

# CONSERVING GEORGIA'S NONGAME WILDLIFE

2015 FISCAL YEAR REPORT



**L**oggerhead sea turtles. Bald eagles. Northern long-eared bats.

Monkeyface orchids, bluestripe shiners, Tennessee heelsplitters.

Sandhills and longleaf pine savannas. Black Belt prairies.

In Georgia, the rich names of these and other native animals, plants and habitats reflect a rich heritage: Our state is one of the most biologically diverse in the U.S.

But that heritage is threatened. More than 600 of our wildlife species are considered a high priority for conservation. And that's not counting the wild places they need to survive.

As part of Georgia DNR's Wildlife Resources Division, our mission at the Nongame Conservation Section is conserving the more than 95 percent of species not legally fished for or hunted, plus rare plants and natural habitats.

From research to education, this work involves creatures and landscapes treasured by millions and critical to a wildlife-watching economic impact that exceeds \$1 billion a year in our state.

Conserving nongame also isn't just about today. Restoring wildlife and habitats means our children and grandchildren will also enjoy soaring bald eagles and cathedral-like longleaf forests.

You can help ensure that heritage continues. When you buy or renew an eagle or hummingbird license plate, or contribute through the Give Wildlife a Chance tax checkoff, you provide vital funding for this work.

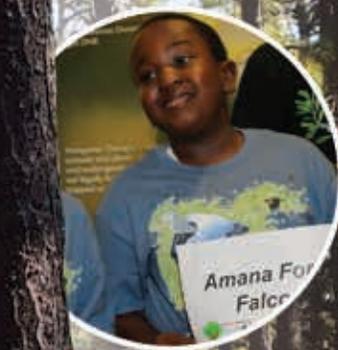
Thank you for your interest. I hope this report informs you of our progress in 2015, and encourages an even deeper appreciation for Georgia's rich realm of nongame wildlife.

A handwritten signature in black ink, reading "Jon Ambrose".

**Jon Ambrose**  
*Chief, Nongame Conservation Section*

Also at [www.georgiawildlife.com/conservation/AnnualReport](http://www.georgiawildlife.com/conservation/AnnualReport): Comprehensive report | Interactive map

GEORGIA DEPARTMENT OF NATURAL RESOURCES | WILDLIFE RESOURCES DIVISION | NONGAME CONSERVATION SECTION



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## 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 2015 was a good one for beach-nesting birds. There were few extreme tide events and storms during nesting season, allowing for solid productivity. Although a small mixed-seabird colony was partially washed over on Little Egg Island Bar, a colony of 437 brown pelicans continued to nest on Satilla River Marsh Island. Overall pelican nesting numbers are still low, however, compared to records from five-10 years ago.

Nongame Conservation Section staff and partners tracked seabird colonies on Ogeechee Bar, Ossabaw Island, Little Egg Island Bar, Pelican Spit, St. Simons' East Beach, Brunswick Dredge Island, Satilla Marsh Island and several rooftop colonies in the St. Marys 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. Remarkably, a small least tern colony successfully fledged chicks on St. Simons' East Beach, one of the most heavily used beaches in the state.

Brunswick Dredge Island, a dredge-spoil island created by the U.S. Army Corps of Engineers in 2007 near the Brunswick shipping channel and owned by the state, is an important nesting site for waterbirds. In 2015, 3,181 royal tern nests were documented, along with 20 sandwich tern nests, 155 black skimmer nests, six gull-billed tern nests, 200 least tern nests and 250 laughing gull nests. The Nongame

Conservation Section is working with the corps to keep the site free of vegetation, promoting beach-nesting seabirds and discouraging nesting by gulls.

In other updates involving Nongame Conservation:

- The agency received a grant from The Georgia Ornithological Society to continue trapping predators on the Altamaha River. This initiative follows a two-year trapping effort funded by a National Fish and Wildlife Foundation grant to control predators at a number of key nesting sites for American oystercatchers. Ongoing trapping efforts continue to pay off. Coupled with favorable weather conditions in summer, trapping helped produce the highest productivity documented in the state for American oystercatcher. More than 40 chicks survived to fledging age, and 32 were banded, also a record for the state. The threat mammalian predators pose to nesting shorebirds and seabirds was highlighted again in 2015 with very low oystercatcher productivity on islands that have coyotes.
- Nongame Conservation coordinated the third year of a major 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

American oystercatcher chicks (Diana Churchill)



# Birds

were conducted at 23 sites during fall 2014 and spring 2015. DNR and U.S. Fish and Wildlife Service staff, island managers, and volunteers conducted the surveys aimed at helping generate more accurate population and trend data for a number of Arctic-nesting shorebirds.

- Researchers documented 120 pairs of American oystercatchers on the Georgia coast.
- A graduate student completed her second field season working with Wilson's plovers on Cumberland Island National Seashore during summer 2014. The student studied nesting ecology, including how males and females respond to different nest predators.
- Nongame Conservation continued support for a doctoral candidate working with Wilson's plovers and American oystercatchers on Little St. Simons Island. The project is incorporating terrestrial LiDAR (Light Detection and Ranging) scans to record and analyze habitat topography in extreme detail.
- One whimbrel, nicknamed Postel, is still transmitting radio signals since being tagged on May 6, 2012, in a project supported by The Environmental Resources Network and other partners. Eight 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. Postel has flown some 55,300 miles since being tagged and transmitted for 1,211 days. On its southbound flight in late-summer 2015, the whimbrel survived Tropical Storm Erika.
- Nongame Conservation 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.
- Staff took part in a pilot project surveying nesting American oystercatchers. The work will help lay the groundwork for a rangewide nesting oystercatcher survey in 2016. To date, all rangewide surveys of this species have been winter surveys, a season in which constricted ranges and communal roosting behavior make finding and counting birds easier. DNR and partners conducted 39 surveys of nine sites representing different habitat types and nesting densities.
- The agency and several coastal partners also continued leading the Georgia Shorebird Alliance. Involving state, federal and private groups, this



Banded red-cockaded woodpecker chick (Jessica McGuire/DNR)

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 many 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, or those on the site when the agreement is made. A family group refers to red-cockaded woodpeckers occupying a cluster of cavity trees. The group can vary 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 does not increase if the woodpecker population does.

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 those woodpecker populations. Most of these properties are in the Red Hills Region near Thomasville. Red Hills 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 fiscal year 2015 to monitor and band woodpeckers and install artificial nest cavities. Staff worked, as well, with Tall Timbers Research Station and Land Conservancy to replace approximately 20 artificial nest cavities on multiple Safe Harbor properties.

Staff also continued to work with the Joseph W. Jones Ecological Research Center to restore the red-cockaded woodpecker population at Ichauway Plantation in Baker County. These 29,000 acres supported a single male in 1999. In part through the translocation of 71 young birds, Ichauway Plantation now 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 population at Silver Lake, Nongame Conservation staff translocated six red-cockaded woodpeckers from Fort Stewart in January 2015. The Silver Lake population has grown, with 28 family groups documented in 2013 and 2014, including 35 nestlings fledged in 2014. Nesting success improved to 40 young fledged in 2015, from only 26 active clusters.

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

At Moody Forest Wildlife Management Area in Appling County, Nongame Conservation staff monitored a red-cockaded woodpecker cluster and banded three young in 2015. Planned habitat management, including timber thins, are helping create more woodpecker habitat.

## Partners in Flight

Georgia-based work tied to Partners in Flight, an international bird conservation effort, continued to focus on priority bird species identified in the State Wildlife Action Plan. Research and survey questions and conservation needs have been identified and condensed into programs for bird conservation funded by a State Wildlife Grant.

The Nongame Conservation Section's most recent efforts included the following projects.

Secretive marshbird surveys in fiscal 2015 focused on the **black rail**, a species that is difficult to survey due to its secretive nature, small numbers and use of habitats that are often hard for people to access. Surveys in other states suggest a 75- to 90-percent decline in black rail populations over the past two decades.

Potential habitat was identified along the coast using remote sensing and computer tools such as computer Digital Elevation Models and LiDAR (Light Detection and Ranging) mapping technology, a form of laser elevation measurement. Maps created using the technology allowed DNR to identify coastal saltmarsh areas that occasionally experienced very shallow flooding by tides. Shallow-flooded saltmarsh is often preferred habitat for black rails. These sites were field-truthed from the air and ground to further refine potential survey locations.

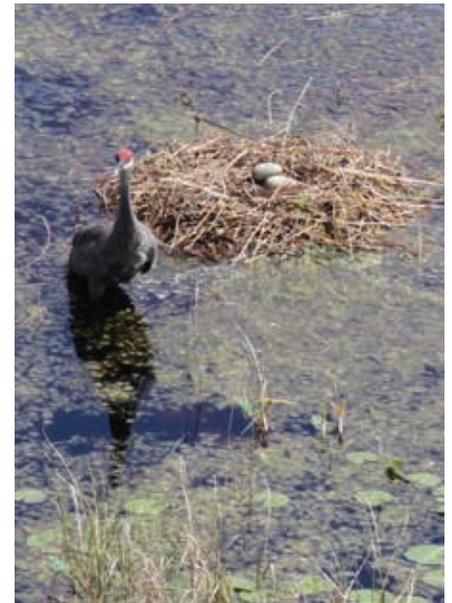
Surveys were conducted from April through June by broadcasting standardized recordings of black rail vocalizations with a playback device using a methodology developed by researchers in the mid-Atlantic states. This methodology is being used across much of the Atlantic Coast for black rail survey work and results can be shared, aggregated and analyzed at many levels, including by state, region or across the Atlantic seaboard.

Sites surveyed in 2015 included areas adjacent to the Andrews Island dredge spoil containment site causeway in Brunswick, the Jekyll Island causeway, saltmarsh near the Isle of Wright, Shellman Bluff and Richmond Hill Wildlife Management Area, a brackish water site on Little St. Simons Island, and a wet flatwoods site at Paulks Pasture Wildlife Management Area. A total of 63 points, known as stations, were surveyed from one to four times at night, the best time to detect black rails. Unfortunately, no black rails were detected.

The **MacGillivray's seaside sparrow**, a subspecies of seaside sparrow that occurs only in coastal saltmarsh in Georgia, the Carolinas and a small area of northeast Florida, has been the focus of monitoring and research efforts of the Nongame Conservation Section through a contract with a University of Georgia Ph.D. student. This bird is of conservation concern due to the restricted nature of its habitat and threats to this habitat, particularly from sea-level rise.

For the past three years, populations along the Georgia coast have been monitored and research on factors that influence nesting success has been conducted. The fate of about 350 nests has been tracked, 160 of them in fiscal 2015. In addition, 46 adults were captured and banded this year with unique color band combinations that allowed the tracking of individual nesting birds to determine nest site fidelity, mating pair fidelity and other facets of nesting biology. Sixteen birds banded during the previous breeding season returned to nest in areas they had nested last year.

Much of the information gathered during this research is being used to develop computer models that predict where suitable nesting habitat will occur as saltmarsh migrates in response to sea-level rise. This modeling will help in developing conservation strategies that can address habitat loss and shifts in location of habitat across the landscape.



Florida sandhill crane nest at Okefenokee NWR (Tim Keyes/DNR)

Little is known about the population status of the **Florida sandhill crane**, a resident subspecies that occurs only in peninsular Florida and the Okefenokee National Wildlife Refuge in Georgia. Over the past four years helicopter surveys have been conducted annually in the Okefenokee NWR from March-April to count nesting pairs of Florida sandhill cranes. Starting in 2014, a standardized grid of transects has been flown to conduct the counts. Using this approach, statistically valid population estimates can be developed.

While only one flight per year was flown in past years, in 2015 three consecutive flights were flown one to two weeks apart. This series was an attempt to estimate detection probability when flying the transects. The probability of detecting the birds can be used to correct for variation in counts related to observers, weather conditions, seasonality and other factors.

All three flights in 2015 were in April. They yielded counts of 32, 30 and 29 adult birds, an average of 30.3 per flight. Nest counts were 11, 10 and 13 nests, respectively, a per-flight average of 11.3 nests. Since some nests may have been seen on multiple flights, further analysis of nest coordinates and other data are needed to determine the total of individual nests.

Surveys started five years ago for **Henslow's sparrow** continued in 2015. This species 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. Henslow's sparrow numbers

Biologist Todd Schneider with Henslow's sparrow (Rick Lavender/DNR)



have declined precipitously over the last several decades due to habitat loss on breeding and wintering grounds.

This sparrow is a species of high conservation concern because of its small population size, greatly reduced habitats and other factors. Its secretive nature and small numbers make it difficult to survey and monitor. Little is known about its distribution and populations across most of its range, including in Georgia.

Standardized transects at Paulks Pasture WMA in Glynn County, Townsend Wildlife Management Area near Ludowici and Moody Forest Wildlife Management Area near Baxley were surveyed three times from January through March using the same techniques (flush netting) as the previous four years. However, only 33 birds were captured and banded this year, a fraction of the average number captured in previous years (slightly fewer than 65 birds a year), and only about 38 percent of the total (86) captured and banded in 2014. While seemingly alarming, the 2015 counts should not be cause for concern because there can be a great deal of inter-annual variation in populations of this species, as well as shifts in use of winter sites. More encouraging is that two new sites for this species were discovered in large powerline corridors. Several birds were seen at each site and a few were captured and banded.

Surveys will continue at Paulks Pasture, Townsend and Moody Forest to track long-term population trends. Other sites with suitable habitat will be surveyed, as well, for new populations.

The nest box program for **southeastern American kestrels** is being refocused. About 40 nest boxes that have not been used and which habitat selection models indicate are in habitat that is likely unsuitable are being relocated to more promising sites with the hope of improving nest box use, which has been lower overall the last several years. While boxes on conservation lands will remain, regardless of use or habitat, relocated boxes will be placed in areas where habitat models suggest suitable habitat, largely on public lands.

Work with kestrels in fiscal year 2015 included a fifth year of ground and air surveys of known populations. Results showed that Fall Line populations continued to decline steeply, while others appeared stable. Nongame Conservation also reached out to power distribution authority MEAG Power about erecting boxes on MEAG rights of way where habitat appears suitable.



Peregrine falcon nest at Tallulah Gorge (Nathan Klaus/DNR)

A group of cooperators continued to install kestrel boxes at Fort Benning in calendar year 2014, following a pilot project that detected at least four nesting kestrel 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. Twelve kestrel pairs successfully nested in these boxes in 2015, two more nests than in 2014.

**Native grass restoration** efforts continued at Panola Mountain State Park near Stockbridge. About 40 acres were planted in calendar year 2014. This planting required mowing and spot-spraying of Johnsongrass, an invasive exotic species, in summer 2015. About 35 volunteers planted another 18 acres in spring 2015. Good rains followed and the Indiangrass flourished. Eight acres were prepped for a possible planting in 2016. Nongame Conservation staff also teamed with a state parks AmeriCorps crew for two days of invasive exotic species control at Panola Mountain. Mimosa, Johnsongrass, elaeagnus, Chinese privet, Japanese hops, chinaberry, perilla and other invasive species were controlled. About 80 acres of a grassland restoration at the park were burned in spring 2015. Burning the remainder is planned for winter 2016.

Native grass restoration efforts on state properties 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. This inspired further work at Joe Kurz, and about 45 acres of native grass plantings are planned for 2016. Timber marking also has begun on about 250 acres of forest adjoining native grass fields to provide additional habitat for declining grassland species.

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

2015 to further enhance the habitat. However, Georgia's golden-winged warbler population has faltered. Biologists detected a lone male in 2013, no birds in 2014 and one male in 2015. Whether this population can recover is in doubt. Efforts continue to try to "shortstop" migrating golden-winged warblers at suitable habitat on Chestnut Mountain in Fannin using automated playback devices.

On a brighter note, the state's first **peregrine falcons** nest in a natural setting in some 80 years produced two fledglings at Tallulah Gorge State Park. The northeast Georgia park temporarily stopped rock climbing to protect the nest. Many feel the peregrine nest is the culmination of more than a decade of habitat restoration at Tallulah Gorge. That work is ongoing. Many are also hoping for a second falcon nest in the gorge in 2016.

## 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.

The Nongame Conservation Section conducts aerial surveys each spring to find and monitor nesting colonies. Stork nesting effort – the number of pairs that attempt to reproduce – fluctuates annually. Calendar year 2014 was a record nesting season 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.

2015 didn't match the previous year, however, with 2,496 nests documented statewide in 22 colonies, a decline of more than 400 nests. Still, the number of nests rated well above average and continued a pattern of wide fluctuations year to year but with totals tracking a steadily increasing trend. Also this year productivity was strong with very few abandoned colonies. There were many two- and three-chick nests among colonies monitored for productivity.

More than 75 percent of all wood stork rookeries in Georgia are 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 2015 nesting season, the Nongame Conservation Section documented 210 occupied nesting territories. Of these, 170 were successful, fledging 270 eaglets. These numbers were up from the 188 occupied territories, 150 successful nests and 238 eaglets the previous year. For further comparison, there were 139 known nesting territories in Georgia 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 continued 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. Often referred to as AVM, this mysterious disease has caused significant mortality in American coots and bald eagles. 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.



Bald eagle nest (Tim Keyes/DNR)

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 drawn to the large numbers of coots attracted by the reservoir's extensive hydrilla beds. However, the number of eagles dwindles by January, with the only remaining eagles associated with a few territories on the northern end of the lake, farther away from the hydrilla. Satellite telemetry devices were placed on three eaglets from two nests on the northern part of Thurmond Reservoir. Two males from the same nest spent the summer in southeastern Canada and a female from another nest remained at Thurmond. These birds will be tracked through the coming fall to determine AVM impacts.

## ■ 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.

The Nongame Conservation Section's kite project had three main focuses in 2015: encouraging the public to report sightings by posting flyers at boat ramps on the periphery of the kites' known range, revisiting core nesting areas in the lower Coastal Plain, and working on management guidelines for kites on state property.

Signs were posted at 89 boat ramps. These led to confirmed nests in Okefenokee Swamp, and many reports from areas previously unknown to harbor kites. Twenty-two nests were located during surveys and five areas likely had nests based on

kite behavior, though nests were not spotted. Also, management guidelines were written to include in plans for wildlife management areas that have kites or prime kite habitat.

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

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

Kite numbers appear stable in Georgia, yet 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.

Nongame Conservation 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.



Swallow-tailed kite (Todd Schneider/DNR)

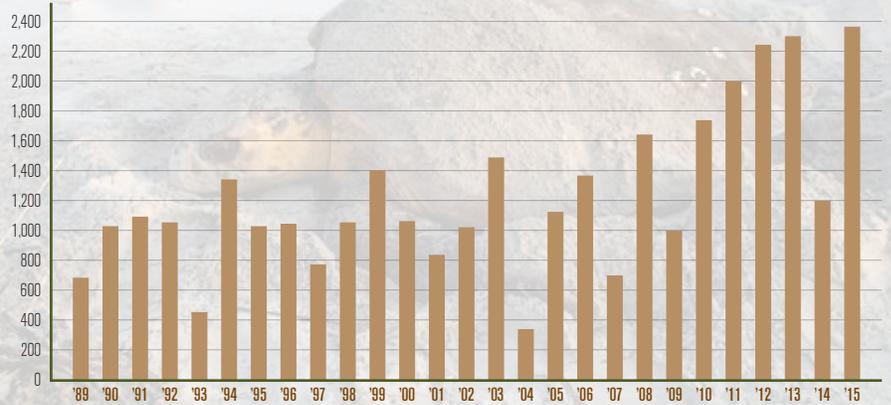
## Sea Turtle Conservation and Research

Loggerhead sea turtles are found in Georgia's coastal waters year-round and nest on all barrier island beaches. In accordance with the U.S. Fish and Wildlife Service and federal recovery plan for this species, 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. In addition, Nongame Conservation runs the nesting projects on the state-owned islands of Sapelo and Ossabaw, including hiring and supervising seasonal technicians.

Nest management strategies such as relocating nests, installing protective screens and removing predators help ensure high nesting success. Since comprehensive surveys began in 1989, loggerhead nesting has been highly variable, with an average of 1,200 nests per year. In 2015, more than 2,300 loggerhead nests were documented on Georgia beaches, a record high for the 27 years of surveys.

While long-term nesting data marked a significant decline in nesting from the mid-1960s through

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



the early '90s, more recent data shows an increasing trend of approximately 3 percent a year, suggesting that the loggerhead population in Georgia is in a recovery period. According to the recovery plan by 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. Based on the current rate of increase, we expect to reach our recovery goal in Georgia in seven years.

Other conservation activities conducted by Nongame Conservation in fiscal year 2015 included reviewing development plans for offshore oil and gas development, conducting lighting surveys on developed nesting beaches, and monitoring the effects on sea turtles of the storage of beach recreational equipment.

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. Drs. Joe Nairn and Brian Shamblin,

Sea turtle hatchlings (DNR)

# Amphibians and Reptiles

Little St. Simons' Lauren Gingerella with loggerhead hatchlings (Mark Dodd/DNR)



working with DNR staff, have identified an average of 532 loggerhead females using the Georgia coast annually from 2008-2014, with a range of 288-733 turtles per year.

One of the significant findings of this study is that at least 60 mother/daughter pairs nest on Georgia's barrier beaches. Because it takes at least 30 years for a loggerhead to become sexually mature and begin nesting, the mothers 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

DNR's Ashley Raybould measuring stranded sea turtle (Mark Dodd/DNR)



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

In 2015, 125 dead or injured turtles were documented, below the 25-year average of 192 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, accounting, respectively, for 18 and 21 percent of strandings in fiscal year 2015.

## 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 spring and summer of 2015, Nongame Conservation Section staff continued survey efforts with Clemson University, deploying 210 traps in 11 sites – two with known bog turtle occurrences and nine potentially suitable sites. Researchers developed a species distribution model and reviewed aerial photography using Geographic Information Systems software to identify potential areas. Over the last two years, more than 210 mountain wetland sites have been ground-truthed and evaluated in the field to find survey areas; 85 were checked in 2015.

As a result, a previously undocumented bog turtle population was discovered in 2015, increasing the total number of extant sites in Georgia to 11 and doubling the number of sites thought to possess populations with long-term viability. This year's survey effort, totaling more than 10,000 trap days, recorded 10 captures (including eight different bog turtles) at the two sites with known populations and five captures (of four different bog turtles) in the previously undocumented site. Four bog turtles in the newfound populations and six turtles from populations discovered in 2014 were tracked using radio telemetry to determine microsite preferences and habitat utilization.

## 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 fiscal year 2015, the Nongame Conservation Section tortoise survey crew completed line-transect distance surveys on 10 sites, sampling aimed at estimating tortoise density and abundance. Sites included Sansavilla Wildlife Management Area in Wayne County, resurveys of two tracts on Townsend Wildlife Management Area in Long and McIntosh counties, three sites belonging to Plum Creek timber company in Quitman, Randolph and Clay counties, Kolomoki Mounds State Park in Early County, three properties along Trail Ridge on the Okefenokee National Wildlife Refuge in Charlton County, and two tracts with multiple owners including conservation organizations and timber companies. Nongame Conservation also contracted with Tall Timbers Research Station biologists to conduct line-transect distance surveys for tortoises on eight properties managed for quail in southwest Georgia.

In all, surveys were conducted on 18 properties. Highlights included tortoise populations topping



UGA's Dan Quinn releasing tortoises with transmitters at Yuchi WMA (Rick Lavender/DNR)



1,500 on both Trail Ridge sites and a Brooks County property, more than 1,000 tortoises at Townsend WMA, and 444 at Sansavilla WMA. The U.S. Fish and Wildlife Service has estimated that 250 adult tortoises is the minimum needed to ensure a long-term, sustainable population. Also noteworthy, a number of gopher frogs and several pine snakes, both species petitioned for federal listing, were seen during the Trail Ridge surveys.

Nongame Conservation began doing line-transect distance sampling for gopher tortoises in 2007. Since, surveys have been completed on 72 sites, public and private, statewide.

The recent fiscal year saw also saw the continued proliferation of solar farms in sandhill habitats. The developments have affected tortoises on those private lands, while also providing opportunities to use these displaced tortoises to augment depleted populations on protected state lands. The Southern Company and its environmental consultants paid for and built, under guidance by Nongame Conservation staff, acclimation enclosures on Silver Lake, Chattahoochee Fall Line and Fall Line Sandhills wildlife management areas. In all, 121 displaced tortoises were translocated to these WMAs and will remain in the enclosures for at least nine months before being released. Research has shown that this “soft release” technique for tortoises is required to ensure an acceptable level of fidelity and establishment at a long-distance translocation site.

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 and with juveniles hatched and head-started from eggs collected at stable populations. In 2015, 143 juvenile tortoises were released at Yuchi, 30 with attached radio-transmitters. Researchers with the University of Georgia are tracking the free-ranging juveniles to evaluate growth, habitat use, home range and survivorship. Fourteen nests at stable donor sites were secured for egg collection and captive rearing of hatchlings for a spring 2016 release.

In another study funded and supported by Nongame Conservation, The Orianne 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.

Orianne staff surveyed 20 sandhill sites on public and private lands, detecting indigos at 34 percent of the sites. The degree of detections in 2015 did not differ significantly from the previous four 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 The Nature Conservancy’s 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 2015 season. This observation also was the case in Georgia, where only a few egg masses were found at donor populations despite extensive searches. Portions from two egg masses were collected and raised, resulting in the release of nearly 800 froglets at Williams Bluffs. During one of these release efforts, University of Georgia researchers caught two unmarked juvenile gopher frogs, evidence that natural breeding and recruitment occurred at the site this year.

## North American Amphibian Monitoring Program

The Nongame Conservation Section coordinates the state’s participation in the North American Amphibian Monitoring Program, an effort 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, training and retaining volunteers and compiling data.

Volunteers are asked to drive pre-established routes 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. There are 73 routes in Georgia. 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 in recordings of mixed-species choruses.

In 2015, approximately 52 surveys were conducted by about 19 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.

## 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 2015, Nongame Conservation Section staff surveyed for hellbenders in 25 stream stretches in 21 streams using conventional techniques – snorkeling and flipping rocks. Researchers caught 138 hellbenders. Each was weighed, measured, photographed and marked with a Passive Integrated Transponder, or PIT, tag for future identification.

As part of this long-term monitoring effort, 20 stream stretches first surveyed in 2012 were re-surveyed as part of a three-year cycle. This sampling schedule is building a long-term dataset, providing current data for estimating hellbender numbers, and allowing for periodic assessment of stream habitat conditions and hellbender population health. PIT tag scans showed that six caught in the recent fiscal year also had been caught in 2012.

Genetic tissue samples were collected from 127 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 taken from every hellbender caught. Analysis is contributing to a range-wide assessment of the species' health. Abundance, size and mass data are used to determine the health of hellbender populations.

In cooperation with the University of Georgia's Savannah River Ecology Laboratory, Nongame Conservation staff continued 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 Monitoring and Research

The striped newt is a candidate for federal listing under the Endangered Species Act and a high-priority species for conservation in Georgia. In fiscal year 2015, the Nongame Conservation Section and partner organizations monitored all known extant breeding populations and confirmed that striped newts were still found at the sites.

In other work, a project pairing the wildlife agencies in Georgia and Florida, the only states within the species' range, is studying the genetic variability within populations to determine the degree, if any, of inbreeding depression and genetic bottlenecks. Also, the threat from an emerging fungal pathogen known as salamander chytrid that is fatal to newts has prompted screening for the fungus in wild populations. Nongame Conservation staff and partners collected striped newts from four of Georgia's populations, taking tissue (tail clips) for the genetic variability study and skin swabs to screen for salamander chytrid. Analyses are pending.



Biologist Katrina Morris with eastern hellbender (Thomas Floyd/DNR)

## 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 465 whales and is increasing at a rate of 2.6 percent a year. Despite recent gains, however, there are only approximately 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.

Aerial and boat teams documented 47 individual right whales in the Southeast during the 2014-2015 calving season. The count included 17 new calves, slightly below the average of 20 documented per year since 2000. Boat teams collected genetics samples from 20 right whales, including 16 of the 17 calves. No entangled, injured or dead right whales were documented.

In January 2015, the Nongame Conservation Section began a three-year project to develop and deploy minimally invasive, implantable satellite tags on North Atlantic right whales. The work is being led by researchers at the Alaska SeaLife Center and University of Alaska Fairbanks, with help from DNR, Florida Fish and Wildlife

Conservation Commission, Sea to Shore Alliance and the NOAA Southeast Fisheries Science Center. Three right whales were tagged in January. The tags remained attached from one to 50 days. The latter tag enabled researchers to track one juvenile whale's migration more than 1,000 miles from Florida to Massachusetts. More information can be found at [www.alaskasealife.org](http://www.alaskasealife.org).

Nongame Conservation 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 "Law Enforcement for Nongame.") Most funding for DNR right whale conservation efforts is provided through NOAA Fisheries grants. The Environmental Resources Network, or TERN, friends group of Nongame Conservation, is helping fund part of the satellite tagging project.

North Atlantic right whale's open mouth shows baleen plates (Florida Fish and Wildlife Conservation Commission/NOAA permit 15-488)



# Mammals

## Georgia Marine Mammal Stranding Network

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

Network goals include investigating human impacts on marine mammals, monitoring population health, providing rapid and humane response to live stranded marine mammals, contributing to marine mammal research, and educating the public about marine mammal issues.

From 2000 to 2014, the network documented, on average, 32 stranded dolphins and whales a year. Bottlenose dolphins were the most commonly stranded species, making up 78 percent of strandings, followed by pygmy and dwarf sperm whales (13 percent combined). Other species that have stranded include Atlantic spotted 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. The network documented 42 strandings in calendar year 2014 – 36 bottlenose dolphins, five dwarf sperm whales and one pygmy sperm whale. No human-related causes of mortality or injury were observed.

The network continued to monitor the morbillivirus outbreak implicated in a die-off of more than 1,800 bottlenose dolphins from New York to Florida since 2013. One third of dolphins tested in Georgia in calendar year 2014 were positive for the virus.

## 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 6,000, 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 migrate into Georgia, returning to Florida in fall as water temperatures cool.

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

Fifty-six manatee mortalities were documented in Georgia waters from 2000 to 2014. Of those, 17, or

30 percent, were due to watercraft-related impacts. Less common causes of mortality include drowning in commercial fishing gear and hypothermia when manatees failed to migrate south during winter. Three manatee mortalities were documented in Georgia in calendar year 2014. One died from a boat strike and two from hypothermia. In December 2014, Nongame Conservation, SeaWorld and Florida Fish and Wildlife Conservation staff rescued a manatee that became trapped at a paper mill outfall near Savannah when water temperatures fell to lethally low levels. The manatee was rehabbed at SeaWorld and released near Titusville, Fla., in 2015.

In June 2015, Nongame Conservation began a multi-year manatee satellite-tagging project in cooperation with the Navy, Sea to Shore Alliance, Georgia Aquarium and others. The primary objective is studying fine-scale movement of manatees around Naval Submarine Base Kings Bay to assess watercraft collision risks. Other objectives include assessing migratory behavior and identifying travel corridors.

Five manatees were captured at Cumberland Island and fitted with high-accuracy, GPS-linked satellite transmitters. The manatees soon ranged as far as Sapelo Island to the north and Cape Canaveral, Fla., to the south. Those with tags that remain intact and transmitting will be tracked through winter 2015-2016. The transmitters will then be removed, and five more manatees tagged in spring 2016.

## Small Mammal Conservation

A grant for bat and small mammal conservation originally secured by the Nongame Conservation Section in 2012 continued to support work on these species in Georgia. The grant also included funding for a graduate project investigating northern yellow bats.

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

In the largest study of its kind across the northern yellow bat's range, 39 bats were tagged and tracked to roosts on Sapelo and Little St. Simons islands.

Assessing manatee for tracking project (Sea to Shore Alliance)



The majority 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 Indiana and northern long-eared bats. 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.

Beginning in summer 2015, a UGA graduate student and technicians began capturing and tracking the target species across the potential range as defined by the U.S. Fish and Wildlife Service. Simultaneously, Nongame Conservation biologists and DOT contractors completed 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.

Data will be reviewed each season and used to refine potential range maps and areas where DOT

surveys are required. Telemetry results may yield information about roost-site preferences that can better define potential habitat. If sufficient netting efforts and call analysis across an area do not yield targeted species, those areas might be removed from range maps the Fish and Wildlife Service maintains, reducing DOT's burden to do bat surveys for projects in those areas.

Nongame Conservation, the Fish and Wildlife Service and DOT staff also began surveying for bats at bridges in fiscal 2015. Little is known about bats occupying bridges in Georgia. Nongame Conservation developed a mobile survey form and tested it during this first survey season. The surveys revealed a surprising number of bridges with bats. DOT will work with DNR and the Fish and Wildlife Service to protect these populations during bridge maintenance, repairs and replacement projects.

Nongame Conservation biologists started a project with UGA to **inventory bats at several National Park Service sites** in 2015. Biologists and technicians searched for roosts, set mist nets and conducted stationary Anabat surveys at Ocmulgee National Monument in Macon, Chattahoochee River National Recreation Area in metro Atlanta and Kennesaw Mountain National Battlefield near Kennesaw.

Nongame Conservation biologists remain active in the Georgia Bat Working Group and helped plan and hold the second annual Georgia Bat Blitz. For

the event at F.D. Roosevelt State Park near Pine Mountain, teams spent three nights netting in and around the park, Callaway Gardens and Blanton Creek and West Point wildlife management areas. Almost 50 people attended the blitz. Mark Yates of LaGrange College led a public bat program at the park. Blitz participants caught 68 bats of eight species, providing key data in an area where few surveys had been done.

The statewide Anabat survey continued in 2015. The project 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 analyze Anabat survey calls collected through 2013. Through such 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. An interactive map of identified bat calls was completed for 2014 and posted online. Other years are being added.

A program launched in calendar year 2014 to monitor summer bat maternity roosts in the state also was continued. This outreach encourages the public to count bats at bat houses, barns and other roosts twice each summer. The effort mirrors programs in Pennsylvania and Wisconsin and allows the public to help with long-term monitoring of wildlife populations.

As of winter 2015, Nongame Conservation had confirmed **white-nose syndrome**, or WNS, in nine Georgia counties. Biologists also documented an 82-percent decline in populations at 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 follows these trends.

According to Fish and Wildlife Service estimates, this devastating disease has killed more than 5.7 million bats and been documented in 26 states and five Canadian provinces as of the close of fiscal 2015. Nongame Conservation will continue to monitor sites in winter to document the disease's spread and related mortality. Biologists also are working with the public and the caving community to promote awareness of white-nose and support for bat conservation



Big brown bats (Pete Pattavina/USFWS)

## 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. A recent assessment recognized 152 imperiled aquatic species in Georgia, more than half of which have a significant portion of their global range within the state's boundaries. Approximately 22 percent of Georgia's freshwater fishes, 28 percent of mollusks and 36 percent of crayfishes are ranked as imperiled or critically imperiled in the state. Even these numbers understate the problem because they don't include an additional 48 species, most of them mollusks, considered historic or extirpated from Georgia.

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. This 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



Mussel survey in South Chickamauga Creek (Brett Albanese/DNR)

aquatic species. In the past year, surveys focused on species considered for listing under the Endangered Species Act, such as the bluestripe shiner and Halloween darter in the Chattahoochee and Flint river systems and the Chickamauga crayfish and Tennessee pigtoe mussel in the Tennessee drainage

As part of the State Wildlife Action Plan revision submitted for federal review in late-summer 2015, Nongame Conservation staff completed an assessment of the status and conservation needs for 251 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. The assessment includes high-priority management actions, research, monitoring and habitat protections needed to conserve and recover Georgia's rare aquatic species. Some of the most highly rated conservation actions include protecting connectivity in free-flowing rivers, developing environmental flow recommendations and targeting land-protection efforts.

# Freshwater Aquatic Species



Bluestripe shiner from Chattahoochee River (Steve Sammons)

The aquatic species technical team also identified 165 high-priority watersheds to protect the best known populations of high-priority aquatic species. A detailed Geographic Information Systems assessment of existing protection and conditions, recent land cover trends, and future threats was completed to help guide conservation efforts in these watersheds. Two reports documenting the species and watershed assessments were completed in spring 2015 and will be posted on the DNR Wildlife Resources Division website.

In other work, Nongame Conservation continued a collaborative project with the Tennessee Aquarium Conservation Institute to survey South Chickamauga Creek near Ringgold. Despite historical records for several rare aquatic species, this stream has been sampled only in a few locations due to limited access. Twenty-two sites accessed via kayaks and roads were sampled, yielding important records for snail darter, mountain madtom and Chickamauga crayfish, plus other protected species such as stargazing minnow. Another project goal 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, in cooperation with The Nature Conservancy and Kennesaw State University. The purpose 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. 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 another team project, Young Harris College continued monitoring the sicklefin redbhorse



Stargazing minnow (Brett Albanese/DNR)

population in Brasstown Creek. This project documented large numbers of sicklefin redbhorse migrating into Georgia during 2013 -2015, as well as the most upstream record of the species in Brasstown Creek. The sicklefin redbhorse is a state-endangered species and a candidate for listing under the Endangered Species Act. Staff participated in a conservation planning meeting for this species in Asheville, N.C., in November 2014. There is a strong interest among stakeholders in efforts to conserve and recover this species in lieu of federal listing.

Nongame Conservation staff also began work on a new project to survey for the state-endangered blackbanded sunfish using environmental DNA methods, often called eDNA. This is a State Wildlife Grant project with the South Carolina Department of Natural Resources. Building on a recently completed survey that used traditional sampling methods, eDNA sampling will be used to target 30 south Georgia sites where the species has not been detected but where habitat appears suitable. Nongame Conservation contracted Valdosta State University to do the initial surveys and will collaborate with the school on site selection and sample processing for this project.

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. One current objective is using eDNA technology to survey for the frecklebelly madtom in areas it has not been detected using traditional methods in more than a decade.

Monitoring in tributaries to the lower Flint also was continued in 2014-2015, marking the eighth year of monitoring these populations. The focus: Assess the impacts of extreme low flows on survival and recruitment of mussel populations.

Staff completed a project to investigate 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 were tagged in the area, including the federally endangered shinyrayed pocketbook and oval pigtoe. Models generated from this data indicated that the stream flow augmentation did not affect survival or movement of any mussels in the project area.

In other work focused on mollusks, an assessment of the status and distribution of imperiled mussel species in the Apalachicola-Chattahoochee-Flint River Basin was completed in calendar 2014. The Apalachicola floater, petitioned for federal listing, was collected from several sites in Lake Blackshear and the Flint River. Additional surveys were completed in the Tennessee River where several rare and protected species were documented. The federally petitioned Tennessee pigtoe was collected live at several sites in the South Chickamauga Creek watershed, greatly expanding the known range of the species in Georgia. In addition, staff found the Tennessee heelsplitter at four sites where it was previously not known. Additional surveys in the upper Coosa River Basin were initiated in spring 2015 to assess the status of several mussel species petitioned for listing.

Tennessee heelsplitter from Little Chickamauga Creek (Jason Wisniewski/DNR)



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

Data from survey and monitoring efforts, including data submitted through the agency's scientific collecting permit program, 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 bolster the amount of data available for environmental review and conservation planning.

Nongame Conservation is recording population information on 133 fishes, 72 freshwater mussels and snails, and 24 crayfish species. In fiscal 2015, 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 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 in 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 to restore 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 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 began a project to augment its Pee Dee River population in calendar year 2014.

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 juvenile and adult populations. 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.

Recent projects included:

- An intensive electrofishing survey of the Oconee River from Sinclair Dam to Dublin – designed to assess the current status of the Oconee population – was completed. 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. A new fish community survey was proposed for this reach of the Oconee River in 2015, but low flows precluded sampling. The goal of this survey, which will be re-attempted in 2016, is to assess changes in the fish community since the early 1990s, when similar sampling was conducted. Because robust redhorse are so rare in this reach, changes in the abundance of other species groups (e.g., other sucker species) may help indicate why robust redhorse have declined.
- Staff also conducted 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. The only known spawning site on the Ogeechee was surveyed during 2015, but high flows precluded visual observations.

- Remnant populations were searched for 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. Potential spawning shoals were surveyed in Little River during 2013-2014, but no robust redhorse were observed. Additional surveys are needed in the Little and Apalachee rivers.
- While adult robust redhorse are known to have survived and found spawning habitat in the Ocmulgee, Ogeechee and Broad rivers, additional monitoring is needed to ensure recruitment. In cooperation with partners, Nongame Conservation helped develop a visual monitoring protocol that estimates the number and size distribution of adult fish observed at spawning sites each year. If sufficient recruitment is occurring, the number of small fish and the total number of fish observed at spawning sites should remain stable or increase from year to year. This protocol was implemented on the Ocmulgee and Savannah rivers in 2015, documenting about 14 and 100 adult fish, respectively.
- Juvenile robust redhorse have proved almost impossible to detect since the onset of sampling by the Robust Redhorse Conservation Committee and its partners. Three juvenile robust redhorse were documented in the lower Savannah River's intertidal zone from 2012-2014, more than 130 miles downstream from the nearest known spawning site. DNR's Stream Survey Team collected the first juvenile from the lower Ocmulgee near Hawkinsville in 2014, an occurrence that is consistent with long-distance dispersal from an upstream spawning site. While low detection of juveniles probably precludes their use for recruitment monitoring, these captures are helping researchers better understand the life history and habitat needs of robust redhorse.

## Sandhills Conservation

Two competitive State Wildlife Grants in Georgia and other states have benefited sandhill and upland longleaf pine habitats that support gopher tortoises. A third grant, awarded in calendar 2015, will continue that progress.

DNR received the first grant, for \$1 million, in 2009 to work with Alabama, Florida and South Carolina on restoring high-priority sandhills. DNR and state wildlife agencies in Florida, Alabama, Mississippi and Louisiana were awarded a \$981,000 State Wildlife Grant in 2011 for additional habitat restoration on the targeted habitats, referred to as phase two of the original project.

In fall 2015, Georgia, Florida, Alabama, South Carolina, Mississippi and Louisiana were scheduled to begin phase three, powered by a competitive \$500,000 grant awarded earlier that year.

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



states exceeded the goals. By the end of fiscal 2014 alone, Georgia had completed more than 22,000 acres of prescribed burning. This work 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. A final report on phase two will be completed by the end of calendar 2015.

Goals for phase three, a two-year part of the project, include restoring or enhancing more than 33,000 acres of sandhill or upland longleaf habitat across the six states in the gopher tortoise's range.

Partner states are using standardized methods for long-term monitoring to gauge the success of habitat treatments. Changes in vegetation and breeding bird communities were picked as key indicators of progress toward restoration objectives. In fiscal year 2015, as part of the vegetation monitoring component in Georgia, 345 sampling transects were completed at 10 properties in fall 2014. Data from this work, done by Nongame Conservation's botany crew, State

Interagency Burn Team prescribed fire at Nature Conservancy's Broxton Rocks Preserve (Shan Cammack/DNR)

# Plants and Natural Habitats

Parks and Historic Sites staff, and volunteers, will be combined with those collected by other states for analysis. Preliminary results indicate that treatments were extremely effective for habitat restoration objectives: Significant canopy opening and increases in wiregrass and other important herbaceous cover were recorded. However, two years of growth following treatment has confirmed that the sites will require prescribed fire long-term – and in some cases more intensive management – to keep the cover of shrubby oaks low.

## 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, photographers and members of botanical organizations. Also, the Nongame Conservation Section's participation in the Georgia Plant Conservation Alliance allows for the exchange of information on significant discoveries and other plant conservation activities.

During fiscal year 2015, numerous rare plant discoveries were made on private and public lands. Significant finds and other important plant conservation activities include the following.

**Orchids** are always high-priority plants, since most rare ones are in need of regular monitoring. Most of these conservation projects are coordinated with Atlanta Botanical Garden.

The rare Chapman's yellow fringed orchid was enhanced by powerline and roadside management coordination, but population levels are still extremely low at six of the eight known sites in Georgia. Efforts to enhance and monitor monkeyface orchid, also called white fringeless orchid, continued in collaboration with staff at Chattahoochee Bend State Park near Newnan and selected private properties. Work to manage and safeguard all remaining populations was started. In September 2015, the U.S. Fish and Wildlife Service proposed listing this orchid as threatened under the Endangered Species Act.

The Kentucky ladyslipper, found naturally at one site near and safeguarded on Beaverdam Wildlife Management Area near Dublin, remains a high-priority species. Propagated plants are being established at these sites, but growth is slow and it takes more than five years in the wild to successfully bring propagules to flower or even come near flowering. Monitoring is essential and exclosures are required to prevent feral hog damage and deer browsing.

On other fronts, a survey for mountain skullcap, a federally threatened member of the mint family, is in

its second year. Work on **other federally listed species** included annual monitoring of persistent trillium at Tallulah Gorge, along with efforts to control invasive plants. The federally endangered Morefield's leatherflower was discovered on Pigeon Mountain. Additional sites for relict trillium, another federally endangered wildflower, may qualify it for downlisting to threatened if management agreements continue to be made, especially around Fort Benning, thanks to collaboration with The Nature Conservancy and private landowners. Relict trillium and fringed campion were documented in southern Houston County as part of an ecological assessment for a highway bridge replacement.

During fiscal 2015, two of Georgia's state-protected plants were federally listed. Whorled sunflower, found on the Coosa Valley prairies in Floyd County, was listed as endangered in September 2014. The next month, Georgia rockcross, found on bluffs and rock ledges in west Georgia along the Chattahoochee and Coosa rivers and northeast along the Oostanaula and Conasauga rivers, was listed as threatened.

Surveys continue for **Georgia aster** under provisions of a Candidate Conservation Agreement signed in May 2014. At least 10 days' worth of surveys were conducted by Nongame Conservation staff working with consultants and volunteers, the Georgia Department of Transportation, the U. S. Fish and Wildlife Service, U. S. Forest Service and the National Park Service. Significant new populations of Georgia aster were found in the Conasauga District of Chattahoochee National Forest and in western metro Atlanta.

A management plan for mountain skullcap at Resaca Battlefield Historic Site in Catoosa County was implemented.

Hirst Brothers' panic grass, one of the more elusive rare plants, was relocated in a limesink pond wet savanna in Sumter County. The grass is extant in only five sites worldwide, in New Jersey, Delaware, North Carolina and Georgia. The Georgia site is not protected; however, plant samples are being safeguarded at botanical gardens. This plant remains a candidate for federal listing and its relocation in Georgia hopefully will renew survey efforts to find more sites.

Pitcherplant bogs remain a special conservation concern. New populations of wiregrass dropseed,



Monkeyface orchid (Rick Lavender/DNR)

sweet pitcherplant, hooded pitcherplant and yellow flytrap were documented along powerlines. A small bog soon to become state property in the sandhills of Irwin County contains some of these bog elements and will be noted in the management plans for the site.

Nongame Conservation staff documented several **other botanical finds** this year. Carolina bogmint was verified at Fort Stewart and the state's largest population on Fort Gordon was verified as extensive and of high quality. A limestone glade habitat with high diversity of herbaceous plants, including purple coneflower and two species of horse-gentian (sometimes called wild coffee, native members of the honeysuckle family), was discovered on the upper slopes of Lookout Mountain in Walker County. While monitoring the rare smoketree on Pigeon Mountain, staff noted an unusual stunted oak as a dominant on the limestone terrace. At present, this oak is regarded as a disjunct population of mapleleaf oak, one of the rarest North American trees and regarded as narrowly endemic to the Ouachita Mountains of Arkansas and Oklahoma. Similar finds had been reported recently at sites in the Cumberland Plateau escarpment of adjacent Tennessee, and all are under further study. Curiously, the smoketree occurs at most of these sites.

Another globally rare woody plant was documented from Gordonia-Alatamaha State Park in Tattnall County. Bigleaf witch-hazel was found in a mixed oak-hickory-pine forest in early spring, with the plant's distinctive, reddish flowers in full bloom and scattered large leaves still evident in the forest litter. This rare shrub is known mostly from scattered sites in the Gulf states.

Areas throughout Georgia remain unexplored for botanical richness. New state records for flowering plants appear annually, and plants in need of study as possible species new to science need attention. A brief journey into the Dugdown Mountains of Polk County revealed American ginseng and Piedmont bigleaf aster, examples of plants of conservation concern that are found in hardwood forests and threatened by poachers and habitat conversion to pine plantations. Also, as showy as trilliums are, "new" trilliums are under study. One possible new trillium resembles trailing trillium, one of the mottled-leaved types, and is found in relict hardwoods along Lake Oconee and in and around Oaky Woods Wildlife Management Area near Perry.

## Coastal Habitat and Rare Plant Conservation

Nongame Conservation Section work focused on plant and habitat conservation and restoration along the Georgia coast ranged far and wide in fiscal year 2015.

The agency teamed with staff of The Nature Conservancy to map high-quality remnant groundcover vegetation in the Fort Stewart/Altamaha River area. Nongame Conservation also provided technical assistance to the Nature Conservancy in mapping native longleaf pine ecosystem groundcover. Inventory and GIS mapping products from this effort will be useful in prioritizing conservation efforts for this area.

Nongame Conservation continued strengthening a conservation partnership with Little Saint Simons Island. As part of the Little Saint Simons

Island Ecological Advisory Council, staff helped revise the island's ecological management plan and create an easement documentation report. These documents were critical in establishing a restrictive conservation easement that will protect the conservation values of Little St. Simons in perpetuity. Staff also supported and advised on a University of Georgia graduate research project examining the effects of prescribed fire on plant and animal communities in the island's rare Muhly dune grasslands. This project is important in determining management effects on a priority habitat and associated wildlife, including the rare island glass lizard, eastern diamondback rattlesnake and painted bunting.

Staff continued working on rare-plant management projects along the coast. A powerline right-of-way pitcherplant bog at Race Pond in Charlton County contains the largest population of Florida hartwrightia in Georgia, a species with only



Endangered hairy rattleweed (Alan Cressler)

eight populations in the state. Woody vegetation is typically hand-cleared from this sensitive site in collaboration with Georgia Power and the U.S. Fish and Wildlife Service. Unfortunately, silviculture bedding machinery and right-of-way mowing in 2014 negatively affected half of the bog. *Hartwrightia* seeds were collected from the site that winter for safeguarding. In 2015, new “no mowing or herbiciding” and “special management zone” signs were put up to help prevent future impacts. Nongame Conservation will continue working with landowners and botanical guardians to protect the site.

The agency is also working with the Fish and Wildlife Service, Rayonier, Plum Creek, the State Botanical Garden of Georgia, Nature Conservancy and other stakeholders to help conserve federally endangered hairy rattleweed on private lands. This plant's worldwide distribution is restricted to two counties in southeast Georgia, with the majority of populations occurring on timber company properties. Stakeholders met in May 2015 to determine conservation goals for hairy rattleweed on private lands. The group agreed to create study plots on timber company lands to determine whether alternative forestry practices, including not using herbicides, would have positive effects for hairy rattleweed populations. The group will continue to work together to help conserve the species and define details of the proposed study.

In 2015, a College of Coastal Georgia intern supervised by Nongame Conservation conducted surveys for hairy rattleweed on the Lewis easement, which is owned by The Nature Conservancy and has a restrictive conservation easement held by DNR. The tract has the only permanently protected populations of hairy rattleweed in a natural longleaf pine ecosystem. Nature Conservancy and partners have been managing this site with prescribed fire and thinning. Survey efforts focused on pine plantations and natural pine flatwoods managed with fire revealed that the plants appeared to be expanding in recently thinned and burned areas.

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



New York ferns at mountain bog (Linda May/DNR)

## 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 23 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, the state-rare narrowleaf white meadowsweet was added to the safeguarding program. This

species is safeguarded ex-situ by Chattahoochee Nature Center and Atlanta Botanical Garden. The material at both institutions is clonal and sexually unproductive. However, since the material represents different genetic stocks, efforts are underway to cross the two to produce viable seed for cultivation. Propagated material from cuttings was introduced to three mountain bogs on the Chattahoochee National Forest – Rock Creek Bog, Hale Ridge Bog complex and Hedden beaver dam complex. This is the first safeguarding species to be outplanted at Hedden Bog, Georgia's largest remaining mountain bog community.

Another mountain bog was added to the list of botanically-managed sites in fiscal year 2015. Mountain purple pitcherplant and narrowleaf white meadowsweet were introduced to Rock Creek Bog, previously managed only as a bog turtle site. The GPCA now lists Rock Creek as a safeguarding site, one of 10 bogs on public and private lands with augmented or reintroduced populations of imperiled species.



Also, purple mountain pitcherplant and swamp pink now have significant levels of seedling recruitment at multiple safeguarding sites. This is especially significant for swamp pink, which has shown no recruitment at its only known natural site in Georgia in more than 10 years

Nongame Conservation continued its participation in the Bog Learning Network. This association of state and federal agencies, non-governmental organizations, academicians, private consultants, and land managers is advancing the stewardship and management of Southern Appalachian bogs by providing a forum for sharing information and resources. In the recent fiscal year, the Bog Learning Network conducted a mountain bog/wetland plant identification workshop at the Nantahala River Bogs and observed International Bog Day with presentations and field trips at Cedar Mountain Bog, both in North Carolina. The network also took part in the celebration marking the April 2015 announcement of the Mountain Bog National Wildlife Refuge, the nation's 563rd refuge. Nongame Conservation botanist Dr. Mincy Moffett serves on the Bog Learning Network's steering committee.

Also in 2015, the "Georgia Outdoors" won a Southeast Emmy Award for Best Magazine Program

for its episode "Mountain Magic," which featured mountain bog conservation and restoration efforts of Nongame Conservation and the Georgia Plant Conservation Alliance.

Bog restoration is not limited to the mountains. Georgia's Coastal Plain herbaceous bogs are small but rare jewels, one of the highest-priority habitats for rare plant conservation. These bogs face threats such as hydrologic disturbance, fire suppression and land development. A number of species of southeastern Coastal Plain pitcherplant and orchid species are safeguarded by Georgia Plant Conservation Alliance partners, with corresponding habitat restoration projects.

As an example, about 100 each of Coastal Plain purple pitcherplants, yellow pitcherplants and rose pogonia orchids were outplanted at a privately owned bog near Claxton last year. This site has the only known population of the Coastal Plain purple pitcherplant – plants grown from seed that Atlanta Botanical Garden collected at the bogs. Eleven people helped with the outplanting, including one of the landowners, three botanical garden staff and four citizen-science volunteers, in addition to Nongame Conservation biologists.

## Habitat Improvement on State Lands and the Interagency Burn Team

A number of significant restoration projects started in calendar year 2014 were completed in 2015. 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 Wildlife Management Area in 2014. In 2015, almost a quarter-million longleaf pines were planted at the WMA near Butler, funded in part by an Arbor Day Foundation grant. Ample rainfall throughout summer helped result in a planting success rate of about 85 percent, high for the site's deep, sandy soils. Also, about 200 acres of loblolly/longleaf plantation in the hills of Spewell Bluff Wildlife Management Area near Thomaston were thinned, removing most of the loblolly to the benefit of longleaf. In 2015, much of the midstory in this area was chemically treated to ensure that the rich grass groundcover associated with mixed longleaf pine/oak woodlands could thrive, providing habitat for declining grassland birds. Another 350 acres of a 2011 thin on Spewell Bluff also received chemical midstory control, as well as a mix of winter and summer burns.

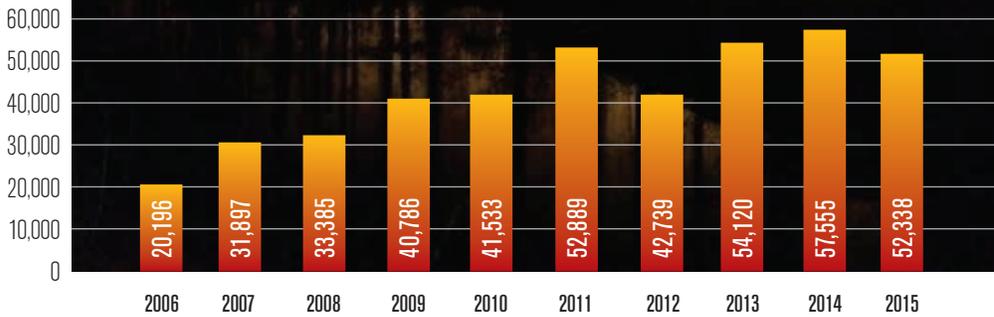
At the close of fiscal 2015, loggers were finishing nearly 400 acres of timber harvest to remove encroaching hardwood and pine plantation around the rare Black Belt, or Blackland, prairies at Oaky Woods Wildlife Management Area near Perry. Next, woody sprouts must be controlled for at least a decade, giving time for climax prairie species to colonize the cleared surroundings.

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

## DNR-MANAGED ACRES BURNED 2006 - 2015\*

Acres treated with prescribed fire on DNR-managed lands has more than doubled in the last decade.

\*By calendar year



Across the Wildlife Resources Division, the acreage burned on DNR-managed lands has more than doubled in the last decade – from 20,196 acres in 2006 to 52,338 acres in 2015. By land type, most of the acres burned are on wildlife management areas. But the increasing trend in burning also includes areas managed as natural areas and state parks.

In calendar year 2015, Nongame Conservation applied prescribed fire to 26,655 acres on state, federal and private lands. As a member of the Interagency Burn Team, the agency worked with 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. Nongame Conservation staff also teamed with other Wildlife Resources Division sections and DNR's State Parks and Historic Sites Division, as well as volunteers trained to federal fire standards.

Volunteers have been a valuable asset to the agency. During the fiscal year, Nongame Conservation trained many technical school students thanks to the help and motivation of one of their fire-trained instructors. Most helped on burns, honing their skills. DNR later hired several of these people, adding to the agency their valuable training and experience.

Since 2009, seasonal fire crews have carried out the bulk of Nongame Conservation's burning. Always on call and working statewide, members have helped increase the acreage burned each year, including 14,054 acres in fiscal 2015. For the second year, Nongame Conservation had two seasonal crews, one housed in southeastern Georgia and the other in west-central Georgia.



DNR's John Jensen (l) and U.S. Fish and Wildlife Service's Chester Figiel with reticulated flatwoods salamander larva at Mayhaw (Jessica McGuire/DNR)

The crews work independently – the west-central group, for example focused on the Fall Line sandhills region and Pine Mountain – and cooperatively on complex fires. When not burning, members work on other projects, varying from marking timber to controlling invasive species.

As part of Nongame Conservation's efforts with the Interagency Burn Team, 4,857 acres of lands managed by The Nature Conservancy were burned, including several large aerial burns where a helicopter is used for ignition. The agency also helped the U.S. Forest Service with burns on the Chattahoochee and Oconee national forests totaling 8,555 acres. The Orianne Society was a key partner for prescribed fires on state lands, the Orianne Society Preserve and private lands with high-quality sandhills. To safely reintroduce fire to these private sites, staff took advantage of unique weather conditions such as milder weather conditions at night to burn heavy fuel loads and higher fuel moistures during the growing season to burn young longleaf pine. The Interagency Burn Team also offered training opportunities for partners and conducted public outreach through news releases, e-newsletter articles and social media posts.

High-priority conservation sites treated with prescribed fire included state-owned lands such as Big Lazer Creek, Chickasawhatchee, Dawson Forest, Doerun, Fall Line Sandhills, Griffin Ridge, Joe Kurz, Mayhaw, Moody Forest, Ohoopce Dunes, Silver Lake, Sprewell Bluff, Townsend and

West Point wildlife management areas, as well as Crooked River, Hard Labor Creek, Kolomoki Mounds, Panola Mountain, Providence Canyon, Reed Bingham and Seminole state parks.

A variety of fire-dependent habitats were targeted for restoration, such as aeolian dune sandhills with xeric longleaf pine/turkey oak, Coastal Plain pitcherplant bogs, striped newt pond habitats, Fall Line sandhills, longleaf pine flatwoods, longleaf pine/wiregrass woodlands, oak woodlands and native grasslands. Many high-priority species identified in the State Wildlife Action Plan benefitted from these restoration efforts.

One example is the ephemeral wetland and pine savanna restoration work on Mayhaw Wildlife Management Area in Miller County. In 2015, reticulated flatwoods salamanders were found at Mayhaw. This endangered species had not been documented there in 12 years. Habitat degradation seemed to have extirpated the salamanders from the area, including the known breeding pond that produced the salamanders more than a decade ago.

Yet restoration work started in 2004 has yielded 500 acres of upland habitat and multiple ephemeral wetlands, including three ponds considered active breeding sites for flatwoods salamanders. While chemical and mechanical techniques have been used, the most critical tool was fire. Changing the timing of prescribed burns to the drier months of the year provided the greatest habitat enhancements.

The Mayhaw restoration project is ongoing, and will provide more than 1,000 acres of pine savannah habitat when completed – habitat that will be home to many species of concern, including reticulated flatwoods salamanders.

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 calendar year 2003 to a record 6,501 acres in 2014. Despite challenging weather and the loss of key fire personnel, 3,582 acres (in 34 operations) were burned in the growing season in 2015. Examples of this successful effort included two burns at Reed Bingham State Park



GPCA members at the Center for Plant Conservation meeting in Athens (GPCA)

near Adel in June while the park was full of day visitors and campers. The effects of the fire were fantastic and park users were supportive.

## Georgia Plant Conservation Alliance

The Georgia Plant Conservation Alliance, or GPCA, is an innovative network of 37 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 100 imperiled plant species. Of these, 99 are in safeguarding programs at botanical gardens, arboreta and seed banks, and 49 species have been successfully reintroduced into the wild. GPCA has 11 safeguarding partner institutions that hold and manage ex-situ collections for recovery and study.

GPCA contributions since the alliance's inception amounted to an estimated \$1.5 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 GPCA's trained volunteer force known as botanical guardians. More than 140 volunteers contributed more than 1,000 hours of conservation work during calendar year 2014.

Member institutions have been instrumental in developing and implementing the original State Wildlife Action Plan, completed in 2005, and will no doubt do the same for the revised plan submitted for federal approval in 2015. Members contributed substantially to the Plants Technical Team Report, a section within the plan that identifies high-priority plants species, habitats and conservation actions. Once approved, the revised State Wildlife Action Plan will become the guiding strategy for the GPCA for the next decade. All GPCA projects are designed to address high-priority species, habitats and conservation actions identified in the plan.

During fiscal year 2015, many member institutions collaborated under the GPCA "umbrella" to develop initiatives related to pollinator conservation, especially with regard to monarch butterflies and milkweeds. This work included Atlanta Botanical Garden, Beech Hollow Farms, Callaway Gardens, Chattahoochee Nature Center, Garden of the Coastal Plain, Georgia Native Plant Society, the Department of Agriculture's Natural Resources Conservation Service, State Botanical Garden of Georgia and U.S. Forest Service. One of those initiatives focuses on collecting the seed of important pollinator plants (for larvae and adults) from across the state. This source-identified, Georgia ecotype foundation seed will be used to

help establish commercial and retail horticultural markets, as well as provide plant material in bulk for conservation projects. Other initiatives involve creating and restoring viable pollinator routes, adding pollinator-friendly plants to urban areas and providing extensive outreach and education to school groups, citizen groups and homeowners. Related projects that have either won awards or been featured in the news include Birds, Bees and Butterflies, Connect to Protect Network, the Georgia Native Plant Initiative and the Greater Atlanta Pollinator Partnership.

GPCA also had many in-situ and ex-situ highlights in fiscal 2015. The federally-endangered hairy rattletweed flowered in ex-situ collections. State-endangered sun-loving *Draba* germinated in a collection for the first time (especially noteworthy because the material is from a small population at Rock and Shoals Outcrop Natural Area near Athens). And the state-threatened floodplain tickseed was added to safeguarding collections.

Key examples of in-situ safeguarding and stewardship included work parties removing invasive sand pine at state-endangered Radford's mint sites along Altamaha River sand ridges; the creation of five artificial pools in granite rock outcrop habitat that were inoculated with the federally-endangered black-spored quillwort at Arabia Mountain near Lithonia; and, the excavation of three pools for the federally-endangered mat-forming quillwort in Greene County, with inoculation planned for fall 2015. The recovery of dwarf sumac at Lower Broad River Wildlife Management Area near Elberton continues to amaze botanists. The number of above-ground stems totaled 825 in a June 2015 census, up from only one stem five years ago.

A survey conducted in summer 2015 regarding plant conservation and general conservation, education, outreach, and promotional activities of GPCA member institutions yielded impressive results. As reported by the alliance's coordinating office, during 2011-2015 member institutions provided a minimum of 287 public and professional presentations; staffed or led 322 classes, programs and field trips; authored or were the subjects of 120 articles appearing in popular literature and scientific journals; developed or made 96 contributions to social media websites and blogs; developed and designed 36 brochures, field guides and posters; and, arranged or were the subjects of 39 radio, television and video interviews.

Also in 2015, GPCA played host to the national meeting of the Center for Plant Conservation's conservation officers. The Center for Plant Conservation is a prestigious national organization dedicated to preventing the extinction of U.S. native plants. The annual meeting at the State Botanical Garden of Georgia in Athens marked the group's first in the southeastern U.S. GPCA was presented as a networking model, with most of a day's programming devoted to member presentations and testimonials.

## 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 2014 was 517.3 pounds dry weight. The 10-year average is 314.4 pounds. The reported harvest increased by about 50 percent from the previous year's dry weight harvest of 345.9 pounds.

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. A 2014 cable TV show on American ginseng trade increased public interest, some likely through

misstatements about the value of the roots. The program likely had an influence on the level of harvest in Georgia and contributed to the significant increase in 2014.

Most American ginseng harvested is exported to China, although local interest in Georgia ginseng for personal use has increased. Georgia is at the southern edge of the distribution of ginseng and the ginseng trade here is much smaller than in nearby states such as North Carolina and Kentucky. Ginseng exports in those states 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.

The database contains more than 15,000 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 fiscal year 2015, Nongame Conservation added 303 records and edited 3,017 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 allows for a more accurate review of species.

Staff also responded to 428 formal requests for data, not counting in-house environmental reviews or data obtained by the public through the website. The creation of new digital forms have aided in collecting and aggregating field data. Also, a new web portal featuring rare species range maps was released in March 2015 and won second-place at the annual NatureServe conference in April.

Lists of rare and protected plants, animals and natural communities are available at [www.georgiawildlife.com/conservation/species-of-concern](http://www.georgiawildlife.com/conservation/species-of-concern). Range maps are at [www.georgiawildlife.com/about\\_rare\\_species\\_range\\_maps](http://www.georgiawildlife.com/about_rare_species_range_maps).

## Private Land Activities

With more than 90 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 2015 (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 Service's Environmental Quality Incentives, Conservation Stewardship, Wetlands Reserve Easements and Working Lands for Wildlife programs, and the U.S. Fish and Wildlife Service's Partners for Wildlife Program.

Private lands conservation coordinator Steve Raper produced a completely revised Landowner's Guide to Conservation Incentives in Georgia. While there are many financial and technical assistance resources available to landowners, the programs are administered by different organizations and the details change often. The Landowner's Guide is one of the few sources of consolidated information on these programs.

Nongame Conservation also continued working with the recently formed Northwest Georgia Working Group of the Talladega-Mountain Longleaf Pine Conservation



Gopher tortoise (Todd Schneider/DNR)

Partnership. The group's mission is focusing efforts to increase and restore longleaf pine and associated ecosystems in north-central Alabama and northwest Georgia by providing technical expertise, strategic coordination and leveraged resources for land conservation and ecosystem restoration. A companion goal is raising awareness about montane longleaf habitat among private landowners who have, or could have, such habitat.

Agency staff 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. Staff also 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.

Nongame Conservation 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 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.

# Private Lands



Corporations participating in Forestry for Wildlife are among the largest landowners in Georgia, directly affecting wildlife habitat on approximately 1 million 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 2014.

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 partner companies' conservation work during fiscal year 2015 included:

At **Plum Creek**, one conservation focus is gopher tortoises. The company continues to cooperate with DNR on the agency's tortoise surveys, expanding the sample size of working forestlands in the Southeastern Plains ecoregion. Sites identified as high potential during surveys in 2014 were managed to promote gopher tortoise habitat. This work included prescribed burning and planting 258 acres of longleaf pine on archaic sand dunes in the Little Satilla River watershed.

In northwest Georgia, Plum Creek protected habitat for the federally endangered gray bat and regionally rare green salamander, while also supporting Nongame Conservation survey efforts to identify unique plant species on company holdings. Plum Creek is working with DNR, The Nature Conservancy, U.S. Fish and Wildlife Service and university researchers to protect and enhance habitat for federally endangered whorled sunflower and federally threatened Coosa Barbara's buttons on and off the Coosa Valley Conservation easement held by the Nature Conservancy. The calcareous soils found on the prairies and parts of adjacent lands support a unique assemblage of rare plants.

In the lower Coastal Plain, Plum Creek has teamed with Nongame Conservation on projects that include managing habitat for Henslow's sparrows, maintaining two wood stork rookeries, preserving isolated wetland habitats and protecting swallow-tailed kite nesting areas. In the Piedmont, Plum Creek continued efforts to increase populations of mat-forming quillwort, a federally endangered plant species endemic to granite outcrops in central Georgia.

In the Pine Mountain area, Plum Creek is supporting the montane longleaf restoration project led by Nongame Conservation. In fiscal 2015, another block of longleaf pine received prescribed fire to enhance herbaceous diversity. Other areas were replanted with longleaf.

**Georgia Power** has 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 has worked with The Nature Conservancy and other partners to establish a test plot for federally endangered hairy rattletweed 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. Georgia Power also has initiated bat habitat surveys on its lands to aid in supporting conservation plans for improving those habitats.

Along with eight other partners, the company signed a Candidate Conservation Agreement for Georgia aster in May 2014. This agreement and the continuing work it outlines will help protect the plant and its ecosystem. In part because of the agreement, the Fish and Wildlife Service announced in September 2014 the species does not need to be listed under the Endangered Species Act.

Georgia Power helped relocate gopher tortoises displaced by development to the company's Plant Vogtle near Waynesboro. The company also converted 250 acres from loblolly to longleaf pine stands, and plans to convert more.

Conservation and wildlife habitat improvements by **CatchMark Timber Trust** included working with the Fish and Wildlife Service to protect habitat for federally endangered fringed campion on company lands, playing host to a Fish and Wildlife Service bat survey on CatchMark property, allowing Nongame Conservation to conduct prescribed burns on native montane longleaf habitat and planting longleaf pine at Sprewell Bluff on Pine Mountain. Company staff was trained by Nongame Conservation regarding gopher tortoises and silvicultural treatments that improve tortoise habitat.

CatchMark leases more than 4,000 acres to the DNR Wildlife Resources Division for Ocmulgee Wildlife Management Area near Cochran and, overall, leases 100 percent of its available lands to the public for hunting and recreation. CatchMark

also sponsors Outdoor Without Limits hunts, providing outdoor recreational opportunities for people with physical and mental challenges.

The company allows universities access to company lands for research. Recent projects include a University of Georgia study of pine decline and root rot, DNR research on black bears and a Columbia University seismic imaging study. CatchMark supports a program of robust thinning on pine plantations, improving wildlife habitat and diversifying the landscape; monitors and treats its lands for invasive species; and, maintains portable bridges for loggers to use, minimizing the impact of stream crossings.

## Army Compatible Use Buffer Conservation

The Army Compatible Use Buffer program, often referred to as 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 in Georgia for rare eastern indigo snakes.

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 teaming with land management activities to enhance gopher tortoise habitat, serving as chair of the group's steering committee and supporting efforts to bring more tracts under conservation ownership and management.

The new Chattahoochee Fall Line Wildlife Management Area, which includes the Fort Perry Tract in Marion County and the Almo area 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.

The preservation of more than 30,000 acres as a military training buffer and wildlife conservation area around Townsend Bombing Range in McIntosh County earned project partners including DNR part of a new conservation award. The Townsend Bombing Range Encroachment Partnering Team and retired Army Brigadier Gen. Bob Barnes, a former senior policy

advisor with The Nature Conservancy, were announced as co-winners of the first Nancy Natoli Élan Award for Innovation in Land Conservation in October 2014. The U.S. Endowment for Forestry and Communities helps coordinate the award, named for Natoli, who led Pentagon efforts to protect military test and training facilities from incompatible development.

## 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 Backyard Wildlife Certification survey has added about 3,000 certified backyards, 550 of which were certified with two or more adjoining neighboring yards for Neighborhood Backyard Certification.

Just after the close of fiscal year 2015, a Nesting/ Roosting Box Certification was created to promote adding nest and roost boxes to certified backyards. This program is in the vein of the Hummingbird Haven Certification, started in 2013 and focused on attracting hummingbirds to yards. About 150 yards have been certified as hummer havens.

The Community Wildlife Project also helps Nongame Conservation build constituency through the 9,000-member Garden Club of Georgia via habitat programs at local, state and region levels.



Carolina wren (Mark Musse/man/USFWS)

Georgia's State Wildlife Action Plan, the 2005 original and 2015 revision, emphasizes increasing efforts to detect, monitor and control invasive species to conserve native wildlife and their habitats. Invasives have negative impacts on native species and are one of the greatest threats to biodiversity. Controlling and treating invasives can yield positive, cascading effects for many native species, and for the benefits people derive from ecosystems.

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 aimed at enhancing methods for assessing and controlling

invasive nonnative species on public and other conservation lands. Objectives also include providing land managers better technical and informational resources to help control invasives, and promoting appropriate use of native plant species by public and private land managers.

During fiscal year 2015, Nongame Conservation staff:

- Continued a multi-year control project to eradicate common reed from the Altamaha River delta. New sites found this year are being added to the control program.
- Coordinated an annual volunteer pull of water hyacinth, working with the Altamaha Riverkeeper in the Altamaha River and the

Satilla Riverkeeper on the Satilla. This effort mainly used an AmeriCorps National Civilian Community Corps team.

- Worked with an AmeriCorps team for five weeks in the spring on invasive species management projects, including treating water hyacinth on the Altamaha, removing sand pine at Townsend Wildlife Management Area near Ludowici, treating Chinese tallowtree on Sapelo Island, treating salt cedar and working on trails at DNR Coastal Regional Headquarters in Brunswick, and improving trails and removing invasives at Cannon's Point Preserve on St. Simons Island.
- Coordinated the fourth annual meeting of the Coastal Georgia Cooperative Invasive Species Management Area, or CISMA. Featuring

# Invasive Species Assessment and Management



AmeriCorps NCCC team (Eamonn Leonard/DNR)

participants' species management projects, the joint meeting with Coastal WildScapes drew more than 100 people, including representatives from government agencies, nonprofits and citizen groups.

- Using National Fish and Wildlife Foundation funding, supported a co-coordinator for the region's Cooperative Invasive Species Management Area, two Student Conservation Association interns and herbicide and other supply purchases.
- Supervised by Nongame Conservation and partially funded by The Nature Conservancy, the Student Conservation Association interns spent 15 weeks helping partners in the 11-county coastal area complete invasive species projects. Partners varied from DNR divisions to Jekyll Island Authority and the communities of Kingsland and Pooler.
- Confirmed eradication of the first stand of Brazilian pepper found in Georgia, on the Jekyll Island causeway in fiscal year 2014.
- Completed work with a College of Coastal Georgia intern on a project mapping invasive salt cedar in the 11 coastal counties. Also created with a technician remote-sensed maps of invasive water hyacinth in those counties.
- Worked with residents in Kingsland and Pooler on awareness, assessment and removal of invasive apple snails.
- Monitored invasive species treatment plots in areas of Sapelo and Ossabaw islands infested with Chinese tallow, measuring the effectiveness of control methods and recovery of the natural communities.
- Worked with Coastal Wildscapes, a nonprofit group that promotes gardening with natives, to increase volunteer opportunities in collecting native seed and identifying and removing invasives. Staff also teamed with the Jekyll Authority to grow native plants from seeds collected by volunteers and offer the plants to the public at two plant sales.
- Continued efforts with the Cannon's Point Conservation Task Force to manage invasive species according to the preserve's management plan.
- Worked with First Coast Invasive Working Group in northeast Florida on detection and management of novel invasive species in the north Florida/south Georgia coastal region.



Apple snails collected in Kingsland (Eamonn Leonard/DNR)



Sand pine removal at Townsend WMA (Eamonn Leonard/DNR)

During fiscal year 2015, the DNR Law Enforcement Division conducted 42 commercial trawling boardings along Georgia's coast to check compliance with turtle excluder device regulations. Rangers issued four state warnings and six citations for TED violations under the Endangered Species Act.

The checks were part of 565 hours the Law Enforcement Division spent at sea this year. Activities also included 37 hours patrolling for violations of laws protecting North Atlantic right whales and 67 hours at Gray's Reef National Marine Sanctuary. Two federal warnings were given for feeding dolphins. Rangers also made 79 contacts with recreational boaters and 18 with commercial boaters in reference to marine mammal protection laws and regulations.

Vessel patrol hours focused on:

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

Other Law Enforcement Division work involving nongame included:

- An investigation by Ranger Daniel North led to charges against four men for taking protected species after Sgt. Patrick Dupree, working a dawn duck-hunting patrol in Echols County,

found the group with a dead great blue heron, six egrets and 11 ibis.

- Two warnings were issued for people feeding dolphins off Jekyll Island's St. Andrews Beach area.
- Cpl. Craig Fulghum worked with Hart EMC to create an osprey nesting site in Hart County after a nearby nest was destroyed in a logging operation. Hart EMC donated the pole and installation.
- State warnings were issued for taking or possessing protected species, including, alligator snapping turtles, turkey vultures, king snakes and a pied-billed grebe.

Report poaching and violations of protected species laws and regulations by calling the Ranger Hotline, 1-800-241-4113, or emailing [RangerHotline@dnr.state.ga.us](mailto:RangerHotline@dnr.state.ga.us).

# Law Enforcement for Nongame

Checking a trawler's turtle excluder device (Mark Dodd/DNR)



## Regional Education Centers

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

Throughout its history, the Wildlife Resources Division has educated Georgia youth and families to increase awareness, engagement and stewardship regarding the state's habitats, wildlife and natural resources. These education efforts began when Charlie Elliott, first director of what is now 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 is reflected 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 and 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 with local school systems, Regional Educational Service Agencies and other state and federal agencies to deliver wildlife-focused education. The centers are Charlie Elliott Wildlife Center near Mansfield, the Go Fish Education Center in Perry, Smithgall Woods near Helen, McDuffie Environmental Education Center near Dearing, Arrowhead Environmental Education Center near Armuchee, Grand Bay Wetland Education Center near Valdosta and Sapelo Island National Estuarine Research Reserve.

Here, visitors learn about natural and cultural resources through hands-on experiences. More than 93,700 students and adults visited the centers in fiscal year 2015. But here's a closer look:

**Charlie Elliott Wildlife Center** held many programs for teachers and students. The teacher workshops are part of Project WILD, an interdisciplinary curriculum that trains educators to teach wildlife and conservation while covering curriculum standards in math, reading and science. As evidence of the program's success, Project WILD trained 675 teachers last year.

Staff offered 33 one-day workshops, including basic Project WILD educator workshops, Growing Up WILD workshops targeting early childhood teachers and Flying WILD workshops for middle school teachers. Project WILD staff also conducted two week-long advanced programs.

The Teacher Conservation Workshop, a partnership with Project Learning Tree and Project WET, is held each June. Twenty-seven educators attended in 2015. The weeklong event uses the forest as a window to environmental education. Activities are led by foresters, wildlife biologists, educators and industry professionals. The workshop is interdisciplinary and centered on the environmental,



Go Fish Education Center's Michael Fulghum (Linda May/DNR)

economic and social benefits of Georgia's forestry and wildlife communities. Educators visit sites including Plum Creek lands, Barkaloo Farm and Gully Branch, plus lumber mills and the Georgia Forestry Commission's Flint River Nursery.

Project WILD also continued its Outdoor Wildlife Leadership School, or OWLS, at Charlie Elliott Wildlife Center. Praise for this program is common. Wrote one teacher, "I had such an amazing time and I learned so much to bring back to nature's classroom." That is what this program is all about. Nineteen K-12 educators from around the state participated this year. All received intense wildlife management instruction. They traveled to Dauset Trails Nature Center in Jackson for a mammals program, Piedmont National Wildlife Refuge near Hillsboro to study red-cockaded woodpecker habitat and Ohoopsee Dunes Wildlife Management Area near Swainsboro to learn about this unique sandhills site with Nongame Conservation botanist Dr. Mincy Moffett. They went frogging with senior biologist John Jensen, birding with ornithologist Todd Schneider and trapped bats with biologist Trina Morris on Oconee National Forest.

Charlie Elliott's Hunt and Learn program, started in 2011, is another success. Nine programs were offered in fiscal 2015 at the center and two at Chattahoochee Fall Line WMA near Geneva. Also, the National Wild Turkey Federation continued offering a program on the coast, and helped with three Hunt and Learn Turkey events held by the Wildlife Resources Division. This program teaches children hunting skills and conservation knowledge. It's part of a division effort that, including Shooting Sports and Hunter Education, served more than 40,000 people in 2015.

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 youth. These programs reached nearly 20,000 students during the recent fiscal year.

Set on 6,000 acres in the Blue Ridge Mountains, **Smithgall Woods** offers an assortment of environmental education programs for students of all ages. Smithgall was established in 1997 as an outdoor classroom in which students and teachers can learn to evaluate environmental impacts and make sound ecological decisions. Adding to the educational value of the instruction provided,



Summer camp program at Charlie Elliott Wildlife Center (DNR)

programs are led by professionals associated with DNR State Parks and Historic Sites, Wildlife Resources, and Law Enforcement divisions. Teachers can also choose to lead activities themselves. Financial support for programming is provided through the Wildlife Resources Division, Smithgall Woods Foundation and Georgia Trout Unlimited chapters.

During the fall 2014 and spring 2015 semesters, approximately 18,000 students took part in 626 educational programs. Of these, more than 2,600 visited Smithgall's "living laboratory" to learn the importance of managing, protecting, preserving and conserving Georgia's natural, historic and cultural resources.

Smithgall Woods has a catalog of nearly 50 programs that are adaptable to reach students from third grade through college. Although diverse in age range, most programs correlate to Georgia Performance Standards and focus on resources unique to the North Georgia mountains. This approach familiarizes students with local issues and demonstrates biological principles at work in their region. Most students served are in school districts served by the Pioneer Regional Education Service Agency. Programming is divided into two categories: onsite and outreach.

On-site programs in fiscal 2015 included lessons in ecology, forestry, wildlife, aquatic habitats, archery and orienteering. While largely school-related, programming is not restricted to students. Smithgall Woods offers many programs to the

general public. This allows "students" of all ages to take part in environmental-themed events. However, on-site field trips requested by schools are a large portion of Smithgall's programming. Fifty-six percent of all educational programs presented this fiscal year were given at the center. Although this total was almost the same as the previous year, the center saw a 10-percent decrease in student numbers.

Outreach programming accounted for 85 percent of students involved in the educational programs. These lessons lasting 45 to 60 minutes extend programming into the winter months and serve schools experiencing budget cuts or logistical limitations. This outreach gave approximately 15,000 students – most of them from middle schools – opportunities to learn about animal adaptations, arachnids, birds of prey, conservation practices, genetics, Native American history and snakes and other reptiles.

The Georgia Council of Trout Unlimited again provided scholarship funding to support free outreach programming for seven counties in Pioneer Regional Education Service Agency school districts. Although schools in those counties took advantage of the funding, several that participated the previous school year did not book programs this year. Counties outside the Pioneer region accounted for 22 percent of outreach activities. Since these schools are more than an hour's drive from Smithgall Woods, in-house "field trips" are more feasible for them.

Just as onsite programming suffered decreased numbers this year, outreach totals also declined, by 24 percent. One factor was the retirement of Smithgall's park naturalist, a change that made it difficult to schedule on-site and outreach programs on the same day. Also, fewer outreach programs for Gwinnett County schools were offered.

Decreased numbers, however, did not hinder the enthusiasm of rangers and volunteers, nor did it lessen the popularity of certain programs. Stream Ecology and Snakes Alive! were this year's most requested on-site and outreach programs, respectively.

Whether displaying an alligator and discussing adaptations or using green tree frogs to teach life cycles, the teachers at **Arrowhead Environmental Education Center** tailor their lessons to Georgia's educational standards. During the 2014-15 school year, students came on field trips to Arrowhead where they studied the collection of live Georgia snakes, turtles, frogs, fish and other live or mounted specimens. They walked through beaver ruins, along streams and through woods to observe life cycles, habitats and food chains they study at school. Also, in hundreds of outreach lessons, Arrowhead teachers visited schools through the center's outreach program, bringing animals and lessons to reinforce the state curriculum standards.

Through the Arrowhead center, a partnership between DNR and Floyd County Schools, 17,067 children and adults learned more about the natural systems of Georgia during the recent school year. Although longtime educator Marilyn McLean retired, Sarah Echols was hired for 2014-15 as a part-time environmental educator. Arrowhead's three teachers conducted outreach programs and field trip lessons for pre-K through 12th-graders and provided displays and programs for public events, including an exhibit at DNR's Outdoor Adventure Day that included storytelling, live animals and an educational scavenger hunt.

In addition, Arrowhead led nature-trail lessons at least twice during the year with each class at Armuchee Elementary School, including a Trail Day for third-graders that used lessons along the trail and in the creek. Students were thrilled to identify endemic species such as the Coosa crayfish on school grounds.

Arrowhead's animals were supported by several classrooms in the Floyd County school system through the center's Adopt-An-Animal donation

program. Also regarding wildlife, for the 13th consecutive year Floyd students took part in the DNR project to restore lake sturgeon to the Coosa River basin. The sturgeon release and outreach provides a hands-on opportunity for them to learn about Georgia river systems.

Berry College again aided the program throughout the year. Berry education majors came to Arrowhead to learn how to incorporate environmental education into the classroom. Arrowhead staff visited college classes, not only at Berry but also at Shorter University, to teach future Georgia teachers about wildlife and using the environment as a context for learning.

Arrowhead teamed with the Coosa River Basin Initiative, riverkeeper for the upper Coosa Riverkeeper, on joint visits to each kindergarten in Floyd County Schools, teaching about watersheds and water conservation. At Waterfest, the annual celebration held by the initiative, Arrowhead's display of animals, mounts and skins proved a popular exhibit.

In other outreach examples:

- Partly as a result Arrowhead's "nature storytelling" in the schools, Ridge and Valley Storytelling Guild developed storytelling programs at several schools and Arrowhead.
- Arrowhead staff gave a presentation at the annual Trout Unlimited Trout Expo, and the center played host to Trout Unlimited members for a DNR Fisheries Management Section presentation about proposed changes in the trout season.
- Ducks Unlimited once again held its annual Green Wings outdoor education day at Arrowhead; about 200 children and adults explored the exhibits, wetlands and woods.
- The 2014 edition of *Tipularia*, journal of the Georgia Botanical Society, featured Arrowhead.
- The center took part in two all-day festivals for gifted children, providing nature storytelling programs to about 20 groups of children and adults. Staff also gave a presentation at Georgia Highlands College's summer camp for underprivileged children.

In all, Arrowhead Environmental Education Center continued to follow its mission, using Georgia's

natural systems as a context to help students in Floyd County Schools learn.

### **Sapelo Island National Estuarine Research Reserve Education Program**

offered a wide range of environmental educational programming during 2014-2015. K through 12th-grade and college-level programs were held on-site and in local schools and universities, reaching 1,272 students in all. School programs were offered two days a week, with a limit of 40 participants per program due to ferry limits.

Sapelo Island Reserve conducted programs for 399 road scholars from the national Elderhostel program. In addition, educational opportunities were provided for 161 participants from various special-interest groups on and off the island, including churches and other organizations. An additional 597 people took part in bird tours and the reserve's Christmas tours.

The Sapelo education program also conducted or partnered with other institutions to train 193 teachers through 12 teacher workshops. Partners included Georgia Southern University, Gray's Reef National Marine Sanctuary, Georgia Association of Marine Educators, Georgia Aquarium, DNR's Coastal Resources Division, Armstrong Atlantic University and the University of Georgia's Marine Extension Service. These teacher workshops focused on coastal ecosystems and issues, as well science, technology, engineering and math.

The reserve offered a variety of programming to the general public, such as regularly scheduled public tours, outreach events and a lecture series highlighting coastal issues and Georgia's rich coastal ecosystems. In all, 1,559 people were given ecological- and historical-based tours of the reserve and surrounding property on Sapelo.

The program's education coordinator conducted six lectures for 338 participants. Topics included Georgia's estuaries and a selection of coastal organisms including representative species such as the horseshoe crab and loggerhead sea turtle. A special Crab and Shrimp Day held by the Sapelo education program highlighted the life history and management of Georgia's crabs and shrimp. Forty-five people attended this on-island event.

The program also worked several outreach events such as CoastFest 2014, which had a record attendance of 9,495; Sapelo's Culture Day, with 800 participants; Beach Week, with 100 people;

and, the Georgia Sea Turtle Center's Shell-e-brate Earth Day events, which drew 1,540.

The Sapelo Island Reserve held a community education event – a public beach sweep – in which 24 people participated during National Estuaries Week.

Through experiences that foster environmental literacy, **McDuffie Environmental Education Center** continued inspiring students to become caretakers of the environment.

For the first time, McDuffie maintained a waiting list of schools for possible cancellations. Several years ago, the decision was made to offer outreach programming only as an extension of an on-site visit. While realizing this reduces student numbers, the more in-depth site visits have a greater potential to reach children in a lasting way – they are learning about nature as they experience it. Because of the full on-site schedule, no outreach programs could be conducted during the 2014-15 school year.

McDuffie's staff, along with educational partners from the Watson-Brown Foundation, conducted a three-day teacher workshop called Get Natural. This unique workshop, developed by McDuffie, Watson-Brown and the state Department of Education, allows teachers to take part in a variety of activities demonstrating how education standards are easily taught beyond the traditional classroom. Plans are in place to offer Get Natural Part 2 in spring 2016.

Also, by partnering with the Watson-Brown Foundation, McDuffie was able to redesign its

home-school sessions. Dates for homeschool programming are reserved and details about programs are emailed to home-school parents. Combining resources and staff provided a more thorough program, and the approach is being continued in the 2015-16 school year.

Through conversations with teachers, the center's curriculum continues to evolve. For example, programs on soil science have become more in-depth and the Backyard Bass activity includes more mathematics, as suggested by teachers, helping keep curriculum current and vital.

The education center is part of McDuffie Public Fishing Area's Outdoor Adventure Day in September, and continues to support the Central Savannah River Area's Environmental Science Education Cooperative. Each spring the cooperative sponsors Eco-Meet, an environmental education competition for middle-school students modeled after the high school Envirothon. Thirty teams compete in the daylong Eco-Meet. McDuffie, a member of the cooperative, provided a competition station on wild turkeys during the 2015 event, which was held at the University of South Carolina's Aiken campus.

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

During 2014-15, 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.

2015-16 will include on-site school field trips and two monthly home-school program sessions, the latter thanks to increased popularity. In support of statewide free fishing days, the center held Pond to Plate, a family festival first that included how-to sessions on casting, cleaning fish and knot-tying. This year will include several new programs: Toad-ally Tots for toddlers, a Monthly Community Speaker Program and the start of promotional outreach.

In fiscal 2015, Go Fish again received and judged state entries for the annual State Fish Art Contest sponsored by Wildlife Forever. Georgia finalists and additional selected artwork were displayed at the center. One Georgia finalist was picked as a national winner.

## Youth Birding Competition

The Nongame Conservation Section held the 10th annual Youth Birding Competition on April 25-26, 2015. Participants again broke records for the number of bird species seen or heard within the 24-hour birdathon, with the overall winning team counting 167 species. Twenty-seven teams signed up, underscoring the popularity of the event that promotes birding and conservation among young Georgians. Thirteen new teams competed in 2015.

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

During the 2015 competition, young birders also raised almost \$2,900 for conservation projects throughout the state, pushing the cumulative fundraising for this event to more than \$20,000. The event's T-shirt Art Contest attracted 254 drawings and paintings of native Georgia birds. A flying great blue heron painted by Ivey Smith, a 17-year-old from Carrollton High School, proved the grand-prize winner and adorned the competition's T-shirts.

And in a move that will only enhance the event's impact, the Youth Birding Competition inspired the

Youth Birding Competition leaders with Kingsley Cardinals team (RacedBirds Foundation)



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, or TERN, Atlanta and Albany Audubon societies, Georgia Ornithological Society, and others. Volunteers are also key to holding the competition banquet, awards ceremony and T-shirt art contest.

## Give Wildlife a Chance Poster Contest

Kindergarten through fifth-grade students submitted nearly 1,500 posters for the 2015 Give Wildlife a Chance Poster Contest. This annual event has encouraged students to explore the wonders of Georgia's native plant and animal species through art for 25 years.

Students from 19 public schools, private schools and homeschool groups participated in 2015, taking to heart the event's theme "Georgia's Wild Plants and Animals: a Natural Investment." To celebrate the silver anniversary and the price reduction of the wildlife license plates to \$25 (a major source of nongame funding), students were asked to design

a Georgia license plate. Drawings were judged based on aspects such as theme, originality and the quality and impact of the artwork.

The posters of state-level contest winners were displayed at the State Botanical Garden in Athens and posted on the Wildlife Resources Division's Flickr site. In addition, the parents and teachers of winners were offered free wildlife license plates.

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, Instagram, YouTube, Flickr and a blog – continued to grow in popularity, spreading awareness of conservation efforts and engaging constituents. Facebook recorded 70,653 likes through June 2015, the end of the fiscal year. Twitter had nearly 4,900 followers. The YouTube channel drew 93,579 views during the year, en route to amassing 300,000 views all-time.

The division's blog, which has a conservation-specific section, registered 77,175 views for calendar year 2014, 95 percent more than the previous year. Instagram attracted hundreds of followers, building toward more than 3,500 followers all-time.

Public Affairs posted and helped produce many videos on nongame-related topics, most using footage supplied by biologists in the field. Popular videos included an [eastern indigo snake](#) crawling into a gopher tortoise burrow in southeast Georgia (about 1.1

million views combined on Facebook and YouTube), former Nongame Program Manager Jim Ozier [releasing a golden eagle](#) fitted with a tracking transmitter in middle Georgia (17,900 views on Facebook) and rare footage of [hellbender breeding behavior](#) in a north Georgia stream (4,471 views on YouTube alone).

Circulation of the nongame e-newsletter Georgia Wild grew nearly 200 percent to more 60,300 subscribers. The newsletter is an effective platform for delivering nongame news and raising awareness. 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.

Social media efforts 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 myriad of ways – speaking to civic, technical and special-interest groups, informing lawmakers on rare species, showing videographers research in the field, and working in other conservation organizations, to name only a few examples.

In fiscal year 2015, the agency staffed events varying from CoastFest in Brunswick, Endangered Species Day at Atlanta Botanical Garden and the Rattlesnake and Wildlife Festival in Claxton to the Georgia Association of Tax Officials' spring conference in Athens and the Georgia Envirothon at Camp John Hope in Fort Valley. Employees provided interviews concerning wildlife to media including Savannah Morning News, The Atlanta Journal and Constitution, The Augusta Chronicle, Georgia Public Broadcasting, Georgia Trend and The Associated Press. Topics varied from [alligator snapping turtle research](#) to a [tagging project](#) involving North Atlantic right whales, and from the first golden eagle fitted with a [tracking transmitter](#) in Georgia to the first pair of peregrine falcons documented [nesting outside of Atlanta](#) in nearly 80 years.

Although outreach efforts are mentioned throughout this report, other examples include:

- Public Affairs staff added two wildlife cams to the Wildlife Resources Division website. Using



Give Wildlife a Chance Poster Contest award-winner (Linda May/DNR)



Duck Dynasty members with Nongame staff at Claxton Rattlesnake & Wildlife Festival (Chris May)

a Georgia Natural Resources Foundation grant, an [underwater cam](#) was installed at the Go Fish Education Center in summer 2014, with video also streamed on the center's website. Staff consulted with Skidaway Audubon and The Landings near Savannah about [installing cams](#) at an eagle nest site that was used that fall by [great horned owls](#), and the stream promoted and shared by the [Cornell Lab of Ornithology](#). Wildlife Resources continued to share streaming video of the popular Berry College eagle nest, and followed Atlanta peregrine falcons through another nesting season via DNR's cam. The cams, featured on a new "hub" page, provided a high-profile platform to promote conservation, logging 922,000 pageviews combined from January-March 2015. The Berry cam was the most visited page on the division's website in calendar year 2014 and a top-five page in 2015. National Geographic touted the Berry and Landings cams as two of four "baby bird cams" to watch.

- Nongame botanist Dr. Mincy Moffett led efforts to organize an October 2014 celebration of educational and recreational improvements at Ochoopee Dunes Wildlife Management Area near Swainsboro. The public event featured local, state and federal officials, area business and school representatives, and site tours. Upgrades powered by a \$106,500 Recreational Trails Program grant, \$50,000 from The Walmart Foundation and help by partners such as Southeastern Technical College include a nearly 2-mile trail with educational signage, a kiosk, a sandhill pond observation deck, parking, a

small-craft boat ramp and measures to restore and protect habitats.

- In December 2014, Nongame Conservation senior wildlife biologist Clay George helped coordinate the capture of a young manatee from the Savannah River near Port Wentworth, where it faced death as winter deepened. SeaWorld Orlando rehabilitated and released the manatee. News media interviewed George, and Sea World produced a [short video](#) on the capture.
- Anna Yellin, Nongame Conservation's environmental review coordinator, and Environmental Outreach Coordinator Linda May organized and awarded a \$1,000 grant to science teacher William Eswine of Savannah Country Day School as part of a TERN-sponsored grant to recognize Georgia's exceptional third- through fifth-grade teachers in life sciences.



Former Nongame Program Manager Jim Ozler with golden eagle (Devil's Backbone Hunting Club)

- Massachusetts youth and RockeTT Report creator Wyatt Powers interviewed Nongame Conservation Fire Management Officer Shan Cammack for a [YouTube video](#) about prescribed fire during a burn at Crooked River State Park. The Emanuel County science club called Sci Fries worked with Cammack and others to produce a video on prescribed fire and Ochoopee Dunes WMA.
- Public Affairs staff worked with Savannah River Ecology Laboratory and nongame senior wildlife biologist John Jensen on coverage of the state's largest release of juvenile gopher tortoises, part of a restoration project at Yuchi Wildlife Management Area near Waynesboro. Staff also promoted via news release, photos and video a new Georgia project with partners to satellite-track manatees in hopes of better understanding how they use estuarine waters near Naval Submarine Base Kings Bay and along the rest of Georgia's coast.
- Many biologists wrote popular articles and published research. Steve Raper, Katrina Morris and Dr. Jessica McGuire wrote articles for Georgia Forestry Today magazine on, respectively, [conservation easement misconceptions](#), managing forests in the range of [federally protected bats](#) and timber management that protects and [helps gopher tortoises](#). In video, the Georgia Outdoors episode "Mountain Magic," featuring Mincy Moffett and other DNR staff, won a Southeast Emmy Award in the Outstanding Magazine category.

## Paulding Forest and Sheffield Forest WMAs

Now 3,192 acres larger, Paulding and Sheffield Forest are adjoining WMAs considered important for recreation and located in a high-priority conservation zone. Their close proximity to Atlanta makes them some of the most popular destinations for hunters, anglers and other wildlife enthusiasts. The WMAs' montane longleaf pine ecosystems and frontage along Raccoon Creek, Hill Creek and the Etowah River also include both in the lineup of six priority focus areas for habitat conservation in Georgia. The fiscal 2015 acquisition underscores this status and will help conserve important habitats and species.

## Dawson Forest WMA

The 205-acre Noblin Tract, a former in-holding, connects once-separate portions of 25,500-acre Dawson Forest. This WMA is a popular destination for hunting and fishing, as well as wildlife-viewing, camping, canoeing, mountain biking, horseback riding and even endurance training. In addition to providing recreational opportunities, including for Atlanta and nearby communities, Dawson Forest provides protection along Amicalola Creek and its tributaries for habitats and wildlife.

Raccoon Creek (Brett Albanese/DNR)

The DNR Real Estate Office acquired about 3,397 acres for conservation and public recreation purposes in fiscal year 2015. These projects conserved priority habitats identified in Georgia's State Wildlife Action Plan. They included additions to three wildlife management areas: about 205 acres at Dawson Forest WMA in Dawson County and 3,192 acres at Paulding Forest WMA and Sheffield Forest WMA in Paulding and Polk counties.

## Paulding Forest and Sheffield Forest

## Dawson Forest



## 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 23 applications in 21 counties received in fiscal year 2015, four were approved by the State Properties Commission and received the tax credit. Seven of the 23 applications received pre-certification for the program and most have submitted final applications. In addition to the four certified applications received in fiscal 2015, eight applications received prior to the fiscal year were certified. These 12 certifications protected a total of 7,184 acres with conservation easements and fee-simple donations.

Staff managing the program is funded in part through the Georgia Environmental Finance Authority. The funding was continued for fiscal 2016.

## Conservation Planning: State Wildlife Action Plan

Georgia's State Wildlife Action Plan is a vital roadmap for conservation, providing guidance for wildlife conservation efforts by 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. Developing, revising and implementing the plan is required to receive State Wildlife Grants.

Like all state fish and wildlife agencies, DNR made a commitment to review and revise its State Wildlife Action Plan, often called SWAP, within 10 years. Georgia completed its initial plan in 2005. A revision process began in 2013. A draft was made available for public comment in summer 2015, with a final version sent that fall to the U.S. Fish and Wildlife Service for review.

The revised plan reflects the most current assessment of Georgia's wildlife conservation needs, with emphasis on the development of strategies that address wildlife conservation needs from a state and regional context. Participation in regional partnerships known as Landscape Conservation Cooperatives, or LCCs, will be instrumental in shaping these wider conservation strategies.

Development of climate change adaptation strategies is another area of emphasis. The State Wildlife Action Plan revision incorporates information on potential impacts of climate change on species and habitats in Georgia and the Southeast. The plan also outlines conservation programs that provide options for maintaining natural diversity in the face of changing climatic conditions.

Nongame Conservation Section staff coordinated the revision with help from other DNR staff and representatives of a variety of government agencies, non-governmental conservation organizations, academic institutions, landowner groups and businesses.

By the end of fiscal year 2014, 14 technical teams focused on categories including birds, plants, invertebrates and environmental education had delved into specifics such as exploring predictive habitat models and updating the 2005 plan's 296 animal and 323 plant species listed as high priority for conservation. The final draft 2015 plan included 349 animal and 290 plant high-priority species.

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

After an internal review of technical team reports, Nongame Conservation posted a draft plan for public comment from June-July 2015. Meetings were held to solicit comments. Staff also gave presentations to agencies and groups.

The revised plan sparked significant media coverage. Articles appeared in news outlets including Savannah Morning News, Saporta Report, Atlanta Journal-Constitution, The Augusta Chronicle, Athens Banner-Herald and others. A Savannah Morning News editorial supported the plan. "A Closer Look," a news show on WABE-FM, Atlanta's National Public Radio station, included a live interview with Nongame Conservation Section Assistant Chief Mary Pfaffko.

The revised SWAP, once approved through the Fish and Wildlife Service, will continue the work of the 2005 version. Conservation successes linked to the original plan include:

- DNR acquired more than 105,000 acres of high-priority lands for wildlife conservation and public recreation.
- Conservation partners and easements protected another 290,000-plus acres.
- Prescribed fire, invasive species control and native plant restoration enhanced key habitats.
- Surveys and monitoring helped manage rare amphibians, birds, bats, sea turtles and plants.

Nongame Assistant Chief Mary Pfaffko on WABE-FM Atlanta program (WABE)



- The plan's focus and direction benefited recovery efforts for federally listed species such as wood storks, as well as landowner technical assistance programs and environmental education.

## Regional Partnerships

Tackling emerging issues such as mega-petitions for species listings under the Endangered Species Act and game-changers such as climate change often require new and innovative approaches. One promising approach is the creation of regional conservation partnerships that address needs for at-risk species across all or part of their ranges. The Southeast At-risk Species Program and Landscape Conservation Cooperatives are two partnerships developed since the original version of the Georgia State Wildlife Action Plan. Each provides resources and coordination for preventing wildlife from becoming endangered, bolstering climate change adaptation and maximizing efficiency by reducing redundancy. The revised State Wildlife Action Plan, also called SWAP, describes how these regional partnerships are achieving successes that could not be accomplished by individual states and encourages continued participation in both.

In 2011, the U.S. Fish and Wildlife Service reached a settlement with WildEarth Guardians and the Center for Biological Diversity under a national multi-district litigation. According to the settlement, the Fish and Wildlife Service's Southeast Region will evaluate whether to list more than 400 species, including 61 already considered candidates for listing. More than 100 of those species are found in Georgia, amplifying the need for up-to-date status information to help inform the service's 90-day findings and

12-month reviews to determine whether a listing is warranted. Barriers to collecting the needed information include a lack of manpower, resources, regional data coordination and basic data on the species. The Southeast At-risk Species Program, developed by the Southeastern Association of Fish and Wildlife Agencies and the Wildlife Management Institute, harnesses the collective research power of the states to address these barriers.

Landscape Conservation Cooperatives also did not exist in 2005 when the Georgia SWAP was completed. Their establishment and support provide a new framework for conservation planning at the regional level. In 2010, the U.S. Department of the Interior launched the cooperatives, often called LCCs, to better integrate science and management in addressing climate change and other landscape-scale issues. There are now 22 cooperatives across the country, forming a network of resource managers and scientists from federal, state and local governments, tribes and first nations, non-governmental organizations, universities, and public and private organizations. These partners work together to identify best practices, connect efforts, pinpoint research gaps and avoid duplication through conservation planning and design.

Georgia is part of three cooperatives: the South Atlantic, Appalachian and Gulf Coastal Plains and Ozarks. By working with the other state agencies and partners within these cooperatives, conservation issues can be addressed at the appropriate regional scale. This approach is particularly important when considering climate change impacts, large landscape features, migration corridors and conservation of large groups of species and habitats. These efforts are

important for achieving longer term and larger scale goals.

When used appropriately, regional coarse-scale datasets provide good context for finer scale local datasets. For example, the South Atlantic Landscape Conservation Cooperative developed the Conservation Blueprint, a spatially-explicit, adaptable plan that describes the places and actions needed to meet conservation objectives. The blueprint provides a consistent plan that transcends boundaries and organizations in mapping out how the conservation community can respond to change.

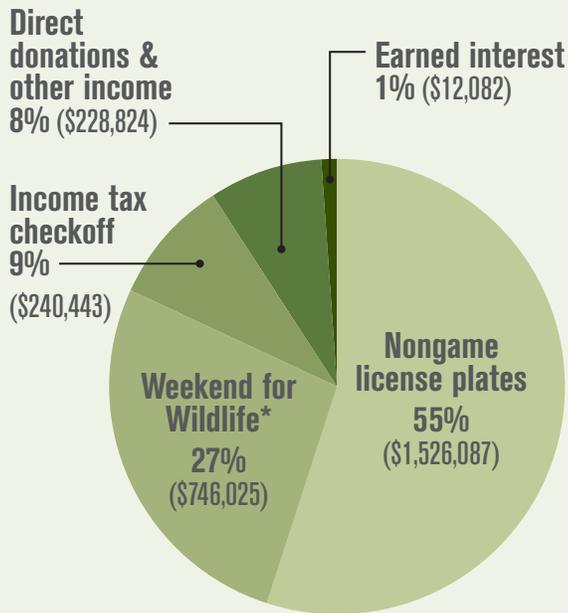
Climate change, urban growth and increasing human demands on resources are reshaping the landscape, cutting across political and jurisdictional boundaries. To prevent or mitigate for these forces, conservation planning and methods must address change across organizations, disciplines and partnerships. In answer, an initiative called the Southeast Conservation Adaptation Strategy was created to knit together the conservation blueprints of Landscape Conservation Cooperatives in the region to define the conservation landscape of the future. This strategy, a long-term vision for lands and waters that sustain fish and wildlife populations, unifies the delivery of conservation action and supports innovation that can be applied across the region. The Southeast Conservation Adaptation Strategy is led by members of the Southeastern Association of Fish and Wildlife Agencies, supported by federal leaders in the Southeast Natural Resources Leadership Group and developed through a partnership of all Landscape Conservation Cooperatives in the southeastern U.S. Those cooperatives include South Atlantic, Peninsular Florida, Appalachian, Gulf Coastal Plains and Ozarks, and Caribbean and Gulf Coast Prairie.

DNR's Rebecca Byrd surveying for Alabama map turtles on the Coosa River (Greg Greer)



## REVENUE

TOTAL: \$2,753,461

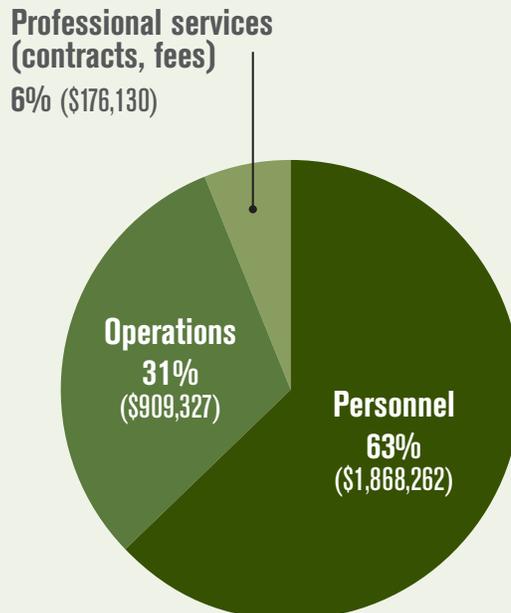


Not including federal and other grants.

\* Includes \$264,000 that will be disbursed through the Georgia Natural Resources Foundation.

## EXPENDITURES

TOTAL: \$2,953,719



Through Nongame Fund.

## Nongame Wildlife Conservation Fund

As in recent years, the Nongame Conservation Section received no state appropriations for nongame wildlife conservation in fiscal year 2015, depending instead on grants, fundraising and direct contributions. While that status changed for fiscal 2016, with the General Assembly budgeting about \$430,000 for the agency, fundraising was and remains a necessity (2016 state appropriations will make up about 6 percent of the section's nongame budget).

Nongame Conservation has three primary fundraisers: 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 Nongame Wildlife Conservation Fund.

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

In fiscal 2015, the Nongame Wildlife Conservation Fund totaled \$2.5 million in revenue (not counting

federal and other grants) and \$2.95 million in expenses. In addition to the three primary fundraisers, revenue included \$12,082 in earned interest and \$228,824 in donations and other income. The fund balance was \$5.74 million at the end of the fiscal year.

### Nongame Wildlife Conservation Fund

Listed in millions per year (not counting federal grants)



## Nongame License Plates

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 average more than half the annual revenue for the Nongame Wildlife Conservation Fund. Affirming the critical conservation role of these and other DNR wildlife plates, in 2013 the Wildlife Resources Division introduced designs featuring artwork across the entire plate for the eagle tag and two tags benefiting bobwhite quail and trout programs.

In fiscal year 2015, the eagle and hummingbird tags accounted for 55 percent of Nongame Wildlife Conservation Fund revenue, up from 41 percent in 2014. The year-over-year increase is attributed largely to 2014 legislation that lowered the cost of buying or renewing any DNR wildlife plate 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 each eagle or hummingbird tag bought and \$20 for each renewal has gone to help conserve nongame wildlife and natural habitats, from bald eagles to longleaf pine forests and brook trout.

In its first year, the legislation sponsored by state Rep. Bubber Epps (R-Dry Branch) and Sen. Jeff Mullis (R-Chickamauga), signed by Gov. Nathan Deal and supported by stakeholder groups, reversed a multi-year slide in tag revenue. Sales and renewals of nongame plates totaled more than \$1.5 million in fiscal 2015, compared to \$841,160 the previous year.

However, the number of eagle and hummingbird plates in circulation continued to shrink. The total has decreased 76 percent, from 347,401 in 2010 to 81,869 at the close of fiscal 2015.

The drop in tag numbers and, in previous years, revenue trailed 2010 legislation that raised the price for these and most state specialty plates, reduced the share going to sponsor groups to \$10, and added an annual renewal fee. While the renewal fee initially increased revenue from the eagle and hummingbird plates – sales and renewals peaked at \$1.88 million in 2011 – the price increase and additional fee undercut sales and the rate of renewals.

The July 2014 return to lower fees and more program support offers hope that the trend in fewer wildlife plates in circulation also can be stemmed. The Wildlife Resources Division's Public Affairs unit and The Environmental Resources Network, friends group of the Nongame Conservation Section, worked in fiscal 2015 to raise awareness of the latest changes. Public Affairs and TERN contacted and visited county tag offices and car dealers, which can sell license plates to vehicle buyers. Many tag offices support DNR wildlife plates. A Wildlife Resources Division marketing plan also includes other targeted promotions, like using the Georgia News Network to raise awareness by promoting wildlife tags during drive-time public service announcements and advertising the eagle plates during Georgia Southern Eagles radio broadcasts.



DNR and TERN leaders recognize legislators for tags law change (DNR)



## Weekend for Wildlife

Weekend for Wildlife is one of the country's most successful fundraisers for nongame conservation, grossing about \$10 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 2015 celebration, the 27th annual Weekend for Wildlife, grossed \$746,025.

Weekend for Wildlife Altamaha River trip (Tim Keyes/DNR)



## '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 in 1991 and a low of \$184,065 in 1994.

In fiscal year 2015, checkoff revenue totaled \$240,443, an increase of \$20,343 over the previous year.

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).

## The Environmental Resources Network



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, raises most of its funds through membership dues and through auction, raffle and sale items at Weekend for Wildlife.

In fiscal year 2015, Nongame Conservation Section staff submitted 18 proposals totaling \$82,500 to TERN for funding. The organization was able to fund 11 of these for \$51,500.

TERN-funded projects during 2015 included:

|  |         |
|--|---------|
| Outstanding educator award                     | \$1,250 |
| Youth Birding Competition (2016)               | \$7,900 |
| Red-cockaded woodpecker management equipment   | \$2,412 |
| Little St. Simons Island sea turtle technician | \$7,142 |
| Camp ACE                                       | \$8,000 |
| Teacher Conservation Workshop                  | \$2,000 |
| Outdoor Wildlife Leadership School             | \$4,500 |
| Camp TALON (youth birding camp)                | \$1,860 |
| Anabat (bat research)                          | \$5,286 |
| Pollinator habitat restoration and outreach    | \$8,500 |
| Give Wildlife a Chance poster contest          | \$2,650 |

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

In fiscal 2015, the group also recognized naturalist Greg Greer of Marietta as its Outstanding Volunteer for 2014 and honored Brock Hutchins for his six years as TERN president. Hutchins stepped down in spring 2015, and Brooks Schoen was elected president.



Honoring Outstanding Volunteer Greg Greer (center, in blue) (Rick Lavender/DNR)

## Federal and Other Funding

The Nongame Conservation Section received \$4.75 million in federal and other grants during fiscal year 2015 to support projects that benefit nongame wildlife species and their habitats. Grant sources included the State and Tribal Wildlife Grants Program, the Cooperative Endangered Species Conservation Fund, the National Oceanic and Atmospheric Administration, National Coastal Wetlands Conservation Grant Program, the U.S. Navy and the U.S. Fish and Wildlife Service.

Use of these targeted grants varied from land acquisition to research, surveys and collecting occurrence data on at-risk species.

Included in the total, Nongame Conservation received \$1.21 million in State Wildlife Grants. That amount is down from \$1.26 million in fiscal year 2014, and marks a 39-percent or \$765,000 decline from fiscal 2010, the program's funding high-point. A suite of federal conservation programs including State Wildlife Grants have been cut in recent years (State Wildlife Grants by 35 percent since 2010). All also have faced repeated House Interior Appropriations Subcommittee proposals to eliminate or reduce funding.

In February 2015, DNR Wildlife Resources Division leaders spread the word about nongame conservation and key funding at the Teaming With

Wildlife Fly-in in Washington, D.C. The annual event is an opportunity to inform members of Congress about how federal programs such as the State and Tribal Wildlife Grants Program are preventing wildlife from potentially becoming rarer or too costly to restore. State Wildlife Grants is the only federal program designed to prevent wildlife from becoming endangered through voluntary, proactive conservation.

The Wildlife Resources Division uses State Wildlife Grants funding to research and monitor species of greatest conservation need, restore habitat, acquire land, and accomplish other work identified in the Georgia Wildlife Action Plan. This comprehensive wildlife conservation strategy, created in 2005 and revised in 2015 with partner agencies, organizations, stakeholders and the public, is required to receive State Wildlife Grants. These conservation projects also contribute 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 the Teaming with Wildlife coalition 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 significantly, dropping Georgia's State Wildlife Grants total from about \$1.5 million to an average of \$1.25 million a year since fiscal 2010.

The Wildlife Resources Division supports Teaming with Wildlife, a national coalition working to support State Wildlife Grants and find new dedicated funding to prevent America's wildlife from becoming endangered.

Current and former leadership from the Wildlife Resources Division, Director Dan Forster and former Director David Waller, participated in the first meeting of the Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources. The Blue Ribbon Panel is a national effort to bring together top leaders from business, energy, conservation, education, recreation, outdoor product manufacturing and environmental interests to recommend a 21st century model of conservation funding. Through participation in the panel, DNR's Wildlife Resources Division remains a national leader in working to identify a dedicated source of funding for states to conserve nongame species.



Shorebirds eating horseshoe crab eggs (DNR)

## Administration and Personnel



DNR's John Jensen (center, with award) received the Alison Haskell Award for Excellence in Herpetofaunal Conservation



DNR's Shan Cammack installing signs at Ochopee Dunes (DNR)

In July 2014, the start of the fiscal year, Dr. Jon Ambrose was named chief of the Nongame Conservation Section. Ambrose is a 28-year agency veteran who had served as the section's assistant chief since 2004. His promotion followed the retirement from DNR of former Chief Mike Harris.

In January 2015, Mary Pfaffko was hired as Nongame Conservation assistant chief. Pfaffko, a Florida native, previously worked in support of state nongame conservation and funding with the Association of Fish and Wildlife Agencies in Washington, D.C.

In other personnel news:

- Senior wildlife biologist John Jensen received the 2015 Alison Haskell Award for Excellence in Herpetofaunal Conservation from Partners in Amphibian and Reptile Conservation. The recognition goes to a person in North America who shows extraordinary commitment to conserving reptiles, amphibians and their habitats. The Gopher Tortoise Council also honored Jensen with a lifetime service award.
- Fire management officer Shan Cammack served as chair of the Georgia Prescribed Fire Council. Cammack helped organize the 2015 annual meeting and guide the council as it promoted Prescribed Fire Awareness Week and other public efforts to raise awareness.
- In honor of Youth Birding Competition founder and wildlife biologist Tim Keyes, the Race 4 Birds Foundation created the Tim Keyes Visionary Award for youth birding leaders who exhibit "extreme leadership, vision and dedication."



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

## WILDLIFE RESOURCES DIVISION

### GEORGIA DEPARTMENT OF NATURAL RESOURCES WILDLIFE RESOURCES DIVISION NONGAME CONSERVATION SECTION

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