame Conservation staff has conducted photo-identification surveys in the Brunswick

area since 2011, with the goal of estimating dolphin calf survival. Researchers hypothesize that PCBs may be reducing dolphin calf survival in the Brunswick and surrounding areas. This effort will likely require at least five years to complete. Assistance has been provided by DNR's Coastal Resources Division, the Georgia Sea Turtle Center and the National Ocean Service, with funding and analytical support from NOAA Fisheries.

Small Mammal Conservation

A grant supporting bat and small mammal conservation was secured in 2012 to continue work on bat and other small mammal species in the state. This grant also included funding for a graduate project investigating northern yellow bats.

A University of Georgia graduate student and former Nongame Conservation Section intern began the graduate project in 2012 and is completing his thesis on this work. Very little is known about the yellow bat throughout the species' range. It is a species of concern in several states and Georgia has few records. Project objectives are to characterize roosts of the northern yellow bat at tree, plot and landscape levels, and conduct acoustic monitoring to examine the species' habitat selection for foraging.

Thirty-nine bats were tagged and tracked to roosts on Sapelo and Little St. Simons islands, the largest study of its kind for northern yellow bats across the species' range. The majority of the bats roosted in Spanish moss clumps in live oak trees. Further analysis should help determine the best factors for roost site selection and landscape-level habitat characteristics.

The DNR, the Georgia Department of Transportation and UGA started a cooperative project in fiscal 2014 designed to learn more about the range of cave-dwelling bats in Georgia, with a focus on the Indiana and northern long-eared bat. Since the Department of Transportation, or DOT, is required under the Endangered Species Act to ensure projects do not jeopardize the existence of bat species such as Indiana and northern long-eared bats, determining the accurate range and habitat specifics of myotis bats can assist DOT with project predictability, balancing federal funding by congressional district, and possibly lowering project planning and construction costs.

Nongame staff examine a juvenile bottlenose dolphin that stranded dead on Cumberland Island (GaDNR)



Beginning in summer 2015, a UGA graduate student and technicians will be capturing and tracking the target species across the potential range as defined by the U.S. Fish and Wildlife Service. Simultaneously, DNR biologists and DOT contractors will be completing project-based surveys in the same area. At the end of each field season, data from bats captured and telemetry results from all Georgia surveys will be compiled and analyzed.

The data will be reviewed each season and used to refine potential range maps and required survey areas for the DOT. Telemetry results may also yield new information about roost site preferences that can better define potential habitat in the state. If sufficient netting efforts and call analysis across an area yield no captures of targeted species, those areas might be removed from range maps the Fish and Wildlife Service maintains, reducing DOT's burden to provide bat surveys for projects in those areas.

The statewide Anabat survey also continued in 2014. The project (www.georgiawildlife.com/AnabatProject) used volunteers to drive 32 transects across the state, collecting bat calls. Most routes were completed once or twice.

Researchers used software and visual identification to complete an initial analysis of calls collected through 2013. Through this analysis biologists are able to determine most bat species and numbers per route. The routes will be run over multiple years to build a long-term set of call data for determining bat population trends across the state.

A new program to [monitor summer bat maternity roosts](#) in the state was launched in 2014. The



DNR's Jackie Jeffrey swabs a bat (Pete Pattavina/USFWS)

project 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 help with long-term monitoring of wildlife populations.

White-nose syndrome, or WNS, spread to eight counties in Georgia during winter 2014. Overall, a decline of 36 percent in populations was noted in known hibernacula across the state. In the northeastern U.S., caves infected with white-nose syndrome have suffered mortality rates as high as 95-99 percent after a few years of infection. Future surveys will show if Georgia experiences the same trends.

According to Fish and Wildlife Service estimates, this devastating disease has killed 5.7 million to 6.7 million bats and been documented in 25 states and five Canadian provinces, as of the close of fiscal 2014. DNR staff will continue to monitor sites in the winter to document the spread of the disease and related mortality. Biologists have focused on educating the public and the caving community to promote awareness of white-nose and support for bat conservation.

On another front, a State Wildlife Grant for small mammal conservation and research efforts was initiated in 2009 and completed this year. The final product was a research project focused on genetic variation in two subspecies of fox squirrel, the southeastern and Sherman's. These fox squirrels are difficult to differentiate in the field and questions remain as to whether they are distinct subspecies. Sherman's fox squirrel is considered a species of concern in Georgia but its status is unknown because of questions surrounding the subspecies.

A UGA graduate student collected genetic samples from fox squirrels in Georgia and Florida. The samples were analyzed to determine if there are two distinct fox squirrel subspecies in Georgia, and if there are populations that require additional management to conserve the genetic diversity of the species. Results of the study suggest that the subspecies distinction is not warranted, but further work is needed. Results of work in Florida are pending. Biologists will review this species' status once those results are available.



Northern long-eared bat (Pete Pattavina/USFWS)

Freshwater Aquatic Species

Aquatic Conservation Initiative

Georgia is one of the richest states in aquatic biodiversity, ranking among the top five in the number of native species of mussels (127 species), fishes (265) and crayfishes (70). Unfortunately, Georgia also ranks among the top states in imperiled aquatic species. About two-thirds of the state's freshwater mussels are extinct, endangered or threatened with extinction. Approximately 30 percent of Georgia's freshwater fishes and 45 percent of crayfishes fall under similar categories.

The Nongame Conservation Section launched the Aquatic Conservation Initiative in 1998 to determine the status of Georgia's aquatic fauna and develop conservation plans for declining species. The effort is aimed primarily at identifying important populations of rare aquatic species through surveys and research, incorporating species location and status information into the DNR database, and assisting with conservation planning for rare aquatic species.

Nongame Conservation staff complete hundreds of surveys around the state each year, documenting or monitoring important populations of high-priority aquatic species. In the past year, surveys focused on species considered for listing under the Endangered Species Act, such as the bluestripe shiner in the Chattahoochee and Flint river systems. Staff also developed conservation status assessment maps for 193 rare aquatic species with a goal of providing consistent

information on the status of species petitioned for listing as well as other rare species. Those maps can be accessed at www.ganriwildlife.com/conservation_status_assessment_maps.

As part of the ongoing State Wildlife Action Plan revision, Nongame Conservation staff coordinated an assessment of the status and conservation needs for 251 rare aquatic species. The assessment was done by a Wildlife Action Plan aquatic species technical team, comprised of more than 40 species experts from Georgia and surrounding states. Scheduled for completion in fall 2014 and available to the public in 2015 as part of the updated plan (see "Land Acquisition, Easements and Conservation Planning"), the assessment will include high-priority management actions, research, monitoring and habitat protections needed to conserve and recover Georgia's rare aquatic species.

In other work, Nongame Conservation is collaborating with the Tennessee Aquarium Conservation Institute to survey South Chickamauga Creek near Ringgold. Despite historical records for



Monitoring mussels in Spring Creek (GaDNR)

several rare aquatic species, this stream has been sampled only in a few locations due to limited access. Sixteen sites accessed via kayak have been sampled, yielding important records for the snail darter, mountain madtom and Chickamauga crayfish. Another goal of the project is to assess the effect of a dam on upstream fish communities and to explore the potential for fish passage.

Staff also continued annual monitoring of Etowah and Cherokee darters in Raccoon Creek. The purpose of this monitoring is to assess the effectiveness of stream channel and riparian restoration in a reach of the creek affected by a powerline right of way. Overall, there is substantial variation in the number of darters captured each year, but Etowah darter numbers have remained low since 2012. Additional monitoring is warranted to determine the long-term effect of stream restoration and drought on populations of these two rare darters.

As part of a collaborative project, Young Harris College continued monitoring the sicklefin redbhorse population in Brasstown Creek. This project documented large numbers of sicklefin redbhorse migrating into Georgia during 2013-2014, as well as the most upstream record of the species ever recorded in Brasstown Creek. The sicklefin redbhorse is a state-endangered species and a candidate for listing under the Endangered Species Act.

The blackbanded sunfish survey, a project funded by the State Wildlife Grants program and contracted with Valdosta State University, was completed in 2014. More than 250 collections at 72 sites within the range of the blackbanded sunfish in southeast Georgia were



Mussels from Holly Creek in upper Coosa River Basin (Jason Wisniewski/GaDNR)

surveyed. The project discovered a new population in the Alapaha River system and persistence of the Linton Lake population in the Aucilla River system.

Nongame Conservation is also contracting with the University of Georgia for long-term monitoring of Etowah and Conasauga river fishes. These two river systems are among the most diverse in the southeastern U.S., supporting important populations of rare fishes such as blue shiner, frecklebelly madtom, trispot darter and Conasauga logperch. Monitoring has been ongoing since 1998. Information from these studies has been invaluable for conservation planning, species status assessments, and documenting relationships between fish populations and environmental stressors.

Nongame Conservation hired a mussel biologist in 2013 to coordinate aquatic conservation efforts in the lower Flint River Basin. Monitoring in tributaries to the lower Flint also was continued in 2012-2013. The focus is assessing the impacts of extreme low flows on survival and recruitment of mussel populations.

Researchers also continued monitoring the response of mussel populations to experimentally augmented flows in a reach of Spring Creek near Colquitt in Miller County. More than 4,000 mussels have been tagged in the area, including the federally endangered shinyrayed pocketbook and oval pigtoe.

A project to assess the status and distribution of imperiled species in the Apalachicola-Chattahoochee-Flint River Basin began in spring 2013 with sampling tributaries to the mainstem Flint and in Lake Blackshear. Apalachicola floaters were collected from several sites in Lake Blackshear and the Flint. Work on this project will be completed in the upcoming year.

Additional surveys were completed in the Tennessee and upper Coosa River basins, where several rare and protected species were documented. Nongame Conservation aquatic staff collected the first records of the federally endangered Georgia pigtoe from Armuchee Creek in Floyd County and also collected the Tennessee pigtoe and Cumberland moccasinshell for the first time since 1963 and 1971, respectively. Additional surveys in the Tennessee River Basin are planned for the upcoming year with hopes of finding additional individuals of these species.



Sampling Raccoon Creek (Bill Harbin)

Staff presented research results at regional and national symposia, and published study results in several peer-reviewed journals. Staff also contributed to several multistate and national efforts to assess the taxonomy, status and distribution of species in North America.

Data from survey and monitoring efforts are entered into the NatureServe Biotics database. Partnerships are also maintained with the Georgia Museum of Natural History and the Stream Survey Team of DNR Wildlife Resources Division's Fisheries Section. These partnerships greatly expand the amount of data available for environmental review and conservation planning.

The Nongame Conservation Section is recording population information on 133 fishes, 72 freshwater mussels and snails, and 24 crayfish species. In the past year, 473 aquatic species records were added to the database and more than 1,100 existing records were updated.

Robust Redhorse Conservation

The robust redhorse is a rare sucker with wild populations occurring in limited reaches of the Ocmulgee, Oconee and Savannah rivers in Georgia and the Pee Dee River in North and South Carolina. The fish is state-listed as endangered in Georgia. Prior to its collection and identification in 1991 by DNR Wildlife Resources Division fisheries biologists, this species had not been observed for more than 100 years. A team of state, federal and industry biologists organized under the Robust Redhorse Conservation Committee has done intensive work since the early 1990s to recover the species in Georgia and the Carolinas.

A significant part of this effort has been capturing and spawning wild fish from the Oconee and Savannah rivers and producing young in hatcheries for restoration of stocks in rivers within the former range. In partnership with the U.S. Fish and Wildlife Service, Georgia Power and the University of Georgia, the Wildlife Resources Division helped develop a hatchery program in 1993. A Candidate Conservation Agreement with Assurances, the first of its kind for an aquatic species, was developed by the DNR, the Fish and Wildlife Service and Georgia Power to help reintroduce robust redhorse into the Ocmulgee River in Georgia.

From 1993-2008, about 115,700 hatchery-reared robust redhorse were stocked in the Broad, Ocmulgee, Oconee and Ogeechee rivers in Georgia. Regionally, South Carolina stocked 71,934 fingerlings in the Broad and Wateree rivers before that state's hatchery program ended in 2013. North Carolina plans to augment its Pee Dee River population.

Biologists documented growth and survival rates in all stocked rivers in Georgia and South Carolina. They also observed spawning behavior in fish stocked in the Broad, Ocmulgee and Ogeechee rivers. Researchers are trying to document survival of wild-spawned fish in stocked populations and their recruitment into the juvenile and adult population. Establishment of additional self-sustaining populations will represent a significant step toward recovery. Other recovery activities included evaluations of recruitment success and a major gravel augmentation project on the Oconee, as well as telemetry studies on the Ogeechee, Ocmulgee, Broad, Savannah and Pee Dee rivers, and a population dynamics study on the Ocmulgee.

The Oconee River gravel augmentation project is designed to improve the abundance and quality of spawning habitat. Recent monitoring suggests that the addition of more than 1,000 tons of gravel substantially enhanced three sites. More intensive monitoring for spawning activity at these new sites was planned for 2013-2014, but high flows precluded observations of gravel bars during the spawning season.

Other activities in 2014 included:

- An intensive electrofishing survey of the Oconee River from Sinclair Dam to Dublin designed to assess the current status of the Oconee population. Staff spent 65 hours electrofishing during April-May 2014, collecting two adult robust redhorse and spotting a third adult. As anticipated, this effort provided substantial evidence that the Oconee River population has experienced a major decline since the 1990s. Causes for the decline appear to be the long-term effects of a combination of reduced spawning habitat, unsuitable spawning and rearing flows, increased sedimentation, and the introduction of flathead catfish. For the near future, the two major goals of the recovery effort in Georgia will be addressing the declining status of the Oconee River population and continuing efforts to document recruitment success in the state's three stocked populations.

- An electrofishing survey of the Ogeechee River population associated with DNR's standardized sampling program. Although high flows reduced overall sampling effectiveness, three adult robust redhorse were collected during spring and summer 2014.
- A search for remnant populations above Sinclair Dam (Little River and the Wallace Dam tailrace) and Wallace Dam (the Apalachee and Oconee rivers). A single adult robust redhorse was collected from the lower portion of Little River above Lake Sinclair in 2012, the product of an accidental escape of fingerlings from the Walton Hatchery in 1995. A limited survey was conducted to assess the status of this stocked population in 2013. More intensive searches upriver will be conducted in 2014-2015.
- Sampling to evaluate recruitment success on the Broad, Ogeechee and Ocmulgee rivers. This sampling demonstrated that substantial populations exist in all of these stocked rivers, and there is limited but still inconclusive evidence of recruitment. A major spawning site was discovered and described on the Ocmulgee River below Juliette Dam.
- Sampling conducted on the lower Savannah River by the U.S. Fish and Wildlife Service and the S.C. Department of Natural Resources documented the first evidence of juvenile and young-of-the-year rearing habitat. This habitat appears to be in the intertidal zone above Interstate 95. More intensive sampling of this and similar areas in the Altamaha and Ogeechee rivers is planned for fall 2014 and 2015.

Activities in 2015 will focus on:

- Continued monitoring for recruitment success in the Broad, Ocmulgee and Ogeechee rivers, including the use of genetics analyses.
- Additional sampling in the lower Savannah and possibly limited sampling in the lower Altamaha to define and describe recently discovered rearing habitat.
- Spawning habitat assessments in the Little River above Lake Sinclair.
- Development of detailed recovery plans for long-term restoration of the wild Oconee River population.

Sandhills Conservation

Two competitive State Wildlife Grants benefited sandhill and upland longleaf pine habitats supporting gopher tortoises in Georgia and other states. The DNR received a \$1 million grant 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 sandhills and upland longleaf pine habitats, work referred to as phase two of the original project.

In phase one, completed at the end of fiscal year 2013, all states exceeded their project goals, with the overall acreage treated nearly tripling the original goal (95,000 acres treated vs. the 38,600 acres proposed). Restoration targets for phase two exceed 51,000 acres across the five states, and more than 18,000 acres in Georgia.

By the end of fiscal 2014, Georgia had far exceeded its phase two goals, completing more than 22,000 acres of prescribed burning. This burning is expected to yield significant habitat benefits, largely through improvements in herbaceous understory coverage, for priority species throughout the sandhills such as the gopher tortoise and northern bobwhite. To gauge success of habitat treatments, long-term monitoring of vegetation plots will take place across the project area in 2015.



Purple honeycomb-head (Alan Cressler)

Rare Plant Surveys on Public and Private Lands

Surveys are conducted throughout Georgia to identify and inventory locations of rare plants and provide guidance on appropriate management activities. This work is done with consultants, private landowners and botanical organizations, as well as through participation in the Georgia Plant Conservation Alliance, enhancing the exchange of information on significant new discoveries and other plant conservation activities.

During the 2014 fiscal year, numerous rare plant discoveries resulted from surveys conducted by DNR staff and contractors, nature photographers and field botanists.

Orchids are always high-priority plants to search for, and several new discoveries were reported. The green-fly orchid was observed on branches of southern magnolia along the Flint River in Sumter

Plants and Natural Habitats



Lily-of-the-valley (Alan Cressler)

County, extending the species' range well inland. The rare Chapman's yellow fringed orchid was found on a few private properties in powerline rights of way in areas mostly northeast of the Okefenokee basin. Efforts to enhance and monitor monkeyface orchid, also called white fringeless orchid, in collaboration with staff at Chattahoochee Bend State Park and selected private properties were conducted. Two terrestrial orchids, the mountain variety of tuberclad rein orchid and the fen orchid or Loesel's twayblade, both known in Georgia from one or two sites on public lands near Young Harris, were revisited. Efforts at seed germination and propagation by rhizome cuttings to safeguard the Georgia material are underway.

A survey for mountain skullcap, a federally threatened member of the mint family, resulted in the discovery of eight new sites. Some of these are on public lands, including the Chattahoochee National Forest, property owned by Chattooga County, the newly established Resaca Battlefield State Historic Site, Bartow County, and a public waterworks-protected watershed on Rocky Face Mountain in Whitfield County. Management agreements for significant populations and the continued discovery of new sites will allow for the possible delisting of this showy wildflower in the near future. Additional sites for relict trillium, another federally endangered wildflower, may qualify for downlisting to threatened, if management agreements continue to be made – especially around Fort Benning, thanks to collaboration with

The Nature Conservancy and cooperative private landowners. Relict trillium also was discovered in southern Houston County as part of an ecological assessment for a highway bridge replacement.

Additional sites for other federally listed plants also were found. Two new populations of pond spicebush were documented on Mayhaw Wildlife Management Area in Baker County. An amphibolite knoll with mature hardwoods on private property in Crawford County is home to a newly found population of federally endangered fringed campion.

On other fronts, a Candidate Conservation Agreement was signed that allows for numerous conservation activities to enhance populations of Georgia aster. Among the actions agreed on by the nine partners are conducting more searches, working with landowners for on-site protection and setting up monitoring plots to determine the stability of populations. The agreement was signed May 16, 2014, during a ceremony at Atlanta Botanical Garden. The focus was eliminating the need to federally list Georgia aster, a candidate species since 1999. (Update: In September, the U.S. Fish and Wildlife Service announced that the plant [will not require listing](#).)

During the last growing season, the number of sites where Georgia aster was known to occur jumped from 55 to nearly 80, due to assistance from Georgia Power staff, volunteers and many contacts with private landowners. In the meantime, however, two rarer plants were proposed for federal

listing (and approved after the close of fiscal 2014): whorled sunflower, known from the Coosa prairies in Floyd County, and Georgia rockcress, found near Resaca, Rome, Fort Benning and southward on bluffs along the Chattahoochee River.

Pitcherplant bogs remain a special conservation concern. New populations of wiregrass dropseed and purple honeycomb-head were documented during surveys for American chaffseed at bog sites in Colquitt County. Another purple honeycomb-head site was discovered with hooded pitcherplants in Camden County.

Columbia County's Burks Mountain complex, with its ultramafic bedrock, is still of great interest. On a lower slope, a new population of a rare clematis or curly heads was found. Yet, attempts to propagate the last remnants of Georgia plume for future enhancement at the site have had limited success, and remaining individuals were caged to prevent browsing impact.

Nongame Conservation staff verified discoveries of two southeastern endemic plants for the first time in Georgia. Alabama larkspur was found in a shale barrens at Johns Mountain Wildlife Management Area on the Chattahoochee National Forest. Nash's sunrose, a plant formerly restricted to Florida with one outer Coastal Plain occurrence in North Carolina, was observed on a sand dune on Little Satilla Wildlife Management Area in Wayne County.

Nongame Conservation staff documented several other botanical finds this year. Carolina bogmint and the shrub conjurer's nut or *Nestronia* were found at new sites in Richmond and Twiggs counties. Wild hyacinth, shooting star and dwarf larkspur were confirmed from additional sites on public and private lands on limestone soils in northwest Georgia. Wild lily-of-the-valley was observed near a mountain bog in Rabun County. A grass more common in the Midwest, pale mannagrass, which occupies pond margins and can appear as an emergent in shallow water, was found during exploration of sag ponds in Bartow County. Finally, a report of a new whitetop pitcherplant site within the Americus city limits was verified. This showy pitcherplant occurs in two tiny wetland sites within utility corridors in Sumter County. Through efforts at the Atlanta Botanical Garden, hundreds of seedlings have been propagated over the years, but safeguarding in the wild remains problematic and one of our highest priorities.

Georgia aster Candidate Conservation Agreement signing (Cedric Mohr/GaDOT)



Coastal Habitat Conservation

Nongame Conservation Section biologists worked in an advisory role to help create management plans and guidelines for high-priority coastal lands. As part of the Little St. Simons Island Ecological Advisory Council, staff helped revise the island's Ecological Management Plan. Several maps were created for the plan, including revised landcover, priority species, elevation, infrastructure and Areas of Conservation Consideration maps. While serving on the Ecological Advisory Council, Nongame Conservation staff also helped make decisions concerning management and potential research projects on the island.

Staff worked, as well, on the Jekyll Island Deer Management Committee, which is charged with determining feasible methods to reduce the island's overpopulated deer herd. Committee decisions will be presented to the Jekyll Island Authority. Nongame Conservation biologists also helped Jekyll staff establish a long-term deer herbivory study to assess the impacts of deer on native vegetation in a variety of the island's habitats. Staff helped collect data in vegetation plots and aided with plant identification.

Staff also served on the Cannon's Point Preserve Conservation Task Force and provided technical support to that group, The Nature Conservancy and St. Simons Land Trust staff. This assistance included helping with the first annual monitoring of the Cannon's Point Preserve easement, making decisions about infrastructure and events held at the site, and making recommendations about long-term monitoring of natural resources and restoration projects.

A long-term vegetation monitoring project focused on *Muhlenbergia* dune grasslands on Little St. Simons continued this year. These grasslands are rare natural communities that provide critical habitat for island glass lizards, eastern diamondback rattlesnakes and other priority coastal species. Little St. Simons would like to maintain them as open grasslands and retain the current amount of wax myrtle shrub cover. The grasslands are being managed with prescribed fire. The goal of the monitoring project is to assess whether fire is a valid management tool for these grasslands and, if so, to determine how often prescribed burns can be used to manage

the habitats. Data collection during this period completed the second year of monitoring for the project. Nongame Conservation also helped lead a successful prescribed burn in this habitat.

Biologists continued a collaborative project with the DNR Coastal Resources Division to monitor salt marsh transects along the Georgia coast. Goals are to examine long-term change in Georgia salt marsh communities and determine the effects of sea-level rise on Georgia coastal habitats. Staff monitored vegetation plots along transects at nine sites. Transects start at an upland anchor point and continue into the salt marsh until reaching *Spartina alterniflora*-dominated marsh.

Also, a survey of rare calcareous hammocks on the Altamaha River was initiated. These undescribed hammocks in Toombs County contain vegetation associated with nutrient- and calcium-rich soils and are dominated by eastern redcedar, possumhaw, river oats and Cherokee sedge. Biologists will work with NatureServe staff to create an official National Vegetation Classification description of this rare natural community.

Coastal Wet Oak Flats Survey

A few years ago, the Nongame Conservation Section completed the Coastal Habitat Assessment project, which included natural community inventories and mapping for the Georgia coastal region. The next step is to collect information about some of the more unique and unfamiliar habitats that were mapped. As part of that effort, biologists are working to describe wet oak flats natural communities on the Georgia coast. Hundreds of these natural communities were mapped during the Coastal Habitat Assessment project, yet little is known about what species occupy them or whether they contain multiple distinct plant communities. This study is the first to formally describe these habitats in Georgia.

Wet oak flats communities occur on poorly drained flat areas on the coast and possibly other parts of the Coastal Plain. Their soils are saturated by rainfall and seasonally high water tables without influence of river or tidal flooding. Similar and



Coastal wet oak flat in Charlton County (Jacob Thompson/GaDNR)



overlapping natural communities have been described in nearby Florida (where they're called hydric hammocks) and North Carolina (nonriverine wet hardwood forest).

The vegetation of these habitats is unique. Because of their hydrology, an interesting mix of upland and wetland species often occurs. It is common to find red maple, willow oak, swamp chestnut oak and other typical wetland trees next to live oaks and pignut hickories. Nongame Conservation's survey found that calcareous and nutrient-rich examples can be quite diverse, including calciphilic plant life uncommon on the coast. Though fire is not typically an important process in these communities, one interesting example from Camden and Charlton counties includes longleaf pine, a fire-adapted species, in the canopy. Rare species found in these habitats include bottomland post oak, shiny spikegrass and green-fly orchid.

In summer 2014, Nongame Conservation biologists worked with private landowners to conduct 20 vegetation plots in these habitats from Camden to Chatham counties. Combined with previous work, nearly 40 plots have been completed, giving biologists a better picture of these threatened habitats in Georgia. Preliminary analysis revealed that four to five distinct wet oak flats natural communities exist on the Georgia coast. Biologists hope that a greater knowledge of these habitats will lead to an increased capacity to conserve and protect them.

Restoration of Mountain and Coastal Plain Bogs

Mountain bogs are one of the most critically endangered habitats of the Southern Appalachians. The bogs are typically small – from a half-acre to 5 acres – and usually associated with seeps, springs and small creeks. These early successional habitats support a variety of unique and imperiled flora and fauna, including the federally threatened bog turtle and swamp pink, possibly the state's rarest reptile and plant species, respectively. Other rare and state-protected mountain bog plants

include the montane purple pitcherplant, which is petitioned for federal listing, plus Carolina bog laurel, Canada burnet and Cuthbert's turtlehead.

For 22 years, the Nongame Conservation Section has worked to restore mountain bogs independently and as a member of the Georgia Plant Conservation Alliance. During the past year, efforts focused mostly on managing Georgia's eight restored mountain bogs (including conducting a prescribed fire in one bog) and gradually enlarging these bogs. Since beavers are no longer active in most bog restoration areas, extreme variations in precipitation during the last decade exposed weaknesses in some bogs' capacity to hold water. Management included microsite "hydro-engineering" to increase or maintain water retention in these bogs.

A cornerstone of the mountain bog restoration program is the propagation and outplanting of rare mountain bog plants. More than 5,000 individuals of five rare-plant species have been propagated during the last 20 years, with 1,000 outplanted (in situ) into appropriate habitats. The remaining plants are in conservation holdings (ex situ) at Georgia Plant Conservation Alliance gardens. Seedling recruitment has been documented for swamp pink and purple mountain pitcherplant at three restored bogs, including an F2 generation (i.e., grandchildren from the original planting) in at least one bog.

Georgia also has a new partner in mountain bog restoration, the Bog Learning Network. Modeled after the highly successful Fire Learning Network,



Ron Determann of Atlanta Botanical Garden and DNR's Tom Patrick during Bog Learning Network field trip (Gary Peeples/USFWS)

the Bog Learning Network is an association of state and federal agencies, non-governmental organizations, academicians, private consultants and land managers who have responsibility for or an interest in mountain bogs. The group's mission is to advance the stewardship and management of Southern Appalachian bogs by providing a forum for sharing information and resources. The creation of the network reflects a heightened regional interest in mountain bog conservation and restoration, an interest reflected in the proposal to create a mountain bogs national wildlife refuge. Nongame Conservation Section botanist Dr. Mincy Moffett Jr. serves on the Bog Learning Network's steering committee.

Also in fiscal 2014, "Georgia Outdoors" aired the episode "[Mountain Magic](#)," part of which focuses on mountain bog conservation and restoration efforts through the Nongame Conservation Section and the Georgia Plant Conservation Alliance.

In Georgia's Coastal Plain, great strides in prescribed fire were made at a high-priority private pitcherplant bog near Claxton. Granted the permission of three landowners, the burn was conducted during the growing season, a timing that is more effective for killing wetland woody shrubs and allowing for expansion of the habitat, which is restricted to a narrow portion of a powerline right of way. Photo monitoring indicated a solid die-back of wetland shrubs.

The prescribed burn marked the fifth that Interagency Burn Team partners conducted at the site in eight years. This success in private-public partnership for prescribed fire at the bog maintained and enhanced the habitat's outstanding floristic diversity, which includes Georgia's only known Coastal Plain population of purple pitcherplant. A site of this caliber is highly unusual for the state's Coastal Plain, where pitcherplant bogs are impacted drastically. Diligent attention to landowner-relations is partially responsible for the success of this project.

On the Black Creek Tract of Fall Line Sandhills WMA in Taylor County, a 1-acre sweet pitcherplant bog was cleared of shrubs and small trees by hand. This work enhanced habitat for rare eastern cottongrass. Further attempts to establish additional plants grown from seed will be attempted. Another smaller bog nearby was included in a prescribed burn that resulted in blooming of the small white-fringed orchid.

Habitat Improvement on State Lands and the Interagency Burn Team

Fiscal 2014 proved a banner year for habitat work on state lands. Besides two well-publicized success stories, [Bachman's sparrows breeding in restored habitats](#) at Joe Kurz WMA and [white-fringed orchids appearing after a prescribed fire](#) on Fall Line Sandhills WMA, there have been a number of lesser-known successes.

Many of these successes involved timber harvests tailored to meet habitat restoration objectives. Nearly 400 acres of offsite loblolly pine and a sand pine plantation were clearcut on Fall Line Sandhills WMA, clearing the way to replant longleaf pine with funding from The Longleaf Alliance and Arbor Day Foundation. About 200 acres of loblolly/longleaf plantation deep in the hills of Spirewell Bluff was thinned, removing most of the loblolly and releasing the longleaf –and longleaf groundcover – to thrive. Another nearly 400 acres of encroaching hardwood is planned for harvest from the rare Black Belt, or Blackland, prairies at Oaky Woods Wildlife Management Area near Perry.

These timber sales are removing unnatural tree encroachment from fire-dependent communities and releasing the all-important groundcover that drives populations of so many of Georgia's rare species.

Also this year, Nongame Conservation added a second seasonal fire crew, this one housed in west-central Georgia. The crew focused on prescribed burns in Georgia's Fall Line sandhills region and across Pine Mountain, as well as helping managers of the Chattahoochee National Forest on several large burns. These workers burned almost 14,000 acres in four months, including a 2,500-acre burn in one day around Spirewell Bluff WMA. When not burning, crew members took part in other restoration activities. They cleared sand pine from about 70 acres of Fall Line Sandhills WMA, doubled the size of the sweet pitcherplant bog on the WMA, girdled encroaching sweetgum on several hundred acres, installed more than a dozen gates and 800 feet of fencing to discourage illegal all-terrain vehicle activity on several properties, picked up about two-and-a-half tons of trash, and planted 35,000 longleaf pines.

Prescribed fire is vital to habitat restoration. The Nongame Conservation Section uses a variety of land-management techniques to improve rare species habitats on state lands, from removing invasive species to planting native species, and from thinning timber to prescribed burning. However, controlled burning remains the most effective tool for conserving and restoring fire-adapted habitats that support numerous species of conservation concern.

Prescribed fire is a safe and cost-effective way to employ a natural process to ensure ecosystem health and reduce the risk of wildfire. Working



DNR's Nathan Klaus with old longleaf on Spirewell Bluff (GaDNR)



with Interagency Burn Team partners and as suggested above, Nongame Conservation applied prescribed fire to many key habitats on state, federal and private lands in 2014. Burn team partners include the Georgia Forestry Commission, The Longleaf Alliance, The Nature Conservancy, The Orianne Society, the U.S. Forest Service and the U.S. Fish and Wildlife Service.

Department-wide, the acreage burned on DNR-managed lands during the last decade almost tripled – from 20,217 acres in 2005 to 57,555 acres in 2014. By land type, most of the acres burned are on wildlife management areas. But the increasing trend in burning also includes state-managed natural areas and state parks.

Nongame Conservation staff led or helped on prescribed burns totaling 27,150 acres in 2014.

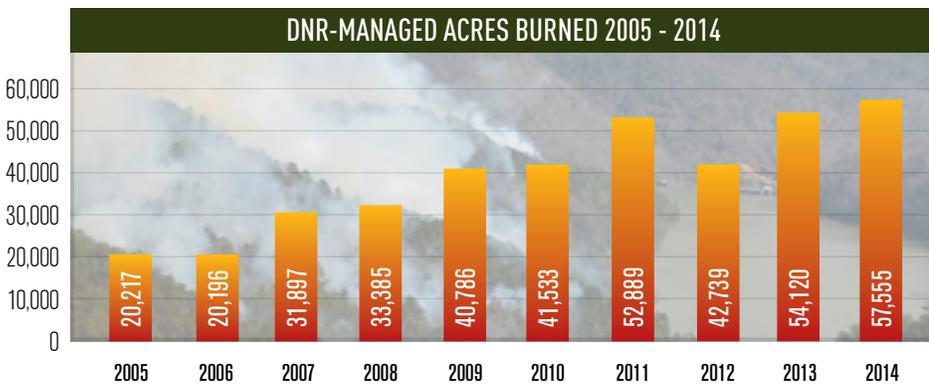
This work involved staff from other Georgia Wildlife Resources Division sections and DNR's State Parks and Historic Sites Division, as well as volunteers the Nongame Conservation trained to federal fire standards.

Volunteers are a valuable asset to the agency, both on the fireline and in training. And thanks to The Environmental Resources Network (TERN), friends group of the Nongame Conservation Section, volunteers were rewarded for their hard work and dedication with fireline gear provided through a TERN grant.

Seasonal fire crews carried out the bulk of burning in the dormant season. From 2009 until 2014, Nongame Conservation used one seasonal fire crew to help with prescribed fire throughout the state, and with growing success. The crew's dedicated efforts resulted in an increasing number of acres burned each year, and a record 9,913 acres in burned in 2013. As noted, this year, Nongame Conservation hired two seasonal fire crews – one housed in southeastern Georgia and the other in west-central Georgia. Working independently and cooperatively, the crews burned more than 12,000 acres each and 20,209 acres combined, more than double the acres burned by the crew since the year before.

In addition to the seasonal fire crews, Nongame Conservation burn crew members helped on fires with the Interagency Burn Team. The burn team also offered training opportunities for partners and conducted public outreach, with press releases, newspaper articles and outreach during burns on high-profile areas.

High-priority conservation sites treated with prescribed fire included state-owned lands such as Little Egg Island Bar, plus Broad River, Bullard Creek, Chickasawhatchee, Doerun, Fall Line Sandhills, Flat Tub, Griffin Ridge, Joe





Kurz, Mayhaw, Moody Forest, Ohoopsee Dunes, Oaky Woods, Penholoway Swamp, Silver Lake and Sprewell Bluff wildlife management areas, and, George L. Smith, Hard Labor Creek, Laura Walker, Little Ocmulgee, Seminole and Tallulah Gorge state parks.

Other prescribed burn sites included preserves owned and managed by The Nature Conservancy – Army Compatible Use Buffer program properties, Broxton Rocks, Heggie’s Rock, Moody Forest, Ohoopsee Dunes and Willams Bluffs. Private lands of significant ecological importance were burned, varying from montane longleaf tracts to aeolian dune sandhills full of rare plants and animals, as well as federal land in the Chattahoochee and Oconee national forests and Piedmont National Wildlife Refuge.

A wide variety of fire-dependent habitats were targeted for restoration, including aeolian dune sandhills with xeric longleaf pine/turkey oak, Coastal Plain pitcherplant bogs, Coosa flatwoods, Fall Line sandhills, longleaf pine flatwoods, longleaf pine/wiregrass woodlands, oak woodlands, native grasslands, pond pine/mixed shrub flatwoods and shortleaf pine/mixed oak

woodlands. Many high-priority species identified in the State Wildlife Action Plan benefitted from these restoration efforts.

As sites move from restoration to the maintenance phase, Nongame Conservation has been able to conduct more growing-season burns. These ecological burns have a profound impact on species, restoring the natural balance in fire-adapted ecosystems by reducing hardwood competition and increasing native grasses and forbs. DNR increased its growing-season burns from 151 acres in 2003 to a record 5,404 acres in 2014.

Georgia Plant Conservation Alliance

The Georgia Plant Conservation Alliance, or GPCA, is an innovative network of 36 public gardens, government agencies, academic institutions, utility companies and environmental organizations committed to preserving Georgia’s endangered flora. Formed in 1995 with the Nongame Conservation Section as a charter member, the Plant Conservation Alliance 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 for 80 imperiled plant species. Of these, 65 are in safeguarding programs at botanical gardens, arboreta and seed banks; 49 species have been successfully re-introduced into the wild.

GPCA contributions since the alliance’s inception amounted to an estimated \$1.35 million in direct and indirect support for plant conservation. More than \$1 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 the trained GPCA volunteer force known as botanical guardians: More than 140 volunteers contributed more than 2,200 hours of conservation work during calendar year 2013.

The development of a safeguarding database significantly enhanced GPCA’s plant conservation program. The database is designed to keep track of the ex-situ collections of all GPCA propagation partners, and the in-situ outplantings across the state. It contains inventory, location, monitoring and survivorship data, and is linked to an ArcGIS geospatial database complementing the Biotics and NatureServe databases. The safeguarding database is housed at Atlanta Botanical Garden and funded, in part, by the Nongame Conservation Section and other GPCA members.

The GPCA was an important contributor to the development of the Candidate Conservation Agreement for Georgia aster. This agreement between the U.S. Fish and Wildlife Service and other parties is designed to address the conservation and management needs of an at-risk species before it requires federal legal protection. Several GPCA member organizations are parties to the Georgia aster agreement, such as the DNR, while others serve as cooperators. The GPCA will help in implementing the conservation measures prescribed in the agreement, especially general site management, invasive species control, and propagation and enhancement of Georgia aster populations.

Other rare species benefited from safeguarding. These successes include species either flowering or fruiting for the first time, such as the Carolina bog laurel, or successfully recruiting a F2 generation (i.e., grandchildren) such as swamp



pink, a rare mountain bog plant. The state's most important dwarf sumac population, which is along the Broad River, responded to intensive management, bringing at least eight genotypes out of dormancy and increasing the above-ground stem count of the plant from two to about 750. Extensive ex-situ collections of pondberry and pond spice, both naturally rare from south Georgia depressional sandhill ponds and under new assault from laurel wilt disease, were established. Material from all 22 individuals of Georgia's rarest tree, the *Torreya* (restricted to the Apalachicola River ravines), as well as from 400 more genotypes from Florida, are in conservation collections in GPCA member institutions. Georgia rockcress, listed in 2014 as federally threatened, is being propagated in quantity with reintroductions ramping up in the Oostanaula River drainage. The smooth coneflower is moving into its seventh year of safeguarding and outplanting. Locating appropriate outplanting microsites for this species has been perfected and each year about 100 coneflowers are outplanted into restored habitat at Currahee Mountain.

Ginseng Management Program

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 this country by the U.S. Fish and Wildlife Service. The export of ginseng from Georgia is authorized by that agency in combination with the Georgia Ginseng Protection Act of 1979, a state law amended in 2013.

In order to have a legal ginseng trade in Georgia, the Fish and Wildlife Service requires Georgia 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 Nongame Conservation Section administers the Georgia Ginseng Management Program, which monitors harvest and sale of ginseng. Staff works with ginseng dealers, growers, the DNR Wildlife Resources Division's Game Management Section and DNR's Law Enforcement Division to make ginseng regulation a transparent and simple process.

The reported wild Georgia ginseng harvest in 2013 was 345.9 pounds dry weight. The 10-year average is 278.7 pounds. The reported harvest decreased by about 4.2 percent from the previous year's dry weight harvest of 361.1 pounds.

In 2013, Nongame Conservation worked with the Georgia Legislature to pass legislation moving the start of the state's harvest season from Aug. 15 to Sept. 1. This change was aimed at improving the sustainability of the ginseng harvest by allowing full ripening of the plants' fruit before harvest. Georgia's registered dealers worked with the agency in 2014 to implement the change in their procedures. Nongame Conservation puts a priority on maintaining good relationships with registered dealers.

The Ginseng Program receives no federal funding, and current resources do not allow for research on

how harvest affects the state's ginseng populations. Challenges include the lack of regular surveys of wild populations, and the illegal harvest, sale and export of ginseng. In 2014, a cable TV show on American ginseng trade increased public interest, some likely through misstatements about the value of the roots.

Most American ginseng harvested is exported to China. Georgia is at the southern edge of the distribution of ginseng and Georgia's ginseng trade is much smaller than in nearby states such as North Carolina and Kentucky. Ginseng exports there total millions of dollars a year. Over the Georgia Ginseng Program's 27 years, there has been an overall decline in harvest and trade.

Biotics Database Development

The Nongame 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: environmental site reviews, conservation planning, scientific research, habitat restoration and management plan development.

In 2014, a new version, Biotics 5, was implemented. The local Biotics 4 server was ported to cloud servers at NatureServe in Arlington, Va. Data is now accessed and updated using the Internet and a web browser.

The database contains more than 13,500 occurrence records for rare species in the state and provides web access to information on occurrences of special-concern species and significant natural communities. During 2014, Nongame Conservation staff added 755 records and edited 4,670 existing ones. Significant efforts were made to update information on species proposed for listing under the Endangered Species Act. Many species are under review, and updating database records helps with the process and allows for a more accurate review of species.

Staff also responded to 362 formal requests for data, not counting in-house environmental reviews or data obtained by the public through the website.

Lists of rare and protected plants, animals and natural communities are available at www.georgiawildlife.com/conservation/species-of-concern.

Private Land Activities

DNR's Dr. Jessica McGuire demonstrates a gopher tortoise burrow camera during a landowner field day in Camilla (GaDNR)



With about 93 percent of Georgia lands in private ownership, conservation activities on private lands are crucial to wildlife and natural communities in the state. The Nongame Conservation Section worked with private landowners throughout Georgia on a variety of conservation activities in fiscal year 2014 (also see "Land Acquisition, Easements and Conservation Planning").

Staff answered landowners' questions and visited sites to give management advice. Nongame Conservation also worked to make landowners aware of cost-share and grant opportunities and help them navigate procedures for using the programs. Examples include the Natural Resources Conservation Services' Environmental Quality Incentives, Conservation Stewardship and Working Lands for Wildlife programs, and the U.S. Fish and Wildlife Services' Partners for Wildlife Program.

Staff held a Pine Mountain Landowner Field Day. The tour gathered conservation-minded owners of significant properties on Pine Mountain to learn about options for forest management. Nongame Conservation also is working with the recently formed Northwest Georgia Working Group of the Talladega-Mountain Longleaf Pine Conservation Partnership. This partnership is focused on raising awareness about montane longleaf habitat among private landowners who have, or could have, such habitat.

The Nongame Conservation Section also provided threatened and endangered species training to loggers and others at quarterly Master Timber Harvester events around the state. The training includes a review of how timber harvesting affects wildlife habitat. Nongame staff served on the Sustainable Forestry Initiative Implementation Committee and its Private Landowner Outreach Subcommittee. Additional education activities included training sessions at Southeastern Wood Producers workshops.

Staff had a display at the Southeastern Wood Producers Association meeting at Jekyll Island. In addition to general outreach, the display was designed to inform attendees about how to protect gopher tortoise habitat and help prevent the need to federally list the tortoise under the Endangered Species Act.

Nongame Conservation also took part in Natural Resources Conservation Service State

Technical Committee meetings to identify wildlife conservation priorities relevant to Farm Bill programs for private landowners. Staff cooperated, as well, with the Game Management Section's Private Lands Program and the Natural Resources Conservation Service to coordinate four temporary biologist positions stationed at Natural Resources Conservation Service field offices in Blakely, Douglas, Swainsboro and McDonough. These biologists work with local landowners to implement National Resources Conservation Service programs aimed at restoring and managing longleaf pine systems, including the Working Lands for Wildlife initiative that targets gopher tortoises and addresses other conservation needs for priority species and habitats.

Along with Game Management and Parks personnel, staff also visited all DNR-held conservation easements to ensure compliance with easement terms and renew relations with landowners.

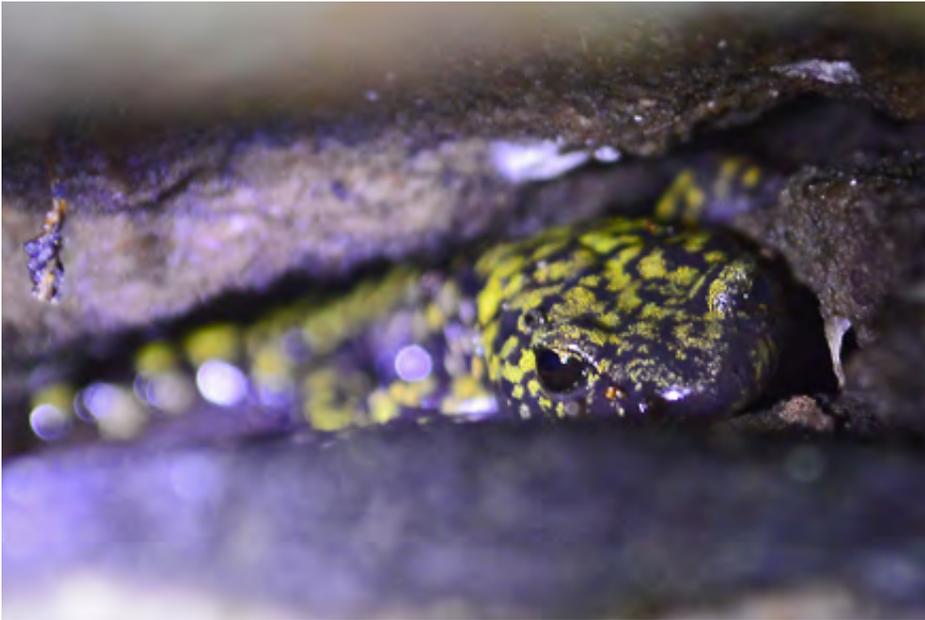
Forestry for Wildlife Partnership

The Nongame Conservation Section plays a strong role in the DNR Wildlife Resources Division's Forestry for Wildlife Partnership. This voluntary program encourages conservation of wildlife habitat on corporate forestlands in Georgia and provides public access to privately owned wildlife management areas for hunting, fishing, wildlife viewing, hiking and camping.

Swallow-tailed kite (Todd Schneider/GaDNR)



Private Lands



Corporations participating in Forestry for Wildlife are among the largest landowners in Georgia, directly affecting wildlife habitat on more than 974,000 acres.

Coordinated by Nongame Conservation and Game Management Section biologists, this public-private partnership provides opportunities to enhance wildlife conservation practices on these lands and benefit companies with public recognition for their conservation achievements. Companies are evaluated on wildlife conservation planning, education and outreach, management practices, sensitive sites and rare-species concerns, recreation, and partnerships.

Plum Creek, Georgia Power and CatchMark Timber Trust were the Forestry for Wildlife partners for 2013.

Forestry for Wildlife conservation targets include red-cockaded woodpecker habitats, bald eagle and swallow-tailed kite nests, isolated wetlands critical to protected reptiles and amphibians, and rare remnant Coosa Valley prairies, home to endangered plants. The partnerships also provide the public with many opportunities to enjoy the outdoors through wildlife viewing, hunting and fishing. All partners are committed to the Sustainable Forestry Initiative, ensuring that their forest managers and loggers have completed the Master Timber Harvester workshop and continue their education to maintain certification or designation.

Highlights of the companies' conservation work during fiscal 2014 included the following:

Plum Creek is engaged in gopher tortoise conservation. Recent surveys conducted by the Nongame Conservation Section on Plum Creek lands are helping quantify the value of working forests to species conservation. Plum Creek partnered with DNR, the U.S. Fish and Wildlife Service and other large forest landowners to investigate opportunities to maintain and enhance habitat conditions for the gopher tortoise across the landscape.

Company holdings in northwest Georgia include a federally endangered gray bat colony. Also, Nongame Conservation found that some sandstone cliffs on Plum Creek lands in the southern Ridge and Valley Region harbor green salamanders, a rare species in Georgia. Plum Creek continued working, as well, with The Nature Conservancy to manage the Coosa Valley prairies, a calcareous prairie system that supports a unique assemblage of rare plants, including the federally endangered whorled sunflower. The company allowed universities access to conduct research on this unique natural system, which is protected by a conservation easement held by The Nature Conservancy.

In coastal counties, Plum Creek teams with Nongame Conservation on projects including managing habitat for Henslow's sparrows and protecting swallow-tailed kite nesting areas. In the Piedmont, Plum Creek is continuing efforts to increase populations of mat-forming quillwort, a federally endangered plant species endemic to granite outcrops in central Georgia.

The company is also entering a new phase in the montane longleaf habitat restoration project coordinated by Nongame Conservation on Pine Mountain. Longleaf pines planted in 2010 were included in a large-scale prescribed burn led by the agency's staff in spring 2014. Fire is an important component of this natural ecosystem.

Georgia Power supports an active prescribed fire program, burning more than 5,000 acres a year, and participates in DNR's Safe Harbor program for red-cockaded woodpeckers. The company worked with The Nature Conservancy and other partners to establish a test plot for federally endangered hairy rattlesnake on a Georgia Power right of way. Overall, company powerlines and rights of way are home to nine federally listed plant species. Designated as special management areas, activities can be restricted in these rights of way.

Along with eight other partners, Georgia Power signed a Candidate Conservation Agreement for Georgia aster. This agreement will help protect the plant and its ecosystem, and in part because of the agreement, the Fish and Wildlife Service has decided that the species does not need to be listed under the Endangered Species Act.

Georgia Power also installed osprey nest platforms for the U.S. Army Corps of Engineers on Lake Allatoona. The company has partnered with the corps for a number of years to install nest platforms on their reservoirs.

CatchMark Timber Trust continues to work with the Fish and Wildlife Service to protect habitat for endangered fringed campion on company lands in Talbot County. The company also is thinning and burning pine plantations to allow native understory plants to grow and benefit wildlife.

CatchMark did not convert any bottomland hardwood forests during the recent reporting period, and continues to monitor and treat invasive species on company lands, use portable bridges to minimize the impact on stream crossings and work to restore longleaf pine to sandhill habitats.

The company also sponsors an Outdoors Without Limits hunt, providing outdoor recreation opportunities for people with physical or mental disabilities.

Army Compatible Use Buffer Conservation

The Army Compatible Use Buffer program, often called ACUB, is focused on protecting priority conservation lands around military installations from development that would restrict key military activities such as training. This buffering is provided primarily through permanent conservation easements. In recent years, the Nongame Conservation Section has joined with Fort Stewart and others to conserve critical lands in the Fort Stewart/Hunter Army Airfield area, including some of the best habitat for rare eastern indigo snakes in Georgia.

Nongame Conservation also is involved with the Chattahoochee Fall Line Conservation Partnership, which is geared toward conserving lands along the eastern edge of Fort Benning. Staff involvement included partnering with land management activities to enhance gopher tortoise habitat, serving on the group's steering committee and supporting efforts to bring more tracts under conservation ownership and management.

The recently opened Chattahoochee Fall Line Wildlife Management Area, which includes the Fort Perry Tract in Marion County and the Almo Tract in Marion and Talbot counties, is an example of this partnership effort, which helps the Army with its mission, protects rare species and provides opportunities for public recreation.

Community Wildlife Project

The Community Wildlife Project, an award-winning initiative of the Nongame Conservation Section and the Garden Club of Georgia, seeks to:

- Enhance native nongame animal and plant populations and their habitats in urban, suburban and rural communities throughout the state.
- Foster wildlife conservation stewardship and education in Georgia communities.
- Promote respect and appreciation of wildlife in combination with community beautification.

- Improve 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 various stages of completing certification standards. Since 2005, the new Backyard Wildlife Certification survey has added about 2,700 certified backyards, 500 of which were certified with two or more adjoining neighbors' backyards to attain a Neighborhood Backyard Certification.

In summer 2013, the Hummingbird Haven Certification program was created with a focus on attracting hummingbirds to yards. About 80 applicants have been certified, with more coming in weekly.

The program also helps Nongame Conservation build constituency through the 9,000-member Garden Club of Georgia via backyard habitat informational programs at the state, regional and local levels.



Northern cardinal (Todd Schneider/GaDNR)

Georgia's State Wildlife Action Plan emphasizes the need for increasing efforts to detect, monitor and control invasive species in order to conserve native wildlife and their habitats. Invasive species have negative impacts on native species and are noted for being one of the greatest threats to biodiversity. Effective control and treatment of invasive species can have positive cascading effects for many species and ecosystem services.

Following completion of the Georgia Invasive Species Strategy in 2009, the Nongame Conservation Section sought State Wildlife Grants funding to implement invasive species assessment and management programs, with a focus on the coastal region. The current project is focused on enhancing methods for assessing and controlling invasive nonnative species on public and other conservation lands. A second objective is providing

land managers better technical and informational resources to help control invasive species. A third objective is promoting appropriate use of native plant species by public and private land managers.

During fiscal year 2014, Nongame Conservation staff funded by this grant:

- Continued a multi-year control project to eradicate common reed from the Altamaha River delta. New sites were found this year and will be added to the control program.
- Coordinated an annual volunteer pull of water hyacinth, working with the Altamaha "coastkeeper" in the Altamaha River and the Satilla Riverkeeper on the Satilla.
- Brought together representatives from state, federal and county agencies, non-profit

organizations, and citizen groups for the third annual meeting of the Coastal Georgia Cooperative Invasive Species Management Area, or CISMA, for Georgia's coastal region. Participants shared their invasive species management projects over the past year.

- Used National Fish and Wildlife Foundation funding to support a co-coordinator for the Coastal Georgia CISMA, hire two Student Conservation Association interns and buy herbicide and field supplies for control and monitoring work.
- Supervised by Nongame Conservation and partially funded by The Nature Conservancy, the Student Conservation Association spent 15 weeks this summer helping partners in the 11-county area complete invasive species projects to achieve management goals. Partners

Invasive Species Assessment and Management

An aerial photograph of a coastal wetland area. The landscape is a mix of green marsh grasses and blue water channels. In the lower-left foreground, a small motorboat is moving through a narrow waterway, leaving a white wake. The background shows a flat expanse of wetland stretching towards a distant horizon under a clear sky.



included DNR Game, Nongame and Fisheries management sections, DNR State Parks and Historic Sites, The St. Simons Land Trust, Jekyll Island Authority, Sapelo Island National Estuarine Research Reserve, Savannah Tree Foundation, U.S. Fish and Wildlife Service, The Nature Conservancy, Little St. Simons Island, Satilla Riverkeeper and Coastal WildScapes.

- Confirmed the discovery by one of the interns of the first sighting of Brazilian pepper in Georgia, on Jekyll Island. As an example of an Early Detection and Rapid Response, Nongame Conservation, the Georgia Forestry Commission, Jekyll Island Authority and the First Coast Invasive Working Group determined a course of action and the site was treated within a week of the report. Monitoring will continue until eradication is achieved.
- Worked with a College of Coastal Georgia intern on a project to map invasive salt cedar in the coast's six counties using remote sensing and field verification and accuracy assessment.
- Monitored invasive species treatment plots in areas of Sapelo and Ossabaw islands infested with Chinese tallow to measure the effectiveness of control methods and recovery of the natural communities.
- Held citizen science programs in the Brunswick and Savannah areas to teach people how to identify and map locations of invasive species in coastal Georgia using EDDMapS, the Early Detection and Distribution Mapping System developed by the UGA Center for Invasive Species and Ecosystem Health.

- Worked with Coastal Wildscapes, a nonprofit group that promotes gardening with natives, to increase volunteer opportunities in collecting native seed and identifying and removing invasive species. In addition, staff worked with the Jekyll Island Authority to grow native plants from seeds collected by volunteers and offer the plants to the public at two plant sales.
- Worked with residents in Kingsland and Pooler on awareness, assessment and removal of invasive apple snails.
- Continued work with the Cannon's Point Conservation Task Force to manage invasive species according to the management plan for this St. Simons Island preserve.

- Held three volunteer work days to help Coastal Wildscapes and the city of Midway remove Chinese tallow and Japanese honeysuckle from the Cay Creek Wetlands Interpretive Center.
- Worked with the First Coast Invasive Working Group in northeast Florida to collaborate on detection of novel invasive species in the north Florida/south Georgia coastal region.

In separate work involving invasive species, Nongame Conservation staff monitored and treated Japanese climbing fern and crotalaria on 500 acres at Silver Lake Wildlife Management Area in southwest Georgia.



During 2013-2014, DNR Law Enforcement Division rangers conducted 41 commercial trawling boardings along Georgia's coast to check for compliance with turtle excluder device, or TED, regulations. During the boardings, rangers issued 12 state warnings and seven citations for TED violations under the Endangered Species Act.

The TED checks were part of 529 hours the Law Enforcement Division spent at sea in fiscal 2014. Activities also included 69 hours patrolling for violations of laws protecting North Atlantic right whales and 78 hours at Gray's Reef National Marine Sanctuary. Three federal warnings were given for feeding dolphins. Rangers also made 75 contacts with recreational boaters and 19 with commercial boaters in reference to marine mammal protection laws and regulations.

Vessel patrol hours focused on:

- Checking shrimp trawlers 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.

In addition to this and other Law Enforcement Division work involving nongame wildlife, Sgt. David Ruddell started an investigation on March 29 that led to a conviction in the shooting of a wood stork.

Ruddell spotted the dead bird in a pickup truck while patrolling by foot in Thomas County during

turkey season. Helped by former Ranger Chris Carlisle, Ruddell tracked down the suspect, who said he shot the stork the day before to "sight in his rifle." (At the time, wood storks were listed as an endangered species under the Endangered Species Act. The U.S. Fish and Wildlife Service announced in June it would down-list the species to threatened.)

The suspect pleaded guilty to taking a protected species and was fined in the county's probate court.

In Hart County, Cpl. Craig Fulghum cited a suspect for killing a red-tailed hawk with a .22 rifle. And in Walton County, a Gwinnett County man was sentenced to 120 days in jail after a ranger discovered him trying to sell juvenile diamondback terrapins, a protected species, on Craigslist.

Law Enforcement for Nongame



Dot Kay leads a teacher workshop at McDuffie Environmental Education Center (Watson Brown)

Regional Education Centers

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

Throughout its history, the Wildlife Resources Division has educated the state's youth and families to increase awareness, engagement and stewardship regarding Georgia habitats, wildlife and natural resources. These education efforts began when Charlie Elliott, first director of what is now Georgia DNR, started the Junior

Ranger Program in 1940. Children in the program conducted nature surveys, planted wildlife food crops and helped "senior rangers." In its first year, more than 25,000 children became involved in learning and practicing conservation.

Elliott's vision of a conservation education program continues today through the Wildlife Resources Division's seven regional education centers, as well as the continuation of the Junior Ranger Program in DNR's State Parks & Historic Sites Division. As growth and development increasingly require stewardship and conservation, the need for wildlife education is paramount.

The Wildlife Resources Division operates the regional education centers in partnership with local school systems, Regional Educational Service Agencies and other state and federal agencies to deliver wildlife-based education to students,

adults and families. The centers are Charlie Elliott Wildlife Center near Mansfield, the Go Fish Education Center in Perry, Smithgall Woods near Helen, McDuffie Environmental Education Center near Dearing, Arrowhead Environmental Education Center near Armuchee, Grand Bay near Valdosta and Sapelo Island National Estuarine Research Reserve.

Visitors learn about natural and cultural resources through hands-on experiences. More than 119,000 students and adults visited the centers in fiscal year 2014.

Highlights included:

Charlie Elliott Wildlife Center held numerous programs for teachers and students. The teacher workshops are part of Project WILD, an interdisciplinary curriculum that trains teachers

to teach wildlife and conservation while covering curriculum standards in math, reading and science. As evidence of the program's success, Project WILD trained 643 teachers last year.

Staff offered 30 one-day workshops, including basic Project WILD educator workshops, Growing Up WILD workshops targeting early childhood teachers and Flying WILD workshops that reach middle school teachers. Project WILD staff also conducted two week-long advanced programs for teachers. The Teacher Conservation Workshop, a partnership with Project Learning Tree and Project WET, is held each June for up to 30 educators from around the state. Teachers travel throughout Georgia learning about forests, wetlands and wildlife.

Project WILD also continued its Outdoor Wildlife Leadership School. Due to the popularity of this program, a new schedule was developed this year, allowing educators who had attended previous Outdoor Wildlife Leadership programs to return and learn about different wildlife habitats. Participants visited caves in north Georgia, climbed Panola Mountain and learned about bears in middle Georgia.

Charlie Elliott Wildlife Center's Hunt and Learn program, started in 2011, expanded this year. Nine programs were offered in fiscal 2014 at Charlie Elliott. Those events will be continued, with two added at a new wildlife management area near Columbus. Also, the National Wild Turkey Federation began offering a Hunt and Learn program on the coast. The federation modeled its program after Charlie Elliott's and plans to increase the number of Hunt and Learn programs it conducts. Hunt and Learn teaches children hunting skills and conservation knowledge. The program is part of a Wildlife Resources Division effort that, including Shooting Sports and Hunter Education, served more than 40,000 people in 2014. Hunt and Learn programs teach hunting skills for deer, squirrels, turkeys, quail and rabbits.

Charlie Elliott Wildlife Center also offered outreach, day-use and residential programs for schools as well as summer camps that taught wildlife and shooting sports to Georgia's youth. These programs reached nearly 36,000 students last year. One parent thanked staff, writing that her son "often mentions activities he participated in or things he learned at Shooting Sports or ACE camp. And just the other day, (he) told me he thinks he wants to

work for DNR one day! Thanks again for providing such excellent programs... What a positive impact DNR summer camps are having on the education and development of young people."

Smithgall Woods' education department continued to offer a variety of onsite and outreach programs for students and adults. During the fall and spring semesters, approximately 23,000 students from adjacent counties to as far away as Jacksonville, Fla., participated in 713 programs that highlighted the beauty and resources at Smithgall Woods.

Demand was high for "in-school field trips" during the 2013-2014 school year. Through word of mouth, new contacts in several counties were added, boosting outreach numbers to more than 20,000 students and adults. "Snakes Alive" remained the most requested program, with "Animal Adaptations" running a close second. Outreach remains the mainstay for the education department, accounting for 87 percent of students reached during the recent year.

Sheila Humphrey, Smithgall Woods' wildlife interpretive specialist, was the guest speaker at the Rabun Chapter of Trout Unlimited's Rabun Rendezvous in February. Her presentation showcased the educational activities made possible by the sponsorship of Georgia Trout Unlimited chapters' Tie One On, an annual event. Outreach numbers grew by 14 percent due to increased participation by schools in the additional five counties sponsored by Trout Unlimited. In an effort to enhance educational opportunities for youth, the Georgia Council of Trout Unlimited donated substantially more scholarship money to Humphrey for the upcoming year to provide free outreach to seven counties surrounding Smithgall Woods Education Center.

At **Arrowhead Environmental Education Center**, whether displaying an alligator to discuss adaptations, a king snake to talk about the food web or green treefrogs to teach life cycles, the center's teachers tailor their lessons to Georgia's educational standards. During the 2013-14 school year, students of all ages visited Arrowhead on field trips, studying the collection of live Georgia snakes, turtles, frogs and fish, plus mounted specimens. They walked through beaver ruins, by streams and through woods to observe the life cycles, habitats and food chains they study at school. Also, in

hundreds of outreach lessons, Arrowhead teachers went to area schools, bringing live animals and lessons to reinforce the standards. In addition, Arrowhead presented programs and displays at public festivals and events.

A total of 21,248 children and adults learned more about the natural systems of Georgia in 2013-2014 through the work of the center, a partnership between DNR and Floyd County Schools. Arrowhead's three teachers conducted the outreach programs and field trip lessons for pre-K through 12th-graders, and also provided displays and programs for public events to teach about Georgia's environment, habitats and wildlife.

For the 12th consecutive year, Floyd County students participated in the DNR Fisheries Management Section project to restore lake sturgeon in the Coosa River Basin. Students look forward to the sturgeon release each year, and the outreach provides a hands-on opportunity for them to learn about Georgia's river systems.

Arrowhead also presented programs and exhibits at local events. A portion of the proceeds from the Coosa Valley Trout Unlimited's Chili Cook-off were donated to the center. Arrowhead also presented at the annual Trout Unlimited Trout Expo; coordinated an exhibit including storytelling, live animal displays and an educational scavenger hunt at DNR's annual Outdoor Adventure Day; and, provided a popular display of animals, mounts and skins at Waterfest, an annual Coosa River Basin celebration.

The program at Arrowhead continued to grow, as well. Berry College, which has long aided the center through its annual Service Day, became an even more important supporter through the college's Bonner Scholar program and involvement of Berry's education department. Five Bonner Scholars volunteered 797 hours at the center. Berry education majors visited Arrowhead to learn how to incorporate environmental education in the classroom, and Arrowhead teachers taught in college classes about using the environment as a context for learning.

In other changes, Ducks Unlimited moved its annual Green Wings outdoor education day to the center, bringing about 200 children and adults to explore the exhibits, wetlands and woods.

Grand Bay Wetland Education Center, a partnership between DNR and Coastal Plains

Regional Educational Services Agency, maintained a full schedule this year. During the 2013-2014 school year, 9,794 students and adults attended day classes at the center. With the support of superintendents, principals, teachers and parents in 12 school districts, Grand Bay filled its scheduling calendar for the school year in one week.

While the busy schedule and limited staff do not allow for outreach programs during the school year, Grand Bay had a full summer program in 2014, both at Valdosta State University and with day camps. About 300 children attended Science Saturday at Valdosta State University. Approximately 500 from the Lowndes County Boys and Girls Club, Sheriff's Boys Ranch and the DARE program attended camps featuring lessons on mammals, birds, reptiles, amphibians and fish found in south Georgia, as well as local plant communities and current environmental issues. All activities met Georgia Performance Standards.

Sapelo Island National Estuarine Research Reserve Education Program

offered a wide range of environmental educational programming during 2013-2014. K-12th grade and college-level programs were held on-site and in local schools and universities. School programs were offered two days a week, with a limit of 40 participants per program due to ferry constraints. In all, 1,195 students varying from elementary schools to universities were represented.

Sapelo Research Reserve partnered with the U.S. Navy and the Center for Sustainable Communities to offer a high school STEM, or Science, Technology, Engineering and Math, program for two local schools. The reserve also partnered with The Nature Conservancy to play host to Leaders in Environmental Action for the Future students. During this period, the reserve initiated its remote learning program to a middle school in North Carolina using webcams to educate students about Sapelo's ecosystems.

The Sapelo Island education program also sponsored or partnered with other institutions to train 184 teachers through 11 teacher workshops. The reserve helped sponsor the annual Georgia Association of Marine Educators conference, reaching an additional 45 teachers. Program partners included Georgia Southern University, Gray's Reef, Georgia Association of Marine Educators, the University of Georgia Marine

Institute and Georgia Coastal Ecosystems Long Term Ecological Research project, and UGA's Marine Extension Service. These teacher workshops focused on coastal ecosystems and issues, as well as science, technology, engineering and math.

In addition to student and teacher educational programming, Sapelo Research Reserve accommodated many special-interest groups on the island, including 400 participants joining in the national Road Scholar program and another 168 special-interest participants during this period.

The reserve also offered a variety of programming to the general public, such as regularly scheduled public tours, public outreach events and a lecture series highlighting current coastal issues and Georgia's rich coastal ecosystems.

McDuffie Environmental Education Center

continues to improve its mission to promote appreciation for the natural world. Several activities were introduced this year and have become part of the center's regular curriculum. "The Woods at McDuffie" is a puppet show in which elementary students act as animals. Older elementary students can now practice math skills by collecting data while casting at fish targets. One of the most popular new activities introduces kindergarten students to the world of earthworms.

With the acquisition of a Georgia Natural Resources Foundation grant, fisheries staff and volunteers built another 110 feet of boardwalk on the Blackwater Creek Swamp Trail. The additional boardwalk provides increased safety for students and teachers, keeping them off eroded areas, which also means less impact on the wetland. Entrances to the new walks were graveled and some minor pruning was done to widen the trail where the wetland had started to encroach. Signs and talking boxes were relocated to provide for a more educational experience for visitors to McDuffie Public Fishing Area who hike the trail. The greatest impact of the additional boardwalk is that the entire trail is once again accessible to people with disabilities.

By relocating and reconfiguring existing resources at McDuffie Environmental Education Center, a new outdoor teaching area was created at the entrance to the Longleaf Pine Trail. Recent controlled burns in the area opened up the woods and the trail itself. This area enables staff to have students

seated for instruction before their hike, offers a resting and gathering point after the hike, and provides an additional teaching area.

Another highlight at McDuffie: The Environmental Education Alliance of Georgia named Dot Kay, education coordinator at the center, the state's PreK-16 Formal Educator of the Year.

The Go Fish Education Center provides quality on-site environmental education programs focused on aquatic resource education and conservation.

During 2013-14, students from preschool to college levels took part in unique activities that met Georgia Performance Standards and creatively used classroom presentations, aquarium tours and the center's hunting and fishing simulators. Customized programs on water resources, the economic impacts of freshwater fishing in Georgia and fish dissection were designed for middle school students. Classes in LEED, or Leadership in Energy & Environmental Design, building design at local colleges visit each year to study the Go Fish Education Center.

The 2013-14 school year brought an additional 21 new schools, increasing the center's student count from 4,890 to 6,290. With 22 fishing programs, Go Fish had 1,137 children and 365 adult participants.

2014-15 will include on-site school field trips and two monthly homeschool program sessions, the latter thanks to increased popularity. In support of statewide free fishing days, the center scheduled Pond to Plate, a family festival first that included how-to sessions on casting, cleaning fish and knot-tying. A first-time summer day camp called "Young Anglers" also was offered.

Go Fish continues to receive and judge state entries for the annual State Fish Art Contest sponsored by Wildlife Forever. Georgia finalists, along with other selected artwork, are also displayed at the center. One Georgia finalist was picked as a national winner.

Youth Birding Competition

Participants in the 2014 Youth Birding Competition set records for the most bird species seen or heard since the Nongame Conservation

Section began the competition nine years ago. Twenty-four teams signed up, underscoring the popularity of this event which is promoting birding and conservation among young Georgians.

Eight teams counted more than 100 species, and two high school teams topped the previous contest high. Flutter Brothers, the overall winner, had 162 species and Chaotic Kestrels had 156.

Coordinator Tim Keyes, a wildlife biologist with Nongame Conservation, said that for the first time in several years the timing of tides on both the evening and morning of the event allowed several teams to see many shorebirds and seabirds.

For this 24-hour birding contest held each spring, teams of pre-K through 12th-grade birders representing schools, Scout troops, science clubs and other groups compete with teams their age to identify as many bird species as they can in the state.

During the 2014 competition, young birders from pre-school ages to teens raised almost \$2,600 for conservation projects throughout the state. In addition, the event's T-shirt Art Contest attracted 121 drawings and paintings of native Georgia birds. A yellow-rumped warbler drawn and painted by Angus Pritchard, 14, an eighth-grader from Decatur and member of the Chaotic Kestrels birding team, proved the grand-prize winner and adorned the competition's T-shirts.

And in a move that will only enhance the positive impact, the Youth Birding Competition inspired the creation of [Race 4 Birds Foundation](#), a nonprofit focused on promoting birding among youth nationwide. Powered in part by leaders such as international birding author Richard Crossley, Race 4 Birds offers guidance and other resources groups can use to organize youth birding competitions at local and larger levels.

Keyes is a foundation director, serving along with a handful of other Georgians in leadership or advisory roles.

The Youth Birding Competition is sponsored by The Environmental Resources Network (TERN), Audubon Society, Georgia Ornithological Society and others.

A first-place poster in the Give Wildlife a Chance poster contest (Linda May/GaDNR)



Give Wildlife a Chance Poster Contest

Kindergarten through fifth-grade students submitted nearly 2,500 posters for the 2014 Give Wildlife a Chance Poster Contest, almost 700 posters more than the previous year. This annual event has successfully encouraged students to explore the wonders of Georgia's native plant and animal species through art for 24 years. Fifth-graders from 21 public schools, private schools and homeschool groups took part in 2014, taking to heart the event's theme "Plug into Nature."

DNR's Tim Keyes and Youth Birding Competition team the 007s (Linda May/GaDNR)



The posters of state-level contest winners were displayed at the Go Fish Education Center in Perry and posted on the Wildlife Resources Division's [Flickr site](#).

The contest is organized and sponsored by DNR, The State Botanical Garden of Georgia and The Environmental Resources Network, or TERN.

Social Media

The DNR Wildlife Resources Division's social media sites – Facebook, Twitter, Flickr, YouTube, Instagram and a blog – grew in popularity, spreading awareness of conservation and the division's work. Facebook recorded 44,076 likes through June 2014, the end of the fiscal year. Twitter had 3,773 followers and the YouTube channel amassed 175,298 views all-time and 644 subscribers.

The division's blog, which has a conservation-specific section, registered 101,698 views, and a new outreach, Instagram, attracted 525 followers.

Public Affairs communications and outreach specialist David Allen produced a number of videos on nongame-related topics, including one of the [sampling survey for alligator snapping turtles](#) on the Flint River and another of [DNR prescribed fire efforts](#). Video of a dolphin rescue shot by Nongame Conservation biologist Clay George was picked up by [GrindTV](#), which is associated with Yahoo! Sports. Also, photos and video of a partially successful

attempt by Nongame Conservation Section and Florida Fish and Wildlife Conservation Commission biologists to disentangle a North Atlantic right whale circulated worldwide among outlets as varied as [Sky TV](#), [The Huffington Post](#) and the Irish Examiner.

The nongame e-newsletter Georgia Wild increased its circulation nearly 25 percent to more than 20,500 subscribers. The newsletter is an effective platform for delivering nongame news and raising awareness. A survey of readers in August 2013 revealed, among other things, that 65 percent of respondents first learned from the e-news that the Nongame Conservation Section receives no state funds to conserve nongame. Also, 77-88 percent said the newsletter spurred them to learn more or tell others about wildlife species or issues.

Newsletter features and videos are cross-promoted on the division's social media sites, increasing the size of the audience and potential impact of the conservation information.

The online ventures and the e-newsletter not only broaden the reach of the Nongame Conservation communications, they enhance interactivity and customer service.

Promoting Awareness

Beyond youth contests and social media, the Nongame Conservation Section promotes awareness of nongame wildlife and issues in a



Berry College's nest cam captures eagles weathering snow

wide range of ways – speaking to civic groups, informing lawmakers on rare species, showing videographers research in the field and working in other conservation organizations, to name a few.

In 2014, the agency staffed events varying from CoastFest in Brunswick and the Rattlesnake & Wildlife Festival in Claxton to the Georgia Association of Tax Officials' spring conference in Athens and the Georgia Envirothon at the University of Georgia's Griffin campus. Employees provided interviews on wildlife to media outlets including Savannah Morning News, The Atlanta Journal and Constitution, The Augusta Chronicle, Georgia Public Broadcasting and The Associated Press.

And in other outreach examples:

- Public Affairs staff worked with Berry College to promote the school's bald eagle nest camera. This live-streaming camera drew millions of views – more than 3 million to the [Wildlife Resources Division website](#) alone – through spring 2014. Berry College shared the video stream for use on the division website, which in turn pointed viewers to ways to support conservation of eagles and other nongame. Agency staff also coordinated [DNR's peregrine falcons nest cam](#), which had a successful but short season – 112,000 views in a month – as the falcons at Atlanta's SunTrust Plaza switched nest sites twice.
- Anna Yellin, Nongame Conservation's environmental review coordinator, and Environmental Outreach Coordinator Linda May organized and awarded a \$1,000 grant to Athens science teacher Steven King as part of a TERN-sponsored grant to recognize Georgia's exceptional third- through fifth-grade teachers in life sciences. The program continued in fiscal 2015.
- Nongame Conservation biologists on the coast gave talks on invasive species assessment and management to garden clubs, pesticide certification classes, Coastal Wildscapes, the Georgia Exotic Pest Plant Council and others. Staff also worked with "Georgia Outdoors" and host Sharon Collins on an invasive species episode dubbed "[Invaders](#)."
- Biologists worked with other producers and media outlets, as well. Thomas Floyd's work with hellbenders appeared on the award-

DNR's Linda May with elementary school students in Stockbridge (Michelle Nesbitt)



winning Daily Planet episode “Searching for Hellbenders” – aired by Discovery Channel – and in National Geographic. Dr. Mincy Moffett Jr. was part of the Blue Ridge episode “Mountain Magic” on Georgia Public Broadcasting’s “Georgia Outdoors.”

- Moffett and Floyd helped organize a meeting of the Bog Learning Network in May in northeast Georgia. The network works to advance stewardship and management of mountain bogs, an endangered southern Appalachian habitat.
- Staff also led in other conservation groups and efforts. Shan Cammack was nominated chair-elect of the Georgia Prescribed Fire Council, which is engaged in advocacy statewide for prescribed fire. Nongame Conservation’s Greg Krakow and Dr. Brett Albanese helped coordinate a webinar on the agency’s species status mapping project, aimed at developing a consistent method for assessing the conservation status of rare species for state wildlife action plans and for species considered for federal listing.
- Nongame Program Manager Jason Lee worked with DNR’s Coastal Resources Division, coastal counties and local and federal agencies to produce an aerial imagery dataset of coastal Georgia that offers the most high-resolution look yet at the region and can be used for everything from county planning to wildlife conservation. The orthoimagery is available at NOAA’s [Digital Coast website](#).
- Many biologists wrote popular articles– such as Katrina Morris’ blog post on the monitoring season for [white-nose syndrome in Georgia’s bats](#) – and published research, including Program Manager Matt Elliott co-authoring a Herpetological Conservation and Biology paper on the distribution of eastern indigo snakes and senior wildlife biologist John Jensen co-authoring a Canadian Journal of Zoology article on cave temperatures and lungless salamander abundance.
- In the 2014 Georgia Legislature, DNR staff provided key information on Senate Bill 322, which – since passed and signed into law – makes it illegal to use gasoline or other chemicals to drive rattlesnakes from gopher tortoise burrows, a practice that threatens tortoises and the many other creatures that use the burrows.

DNR’s Ashley Raybould shows an eastern indigo snake to CoastFest visitors (Linda May/GaDNR)



DNR’s Dr. Jessica McGuire and Kim Kilgore with actor John Schneider at Claxton Rattlesnake and Wildlife Festival (GaDNR)

The DNR Real Estate Office acquired 17,501 acres for conservation and public recreational purposes in 2014. These projects conserve priority habitats identified in Georgia's State Wildlife Action Plan. They included additions to the following wildlife management areas: 1,175 acres at Penholoway Swamp WMA in Wayne County; two tracts totaling 705 acres at Crockford-Pigeon Mountain WMA in Walker County; 1,902 acres at Flat Tub WMA near Douglas; 1,117 acres at Griffin Ridge WMA near Ludowici; 1,392 acres at Oconee WMA near Greensboro; 2,495 acres at Paulding Forest WMA in Paulding County; and 8,715 acres near Columbus that led to the creation of Chattahoochee Fall Line WMA.

Chattahoochee Fall Line WMA: Almo and Fort Perry Tracts

Chattahoochee Fall Line WMA's Black Jack, Almo and Fort Perry tracts total 9,515 acres in Talbot and Marion Counties, preserving and adding recreational opportunities to an underserved area of the state. In addition to expanding conservation and recreational opportunities, these tracts provide a buffer to Fort Benning that is important to protect national security and the region's economy.

The Nature Conservancy purchased the Almo Tract in 2011 and on May 13, 2014, the DNR acquired the 7,495 acres. The Nature Conservancy retained ownership of about 800 adjoining acres to the north known as Blackjack Crossing, but which the organization is leasing to the DNR at no cost. This tract is part of the newly created Chattahoochee Fall Line WMA.

The DNR acquired the nearby Fort Perry Tract, 1,220 acres in Marion County, on the same day as the Almo Tract and also from The Nature Conservancy. In a situation similar to the Almo Tract, The Nature Conservancy retained ownership of 1,280 acres adjoining the western portion of the Fort Perry Tract but will lease this land to DNR at no cost.

Both tracts acquired are within a high-priority zone for conservation, as identified in the State

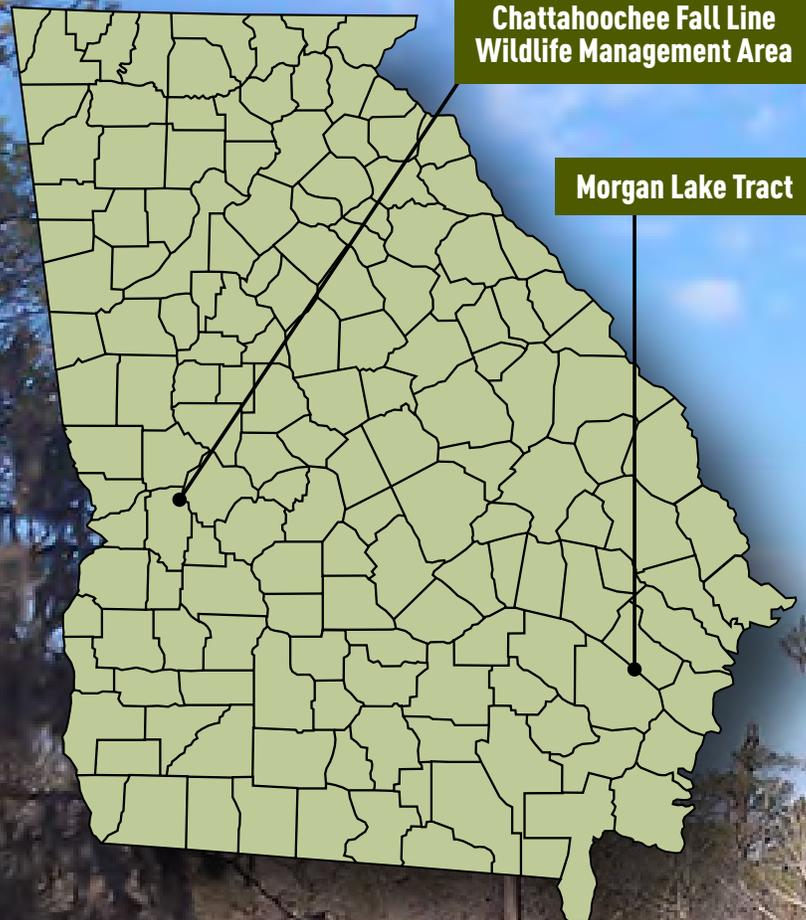
Wildlife Action Plan. Along with the Army and The Nature Conservancy, The Nongame Conservation Section will continue to restore lands within the area for rare species.

Griffin Ridge WMA: Morgan Lake Tract

The 1,117-acre Morgan Lake Tract in Long County is an important acquisition along the Altamaha River corridor, one of the most important conservation targets identified in the State Wildlife Action Plan. On Jan. 30, 2014, the Real Estate Office acquired the tract from The Nature Conservancy for the discount price of \$869,994. The U.S. Marine Corps

significantly reduced the purchase price for DNR when they bought a restrictive easement from The Nature Conservancy for \$950,000. Thanks in part to grants from the U.S. Fish and Wildlife Service and the Knobloch Family Foundation, new public outdoor recreational opportunities and permanently protected frontage along the Altamaha River were added to Griffin Ridge WMA.

The Morgan Lake Tract also provides a buffer to the Townsend Bombing Range, a 5,183-acre training site used by all branches of the military. The Marine Corps has stated that it is "critical to national security to buffer Townsend Bombing Range and keep it operational."



Georgia Conservation Tax Credit Program

The Nongame Conservation Section administers the Georgia Conservation Tax Credit Program in conjunction with the State Properties Commission. This program provides a tax credit for taxpayers who place conservation easements on their land or make fee-simple donations to qualified organizations.

Of the 49 applications in 31 counties received through the program in fiscal year 2014, five were approved by the State Properties Commission and received the tax credit. Most of the 49 applications received pre-certification for the program and may submit final applications. The five donations receiving the credit protected a total of 6,452 acres with conservation easements. An additional 4,197 acres were protected by donations made before 2013 for which the credit was awarded in fiscal 2014.

Staff managing the program are funded in part through the Georgia Environmental Finance Authority.

Conservation Planning

Georgia's State Wildlife Action Plan, a vital roadmap for conservation, was completed in 2005 and provides guidance for wildlife conservation efforts by Georgia DNR and its partners. The plan outlines critical areas of need, with a focus on keeping Georgia's native species from declining to the point of requiring federal protection as threatened or endangered species.

Like all state wildlife agencies, DNR made a commitment to review and revise its State Wildlife Action Plan, better known as SWAP, within 10 years. The revision process began in 2010.

The plan is being revised to reflect the most current assessment of Georgia's wildlife conservation needs, with emphasis on the development of proactive strategies that address wildlife conservation needs from a state and regional context. Participation in recently formed partnerships known as Landscape Conservation Cooperatives will be instrumental in shaping these regional conservation strategies.

Development of climate change adaptation strategies is another area of emphasis. The Wildlife Action Plan revision will incorporate information on potential impacts of climate change on species and habitats in Georgia and the Southeast, and outline conservation programs that provide options for maintaining

natural diversity in the face of changing climatic conditions.

Nongame Conservation Section staff is coordinating the revision process with help from other DNR staff and representatives of a wide variety of government agencies, non-governmental conservation organizations, landowner groups and private corporations.

By the end of fiscal 2014, 13 technical teams focused on categories varying from birds to environmental education had delved into specifics such as exploring predictive habitat models and updating the plan's 296 animal and 323 plant species listed as high priority for conservation.

Recommendations by the teams will be reviewed and prioritized by DNR staff and the SWAP Advisory Committee, with the committee also identifying high-level actions involving emerging issues or new partnerships, policies or initiatives.

An internal review of technical team reports will be followed by a draft revised plan available for public comment in April 2015. Meetings will be held to solicit comment, with staff also doing presentations for agencies and groups. A final version of the SWAP will be submitted to the U.S. Fish and Wildlife Service by July 2015.



Sickleafin recharose (Brett Albanese/GaDNR)

Nongame Wildlife Conservation Fund

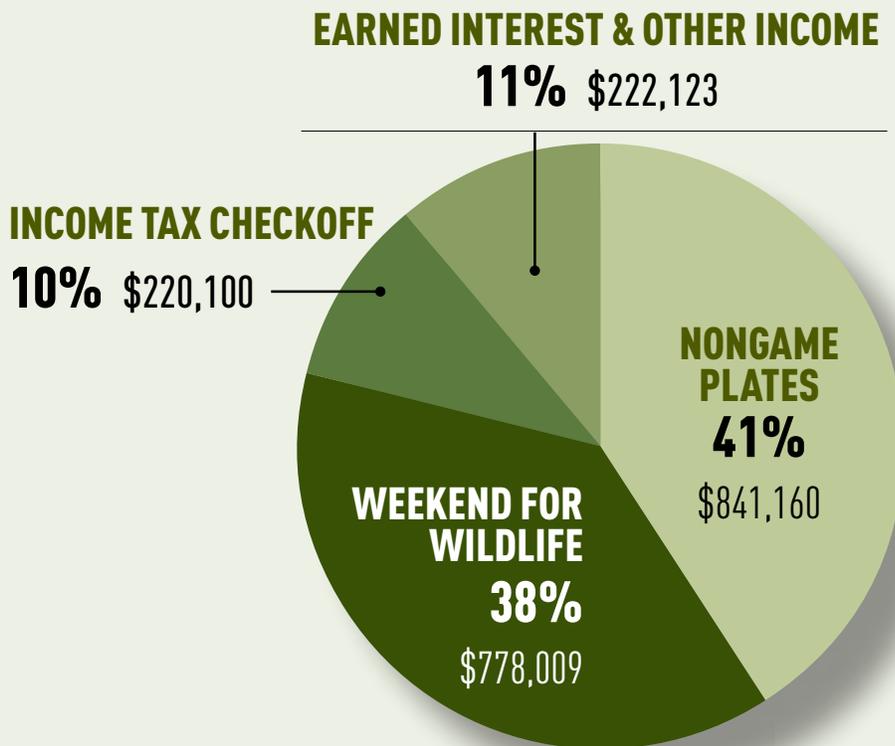
The Nongame Conservation Section receives no state appropriations for nongame wildlife conservation, depending instead on grants, fundraising and direct contributions. With fundraising a necessity, the section has three primary avenues: the nongame wildlife license plates, Weekend for Wildlife and the Give Wildlife a Chance state income tax checkoff.

All contributions go into the Nongame Wildlife Conservation and Wildlife Habitat Acquisitions Fund, often referred to as the Georgia or Nongame Wildlife Conservation Fund.

The Environmental Resources Network, or TERN, the Nongame Section's friends group, also provides significant support.

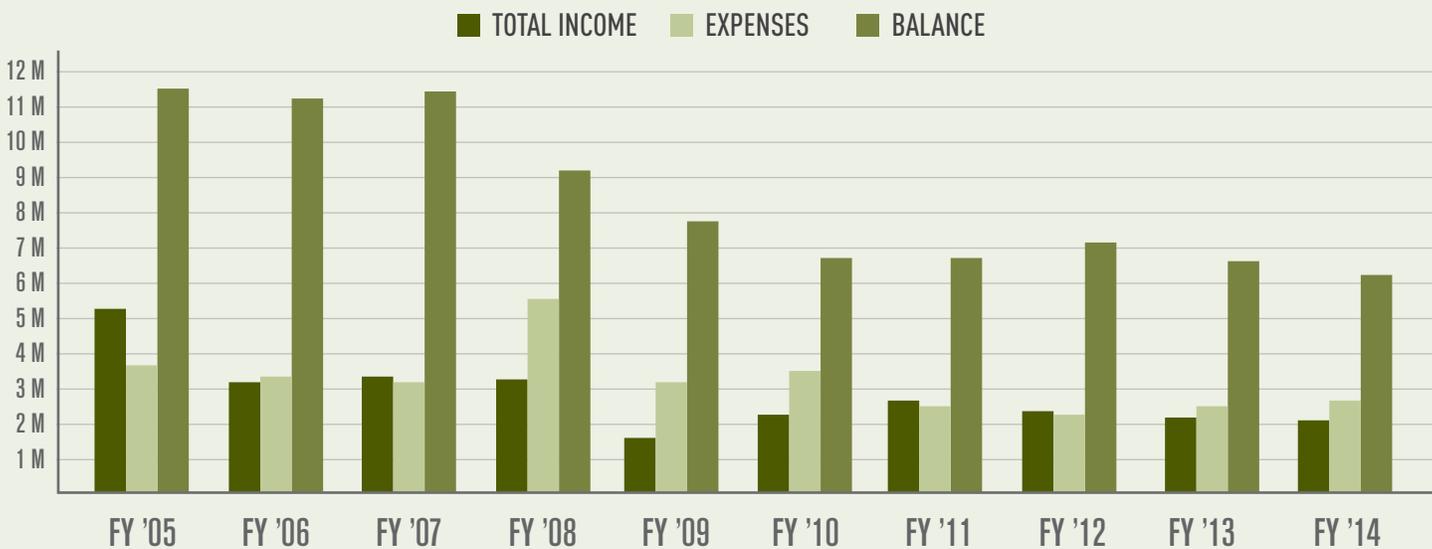
For fiscal 2014, the Nongame Conservation Section totaled \$2.06 million in income from the Nongame Wildlife Conservation Fund (not counting federal and other grants) and \$2.65 million in expenses. The fund had a balance of \$6.20 million at the end of the fiscal year.

Fiscal Year 2014 Funding



Nongame Wildlife Conservation Fund

Listed in millions per year



Nongame License Plates

Gov. Deal signs license plate bill into law (Office of the Governor)



The bald eagle and ruby-throated hummingbird automobile tags remain the Nongame Conservation Section's largest funding source, a standard of support for more than 15 years. Sales and renewals of the plates have provided, on average, more than half the revenue for the Nongame Wildlife Conservation Fund.

However, the number of wildlife plates in circulation decreased significantly after a 2010 legislative change for these and most specialty plates raised the purchase price, reduced the share going to sponsor groups to \$10 and added an annual renewal fee.

While adding an annual renewal fee initially increased revenue to the Nongame Wildlife Conservation Fund – by \$1 million from fiscal 2010 to 2011 – the price increase and additional fee resulted in a sharp drop in sales of eagle and hummingbird plates, and low renewal rates. From 2010 to the close of fiscal 2014, the number of Nongame Conservation Section plates in service

plunged nearly 70 percent, from 347,401 to about 92,000 plates.

In response, the 2014 General Assembly passed and Gov. Nathan Deal signed into law House Bill 881. Sponsored by state Rep. Bubber Epps (R-Dry Branch) and Sen. Jeff Mullis (R-Chickamauga) and supported by numerous stakeholder groups, this legislation lowered the cost of buying or renewing DNR's eagle, hummingbird, quail and trout tags to only \$25 more than a standard design tag and dedicated up to 80 percent of those fees to the wildlife programs the plates benefit.

Since July 1, 2014, \$19 for every new wildlife plate purchased and \$20 for each renewed has gone to help conserve and manage native Georgia wildlife and natural habitats, from bald eagles to longleaf pine forests and brook trout.

Although fiscal 2015 will answer questions about the impact of these changes on wildlife plate trends,

initial signs include positive feedback from the public and a bounce in sales. The Wildlife Resources Division's Public Affairs staff and supporting groups, such as The Environmental Resources Network, are working to promote and raise awareness of these key changes in wildlife plate fees.

In fiscal 2014, revenue from the eagle and hummingbird plates totaled \$841,160, continuing a steady decline from 2011, when sales and renewals peaked at \$1.88 million following the 2010 law change. Tags now account for 41 percent of Nongame Wildlife Conservation Fund revenues. From 1997 through 2013, sales and renewals represented about 60 percent.

In June 2013, the Wildlife Resources Division affirmed the critical role that wildlife plates play in funding conservation, introducing designs that feature new artwork across the entire plate for the eagle tag and the two tags benefiting the division's bobwhite quail and trout programs.

'Give Wildlife a Chance' State Income Tax Checkoff



The state income tax checkoff offers Georgians a convenient way to contribute to the Nongame Wildlife Conservation Fund. Since the checkoff's creation in 1989, net contributions have averaged about \$300,000, with a high of \$510,910 collected in 1991 and a low of \$184,065 in 1994.

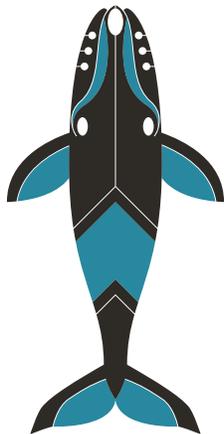
The revenue received for fiscal year 2014 rose slightly to \$220,100, an increase of \$15,618 over the previous fiscal year, which had fallen near the checkoff's record low.

The Give Wildlife a Chance checkoff is line 26 on the long state income tax form (Form 500) and line 10 of the short form (Form 500-EZ).

Weekend for Wildlife

Weekend for Wildlife is one of the country's most successful fundraisers for conservation, grossing more than \$9 million since its start in 1989. The annual event draws 200-400 guests to the prestigious Cloister at Sea Island for a weekend of outdoor trips, auctions and dining.

The 2014 celebration, the 26th annual Weekend for Wildlife, grossed \$778,009.



WEEKEND FOR WILDLIFE
AT SEA ISLAND



The Environmental Resources Network, or TERN, is a nonprofit organization founded in 1992 to support Nongame Conservation Section activities. TERN, online at <http://tern.homestead.com> and on Facebook (www.facebook.com/TheEnvironmentalResourcesNetwork), raises most of its funds through membership dues and through auction, raffle and sale items at Weekend for Wildlife.

In fiscal 2014, Nongame Conservation staff submitted 27 proposals totaling almost \$150,000 to TERN for funding. The organization was able to fully fund nine of these for \$48,650, while providing an additional \$10,000 for dividing among five prescribed fire-related projects, plus \$2,000 for promoting the Nongame Conservation Section's license plates. This \$60,650 in funding pushed TERN's cumulative financial support for the agency over the \$1 million mark!

The nonprofit also recognized Greg Greer of Atlanta as Outstanding Volunteer for 2014. Greer has provided valuable assistance to Nongame Conservation biologists over the years, particularly with projects involving peregrine falcons and reptiles.

TERN-funded projects during 2014 included:

Longleaf pine restoration herbicide brochure	\$900
Gopher tortoise management brochure	\$1,800
Youth Birding Competition	\$7,900
Camp ACE (Adventures in Conservation Education)	\$8,000
Outdoor Wildlife Leadership School	\$6,000
Lake Thurmond AVM (avian vacuolar myelinopathy) bald eagle study	\$8,500
Golden eagle tracking	\$9,300
Give Wildlife a Chance poster and tag contest	\$5,000
Nongame Teaching Conservation Grant	\$1,250
Partial support for five prescribed fire projects	\$10,000
Nongame Conservation license plate promotion	\$2,000

TERN also provided financial support to several other projects and nongame-related conferences throughout the year.



TERN's Ron Lee presents grant check to science teacher Steven King (Jenny Lee)

Federal and Other Funding

The Nongame Conservation Section received federal and other grants during fiscal 2014.

Included was a \$500,000 grant from the U.S. Fish and Wildlife Service Cooperative Endangered Species Fund. With this grant, Georgia and Florida are working together to better determine the status of 23 at-risk species that were included in a listing petition submitted to the Fish and Wildlife Service. Research, surveys and occurrence data compilation, mostly under contract, are being used to help better inform these listing decisions.

This work is providing a range of results and insights, such as:

- Observations at 214 coastal marsh point counts led to the detection of 96 MacGillivray's seaside sparrow nests. Only four of the nests were successful this year, primarily as a result of tidal flooding and predation.
- Aerial surveys at Okefenokee National Wildlife Refuge and surrounding suitable habitat detected 48 Florida sandhill cranes and six nests.
- A gopher tortoise burrow collapse study showed that a 10-foot buffer around the entrance of burrows is sufficient to protect them from heavy equipment.
- Line transect distance sampling conducted through 9,390 acres of habitat at nine sites yielded

1,600 tortoises at densities of 0.1-0.9 per hectare (which equals 2.47 acres). Also, two meetings were held to assess minimum viable population parameters for tortoises.

- A re-survey of the Flint River for alligator snapping turtles included 90 miles south of Albany and 25 miles between Thomaston and Montezuma. Twenty-six alligator snapping turtles were captured. Almost half were juveniles.
- Basking surveys in the Flint River system counted 1,374 Barbour's map turtles. Additional detection surveys will be used to help produce an overall population model.
- The presence of striped newts was confirmed at two sites and eDNA, or environmental DNA, samples were collected.
- A technique for eDNA analysis is under development for the Dougherty Plain crayfish and Georgia blind salamander. Well-trapping arrangements were made for these species.
- Chamberlain's dwarf salamander was confirmed at 29 new sites in 11 counties, bringing the total known sites to 46 – more than twice the total a year ago. The new populations helped fill large gaps in the species' known distribution.
- Surveys for one-toed amphiumas yielded no new sites, but confirmed continuing occurrence at a

known site. Additional new sites with promising habitat will be surveyed.

- Eastern diamondback rattlesnake surveys at six public land sites yielded no detections, but 150 reports were obtained from the public.
- Neither southern hognose snakes nor Florida pine snakes were detected through road surveys. Twelve reports for each species were obtained from the public.
- Genetic analysis and habitat assessment is being conducted with gopher frogs.
- Spotted turtle records were compiled: 97 percent of the 130 documented were adults, and most were found crossing a road.
- Bluestripe shiner records were compiled, including new survey data from the middle Chattahoochee and Flint river systems.
- Surveys for southern elktoe, Apalachicola floater, rayed creekshell, delicate spike and inflated spike freshwater mussels were conducted at 15 sites along the middle Flint River. Only Apalachicola floater was found – at three Lake Blackshear locations.

The agency also received \$1.26 million in **State Wildlife Grants** funding for the fiscal year. However, this total represents a 36-percent decline from fiscal 2010, a funding high-point. Since then, budget cuts have sliced State and Tribal Wildlife Grants by more

Florida sandhill crane and nest in the Okefenokee (Tim Keyes/GaDNR)



Barbour's map turtle (John Jensen/GaDNR)

than a third. Also, a suite of federal conservation programs including State Wildlife Grants has been cut by 25 percent, and all have faced repeated House subcommittee proposals to eliminate funding.

Since 2000, the State Wildlife Grants program has been the main federal funding source to help states keep their common species common and protect others before they become critically imperiled and more costly to recover. That work contributes to local and state economies by supporting the nation's more than 90 million wildlife watchers 16 years old and older, a group that spends some \$55 billion a year on wildlife-related recreation, according to State Wildlife Grants advocate Teaming with Wildlife and a 2011 U.S. Fish and Wildlife Service survey.

In Georgia, State Wildlife Grants are critical to helping the state conserve wildlife and natural places for current and future generations. Likewise, the state is big on wildlife watching, with more than 2.2 million Georgians and \$1.8 billion in related expenditures in the state in 2011, according to the Fish and Wildlife Service survey.

Yet, federal budget cuts have reduced funding by more than a third, dropping Georgia's State Wildlife Grants total from about \$1.5 million to \$1.6 million a year to roughly \$1.26 million over the past four years.

The Wildlife Resources Division supports Teaming with Wildlife, a national coalition working to support



Chamberlain's dwarf salamander (John Jensen/GaDNR)

State Wildlife Grants and find new funding to prevent America's wildlife from becoming endangered.

The Nongame Conservation Section received \$222,123 in interest and other income in fiscal 2014.

Administration and Personnel



Nongame Chief Jon Ambrose flags a trail at Ochopee Dunes WMA (GaDNR)

Leadership of the Nongame Conservation Section changed in fiscal 2014.

Section Chief Mike Harris, who led DNR nongame efforts since the formation of the Nongame Conservation Section in 1998, retired from DNR in June 2014 to work as the at-risk species coordinator for the U.S. Fish and Wildlife Service's Southeast Region.

In July, just after the fiscal year closed, Dr. Jon Ambrose was named to lead the Nongame Conservation Section. Ambrose, a Watkinsville resident and Tennessee native, is a 27-year agency veteran who served as Nongame Conservation's assistant chief since 2004.

As assistant chief, Ambrose helped oversee Nongame Conservation Section projects statewide. Ambrose also served as State Wildlife Action Plan coordinator, guiding the creation with partner organizations of Georgia's first plan in the early 2000s. He is also leading the ongoing revision.

Ambrose discussed his [outlook for the section](#) in a post on the Wildlife Resources Division's blog.

In other personnel news, Southeast Partners in Amphibian and Reptile Conservation awarded biologist Dr. Jessica McGuire its 2014 Conservation Hero Award for her "exemplary commitment to strengthening partnerships that further herpetofaunal conservation."

The Environmental Education Alliance of Georgia named Dot Kay, McDuffie Environmental Education Center's education coordinator, as the group's PreK-16 Formal Educator of the Year.



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WILDLIFE RESOURCES DIVISION
NONGAME CONSERVATION SECTION

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