NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

WILDLIFE DIVERSITY PROGRAM QUARTERLY REPORT

October-December 2019

Table of Contents

Mark-Recapture Surveys Conducted on Focal Snake Species in Sandhills 3
Many Species of Greatest Conservation Need Found During Annual Christmas Bird Count 4
Coastwide Waterbird Survey Updates Presented at Waterbird Society Meeting 5
191 Cold-Stunned Sea Turtles Found So Far This Season 6
Carolina Pygmy Sunfish Monitoring Continues in Southeastern Counties 7
Northern Pine Snake Nest Detected During Upland Snake Surveys 8
Other N.C. Partners in Amphibian and Reptile Conservation News 9
Staff Conduct Surveys for Broadtail Madtoms; Deploy "Motels" for Tiny Catfish 10
N.C. Birding Trail Launches New Mobile-Friendly Website 11
No Carolina Madtoms Collected During Recent Surveys 12
Saving a Streambank to Save a Bog Community 12
5,075 Robust Redhorse Fingerlings Stocked into Pee Dee River in November 14
Head Start on Winter Bat Surveys Pays Off 15
North Carolina's Newest Endemic Salamander Species is Official 16
Golden-winged Warbler Habitat along the Cheoah Skyway Restored 17

Stay Connected with the N.C. Wildlife Resources Commission
ncwildlife.org

Cover photos (clockwise from top): Henslow's Sparrow (John Carpenter); Cedar Point Tideland Nature Trail (Scott Anderson); Hickory Nut Gorge Salamander (Dr. JJ Apodaca); and Broadtail Madtom (Katharine DeVilbiss)

Mark-Recapture Surveys Conducted on Focal Snake Species in Sandhills

In fourth quarter 2019, Wildlife Commission staff spent considerable effort on mark-recapture surveys for a suite of snake species in the North Carolina Sandhills. Specifically, southern hognose snakes were targeted, as they are classified as a Species of Greatest Conservation Need and are state-listed as a Threatened species. They have an activity peak during October. Staff detected very few southern hognose snakes this year compared to previous years, but the reasons for low encounter rates are unknown. Among the reasons could be possibly drought, but also possibly a true decline in the species.

Of note, one adult that was first found and marked on Oct. 8, 2018 was again encountered Oct. 5, 2019, and encountered again Oct. 10, 2019. Recaptures of cryptic species like Southern hognose snakes are uncommon, but the long-term mark-recapture study is beginning to offer insights into abundance and movements of focal snake species on the Sandhills Game Land.

Monitoring of snake populations will allow Wildlife Commission staff to determine population trends of multiple species, including the southern hognose snake.

Southern hognose snake *(Photo: Jeff Humphries)*

Many Species of Greatest Conservation Need Found During Annual Christmas Bird Count

The National Audubon Society's annual Christmas Bird Count is the oldest, active citizen science bird project in the nation. Beginning on Christmas Day 1900, this tradition was initiated to encourage outdoorsmen to count birds during the holidays. Every year since, from mid-December through early January, tens of thousands of volunteers brave the often cold and wet weather to take part in this effort. This past holiday season, 518 surveys were conducted and over 6 million birds counted throughout the Americas. The Wildlife Commission assists with numerous counts throughout the state – approximately 50 are performed in North Carolina each year.

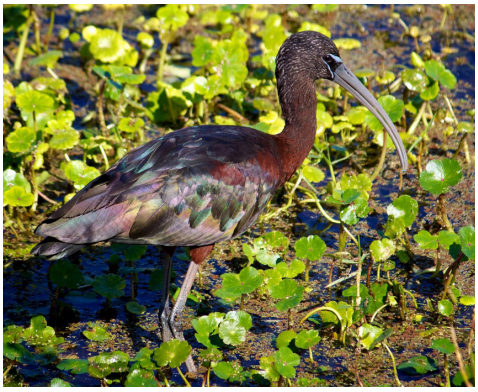
On Dec. 15, 2019, many species of greatest conservation need, including Henslow's sparrows and red-cockaded woodpeckers, were found within the Holly Shelter & Lea-Hutaff Island count, which is centered within a coastal fringe forest containing a diverse mix of habitats. Audubon North Carolina and other organizations use data collected in this long-running census to assess the relative health of bird populations; however, these surveys are limited by a lack of standardized methodology. The Wildlife Commission is attempting to ameliorate this by initiating a state-wide winter bird atlas that will allow staff to more accurately track bird distribution and abundance during the winter months.

Henslow's sparrow *(Photo: John Carpenter)*

Coastwide Waterbird Survey Updates Presented at Waterbird Society Meeting

In November, Wildlife Diversity Program (WDP) staff attended the Waterbird Society Meeting in Salisbury, Md., giving presentations on brown pelicans and great egrets. As part of the Pelicans of the World Symposium, WDP Coordinator Dr. Sara Schweitzer spoke about collaborative work between the Wildlife Commission, Audubon North Carolina, and graduate students and faculty in the Department of Mathematics at UNC-Wilmington to quantitatively and spatially analyze increases in the distribution and abundance of nesting brown pelicans over time in North Carolina. Through coastwide surveys dating back to the 1970s, North Carolina has a long-term data set that can be used to monitor changes in colonial waterbird populations. As the number of islands managed for habitat characteristics needed by nesting pelicans increased, and sites were protected from disturbance, the number of pairs increased in the state. During the most recent colonial waterbird survey, 5,455 nesting pairs at 13 colonies were documented. Results from this study will aid future management of dredged-material islands for brown pelicans and other colonially nesting waterbirds.

Great egret *(Photo: Annika Andersson)*



Glossy ibis *(Photo: Keenan Adams/USFWS)*

Little blue heron *(Photo: Mark Buckler)*

WDP Biologist Carmen Johnson presented work by Annika Andersson, Johnson and Schweitzer on surveys carried out over a 4-year period to better understand the ecology and roosting dynamics of great egrets in North Carolina. These surveys elucidated the habitat features selected by, and abundance trends of great egrets at, evening roost sites, and composition of additional species using these roosts, including four state-listed species of special concern (snowy egret, little blue heron, tricolored heron and glossy ibis). Results from this study are being used by WDP staff to inform public land management decisions, landowner assistance programs and local development planning programs.

191 Cold-Stunned Sea Turtles Found So Far This Season

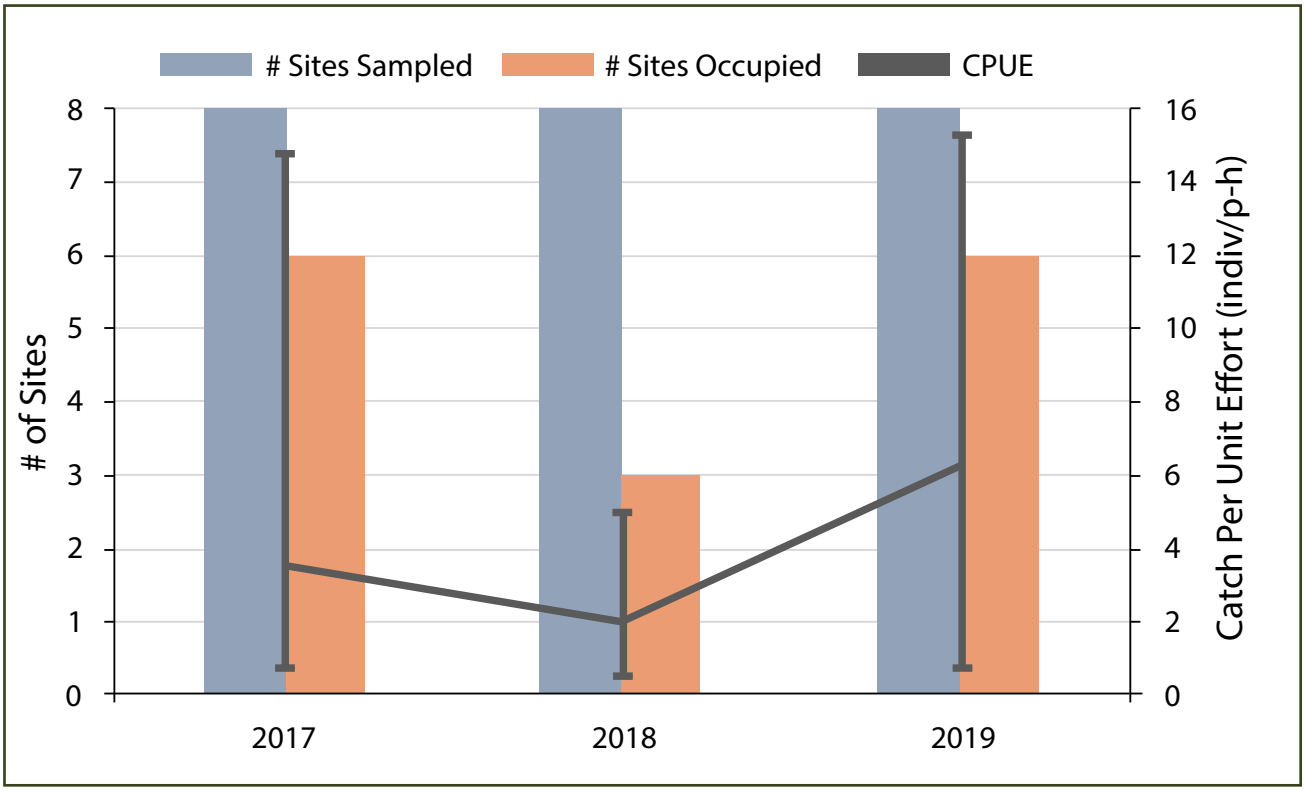
The North Carolina Sea Turtle Stranding and Salvage Network, coordinated by Wildlife Commission biologists, monitors sea turtle strandings along North Carolina's coast throughout the year. During winter months, when inshore water temperatures drop below 50°F, sea turtles strand due to hypothermia or cold-stunning. The 2019-20 winter has so far produced 191 cold-stunned sea turtles since mid-November (182 green turtles, 7 Kemp's ridleys, and 2 loggerheads). The majority (>90%) of these cold stuns occurred in a mass stranding event from Dec. 19-23, 2019 when 170 cold-stunned turtles were found between Carteret County (n=59) and Dare County (n=111). To date, 179 live, cold-stunned turtles have been recovered and admitted to rehabilitation facilities — 23 of those turtles have already been released offshore and several more will be cleared for release soon.

A subset of the live sea turtles recovered from Cape Lookout Bight during the mass stranding event in December 2019. These turtles received health assessments and initial care at NCSU's CMAST before being transferred to rehabilitation partners (NC Aquariums and Karen Beasley Center). *(Photo: Dr. Matthew Godfrey)*

Carolina Pygmy Sunfish Monitoring Continues in Southeastern Counties

Wildlife Diversity Program staff continued annual monitoring surveys for the Carolina pygmy sunfish, a State Threatened species endemic to Columbus and Brunswick counties in North Carolina and small portions of the coastal plain in South Carolina. Of eight previously occupied localities sampled in October, staff collected Carolina pygmy sunfish at six, including a tributary population outside of the core range of Juniper Creek, which was newly discovered in early 2018. Carolina pygmy sunfish are still present and catch per unit effort (CPUE) ranged from 0.7 to 15 individuals per person hour. It does appear that the species has returned to areas where cover vegetation has recovered following the catastrophic flooding that occurred in fall 2018. Staff collected additional species classified as Species of Greatest Conservation Need, including the Everglades pygmy sunfish (four localities), banded sunfish (six localities) and snail bullhead (one locality).

Carolina pygmy sunfish *(Photo: Tim Aldridge/NANFA)*



Carolina pygmy sunfish monitoring results by year. Black line indicates average CPUE values, with vertical black bars indicating maximum and minimum CPUE for each year. 2018 sampling was conducted two months after Hurricane Florence.

Pine Snake Nest Excavated During Snake Surveys

Wildlife Diversity Program (WDP) staff surveyed for upland snakes during October—a particularly important month for detections of the southern hognose snake, eastern hognose snake, eastern coachwhip, northern pine snake and many other species. Overall, 2019 was a poor year for detections of southern hognose snakes with some of the lowest detection numbers in recent years, but at least a few adults were found. However, the story proved slightly brighter for the northern pine snake. Through telemetry work conducted by Jeff Beane, supported by both the N.C. Museum of Natural Sciences and Project Simus, NCWRC staff assisted with an assessment of a pine snake nest. Only nine nests have been found and excavated in North Carolina, including the one from this fall. That nest contained seven eggs, and all hatched out. Typically difficult to find, this nest was only revealed through radio tracking of an adult female that Beane believed had laid eggs. This was not confirmed, however, until the nest was unearthed, and the hatched eggs revealed successful reproduction.

Northern pine snake nest being excavated by NCWRC staff, N.C. Museum of Natural Sciences staff, and Project Simus staff (Photo: Jeff Hall)

Northern pine snakes lay the largest eggs of any snake in North America.

Northern pine snake eggs excavated from nest chamber. (Photo: Jeff Hall)

Other NCPARC News

In early November, NCWRC staff from both WDP and Law Enforcement attended a regional meeting on turtle conservation. Lt. Mark Cagle and Jeff Hall were invited to co-present about ongoing efforts in North Carolina regarding reptile trafficking and to highlight cooperation between Wildlife Management and Law Enforcement divisions. Cagle and Hall presented the details of some of the major reptile cases in the state and also emphasized the importance of training. Cooperation between management biologists and law enforcement officers has been key to the success of these cases and important in decision-making about final disposition of confiscated animals.

In November and December, staff assisted with a N.C. State University (NCSU) project surveying for the Neuse River waterdog. Through financial assistance from NCWRC, a graduate student is assessing detectability and occupancy for this interesting salamander. The Neuse River waterdog was recently proposed for federal listing under the Endangered Species Act as Threatened, and this NCSU study will help reveal management actions that can be taken to assist recovery of the species.

WDP staff visited many coastal wetlands to assess potential for amphibian Species of Greatest Conservation Need (SGCN). SGCN species surveyed for included southern chorus frog, ornate chorus frog, gopher frog, Mabee's salamander, eastern tiger salamander and four-toed salamander. Work will continue surveying for these species through early spring.

Neuse River waterdogs in a minnow trap during field surveys (Photo: Jeff Hall)

Field surveys for the Neuse River Waterdog with NCSU grad student, volunteers and NCWRC staff (Photo: Jeff Hall)

Staff Conduct Surveys for Broadtail Madtoms; Deploy "Motels" for Tiny Catfish

Aquatic Wildlife Diversity Program staff conducted surveys for the broadtail madtom (State Special Concern), a rare, undescribed native catfish, to provide data to inform management decisions and aid species descriptions. Endemic to a handful of coastal plain basins in the Carolinas, less than a dozen of these hard-to-collect fish have been captured in surveys between 2008 and 2016. In October and November 2019, staff visited 55 sites totaling 78 person-hours in Lake Waccamaw, the Lumber River and tributary creeks of the Lumber basin, and the South and Black Rivers of the Cape Fear basin.

Staff collected nine individual broadtail madtoms at four sites, from the Lumber River and its tributary, Shoe Heel Creek. Sampling effort averaged 32 kick-seines per site, with an average catch per unit effort of 0.11 broadtail madtoms per person hour. No broadtail madtoms were collected from Lake Waccamaw or the Cape Fear basin during these targeted surveys. Staff deployed 20 small, artificial cover structures, informally named “madtom motels,” at three occupied sites. Staff will periodically check the structures for occupancy and deploy additional units across multiple localities during 2020. Additional SGCN fish species collected during the survey include the Pinewoods darter, thinlip chub and Waccamaw darter.

Aquatic Wildlife Diversity staff deployed 20 madtom motels at three sites occupied by broadtail madtoms. *(Photo: Katharine DeVilbiss)*

Broadtail madtoms *(Photo: Katharine DeVilbiss)*

The North Carolina Birding Trail Launches New Website

Each year, over 1.9 million people participate in bird watching at their home or on trips, bringing hundreds of millions of dollars to the state's economy. The North Carolina Birding Trail (ncbirdingtrail.org, Facebook, Twitter) has served as a roadmap to the state's incredible birding and wildlife heritage, spurring ecotourism and strengthening people's connection with nature for 15 years.

The goal of the NCBT has always been to encourage use of the outdoors by providing easily accessible information. This year, the NCBT has increased its reach by completely re-designing its website with a mobile-friendly design, allowing users to access it from any Internet-connected device. The website lists descriptions, habitats, recent notable bird sightings, and navigation links for each site on the Trail. It will also be used as a platform for engaging, bird-related information like the recent "What is Birding?" series of essays. Check it out!

New NC Birding Trail website is mobile-friendly

Cedar Point Tideland Nature Trail

(Photo: Scott Anderson)

Patsy Pond Nature Trail Nature Trail

(Photo: Scott Anderson)

Staff Collect No Carolina Madtoms During Recent Survey

In October, Wildlife Diversity Program staff continued Carolina madtom surveys in the Neuse Basin to collect brood stock in collaboration with Conservation Fisheries Inc. Surveys were concentrated in the Little River (Johnston County) and in Contentnea Creek (Wilson County). The Carolina madtom is a small, rare catfish endemic to the Tar and Neuse River basins. It is state listed as a threatened species. Surveys consisted of snorkeling and low frequency electrofishing. Staff collected no Carolina madtom but efforts will continue next summer to collect brood stock for propagation purposes.

While staff collected no Carolina madtoms during recent surveys, they did observe this Neuse River waterdog, a state-listed species of special concern. (Photo: NCWRC)

Saving a Streambank to Save a Bog Community

As the frequency of intense storms increases due to climate change, biologists are seeing more severe stream erosion on the landscape, storm events that yield higher daily rainfall amounts, greater volumes of run-off, and thus more erosive flows in streams and rivers. They have also observed the impact these intense storms can have on the Southern Appalachian bog natural community that is often located adjacent to a stream. In several cases, they have observed severe streambank erosion that threatens the hydrology of an adjacent bog. At a bog in Ashe County, the stream had eroded and migrated over so far that it resulted in a new hydrological connection between the bog and the stream. Not only did water begin to flow out of the bog and into the stream, decreasing the degree of saturation in part of the bog, but the streambank also threatened to eventually erode and drain the bog. With an emergency on their hands, staff took action to temporarily stabilize the streambank and prevent further detriment to the bog community until a full stream restoration can be initiated.

Southern Appalachian bogs are a unique and rare habitat type and has a diverse plant and animal community, including populations of bog turtles. Bog turtles are listed as

Wildlife Diversity Program Biologist Gabrielle Graeter holds a bog turtle found during an annual survey. (Photo: Melissa McGaw/NCWRC)

(continued on page 13)

Saving a Streambank to Save a Bog Community (continued)

federally Threatened (S/A) and state listed as Threatened in North Carolina. Unfortunately, the threats this species and their habitat face are numerous. Fortunately, through funding from the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program and collaboration with the private landowner and many partners, Wildlife Commission staff were able to complete the stream stabilization effort in fall 2019. Before the project began, the stream bank was eroding and moving closer to the bog's edge with each storm event (Figure 1). The stream bank was stabilized with large boulders and erosion control matting, the area where they were connected hydrologically was secured to minimize water flow out of the bog, and all areas where the soil was disturbed were seeded and covered with straw immediately to minimize erosion (Figure 2).

This project was successful because it was installed before any bog habitat was lost and has held back erosion during subsequent large storm and flooding events. The true success will be when staff can fully restore this stream segment and bring it even greater stability for the bog and stream in order to conserve bog turtles and native brook trout. The Wildlife Commission will need help from many partners and finding sufficient funding and resources may be challenging, but by working closely with partners, prioritizing efforts, and taking effective on-the-ground action, there is still hope for this bog and bog turtle population and others facing similar threats.

Juvenile bog turtle (Photo: Gabrielle Graeter/NCWRC)

Figure 1. As seen in this photo from May 2019, prior to the project, the streambank was eroding at a rapid pace and getting closer to the bog habitat with every large storm event. The shrubby area just beyond the sloughing streambank marks the edge of the bog habitat. (Photo: Gabrielle Graeter/NCWRC)

Figure 2. Large boulders and matting were used to stabilize the formerly eroding stream bank. The bog edge is immediately behind the pink flagging. Large gravel was laid down adjacent to the boulders to ensure the farmer could access his hayfield again. (Photo: Gabrielle Graeter/NCWRC)

5,075 Robust Redhorse Fingerlings Stocked into Pee Pee River in November

In November 2019, 5,075 Phase I (6 months old) robust redhorse fingerlings raised at the S.C. Department of Natural Resources' Dennis Center and Wildlife Commission's McKinney Lake Fish Hatchery in Hoffman were stocked into the Pee Dee River in North Carolina. These fish were the products of adults collected in the Pee Dee River spawning shoals in North Carolina in spring 2019. Another 700 were held back at McKinney Lake Hatchery to grow out to Phase II (18 months old), which will be stocked in the winter of 2020. An additional 126 Phase II fish from the 2018 year-class were PIT-tagged and released at the same time.

Katharine DeVilbiss releases Phase II robust Rredhorse into the Pee Dee River.
(Photo: Joseph McIver)

Juvenile robust redhorse
(Photo: Todd Pusser)

Head Start on Winter Bat Surveys Pays Off

Wildlife Diversity Program biologists kicked off the winter bat survey season during the last quarter of 2019. These surveys typically occur in January and February each year, but with continued questions about bat hibernacula locations and the spread of white-nose syndrome (WNS), the winter survey season needed an early start. The goal for early surveys at Piedmont mines was to deploy monitoring equipment at mine entrances and interiors to track temperatures and bat activity throughout winter. These data will indicate how suitable the mines are for Pseudogymnoascus destructans (the fungus that causes WNS) growth and how vulnerable bats may be to the disease.

During one of these early surveys, 32 tricolored bats -- a record high -- were counted in a Nash County mine. The entrance to this mine was recently rehabilitated by Engineering, Habitat Conservation, and Wildlife Diversity Program staff to ensure continued winter habitat for bats. Documenting the highest bat count at the site is encouraging evidence that changes to the entrance did not deter returning bats.

Another highlight occurred during the survey of the maternity cave used by Virginia big-eared bats in the summer months. A Virginia big-eared bat was found hibernating in the cave for the first time. Other caves used by hibernating Virginia big-eared bats will be surveyed in January as part of ongoing monitoring efforts for this endangered species and hibernacula surveys will continue across the state throughout the winter.

A hibernating tri-colored bat in a Nash County Mine *(Photo: Olivia Munzer/NCWRC)*

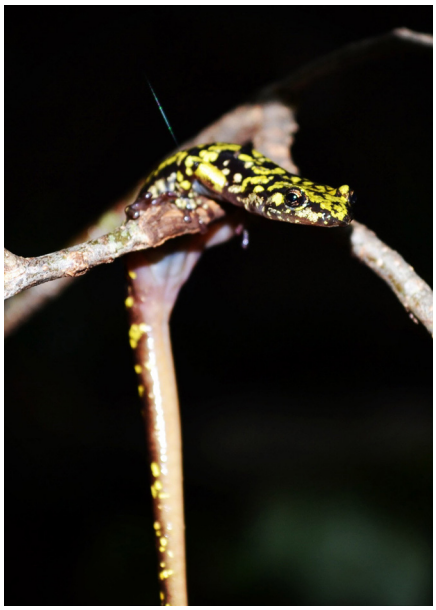
A hibernating Virginia big-eared bat
(Photo: Katherine Etchison/NCWRC)

North Carolina's Newest Endemic Salamander Species is Official

Since 2008, Wildlife Diversity Program staff volunteers have been collecting tail tissue samples from state threatened green salamanders (*Aneides aeneus*) to bank for future genetic research. By 2013, staff helped form a collaborative partnership with several additional researchers including conservation geneticists. Through this collaboration, the research team pursued a long-standing question, dating back at least to the 1990s, of whether the disjunct population of green salamanders in the Hickory Nut Gorge (Buncombe, Henderson, Rutherford, Polk counties) warranted a separate species status. In recent years, and at long last, the question was answered. The culmination of this work was realized in December 2019 with a published peer-reviewed, journal article officially describing North Carolina's newest endemic species, the Hickory Nut Gorge Green Salamander (*Aneides carayaensis*), based on genetic analysis and significant differences in physical traits.

Like other green salamander populations throughout the Appalachians, this species needs mature forests with rock outcrops or cliffs that are shaded, humid, moist but not saturated, and with clean rock crevices wide enough and deep enough for salamanders to use in their various life stages and seasonal habitat needs. The Hickory Nut Gorge is a small geographic area, and relatively few sites and few individuals have been documented for the species, yet the threats to the species and its habitat continue to grow. The main threats include loss of forests especially near rock habitat, increased landscape fragmentation from road building and other development, disease, climate change, possibly overcollection, and in more recent years, wide-scale, intense wildfires and landslides. Staff and partners plan to continue looking for new sites, monitoring existing ones, conserving habitat, and researching this unique, rare species and newest member of the state's salamander community.

*The rare Hickory Nut Gorge Green Salamander (*Aneides caryaensis*), North Carolina's newest endemic salamander species* *(Photo: Lori Williams/NCWRC)*



Hickory Nut Gorge Green Salamander *(Photo: Dr. JJ Apodaca)*

Hickory Nut Gorge Green Salamander
(Photo: Dr. JJ Apodaca)

Golden-winged Warbler Habitat along the Cherohala Skyway Restored

A small cluster of golden-winged warblers in the Unicoi Mountains of Graham County was given room to grow. Biologists anticipated the cluster on the Cherohala Skyway serving as a source for colonizing new timber harvest units in the U.S. Forest Service's nearby Santeetlah project area. Indeed, at least one of the harvest units was occupied in May. However, just as new habitat associated with the Santeetlah project became available, habitat along the Skyway became unsuitable or "aged out" beyond what golden-wings will use. The section of Skyway between mileposts 14 and 15 has supported golden-winged warblers for many years, but Sue Cameron of the U.S. Fish and Wildlife Service found none during her annual surveys in 2019. Fortunately, the Wildlife Commission and partners had identified habitat improvement along the Skyway as a priority to maintain and grow this cluster. The Wildlife Commission and the U.S. Forest Service developed a project to set back succession along this part of the Skyway. They used Google Earth leaf-off satellite imagery from 1993 and 2013 to compare the extent of canopy closure for each timer period and then delineated potential treatment areas.

In November, a team of six staff from the Wildlife Diversity Program and the Cherokee and Nantahala National Forests treated approximately seven acres by felling small trees in open areas where a young forest canopy was closing.

In December, a team of five staff from the Wildlife Commission's Land and Water Access, Wildlife Diversity Program, and Nantahala National Forest cut stump sprouts below Shute Cove overlook. Completion of remaining work at the Obadiah overlook will restore 10+ acres of habitat. Staff anticipate a much better outcome in the spring 2020 bird survey.

Pre-treatment conditions along the Cherohala Skyway
(Photo: Christine Kelly/NCWRC)

Post-treatment conditions along the Cherohala Skyway
(Photo: Christine Kelly/NCWRC)