



NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

# WILDLIFE DIVERSITY PROGRAM QUARTERLY REPORT

JANUARY-MARCH 2022







The North Carolina Wildlife Resources Commission's (NCWRC) Wildlife Diversity (WD) Program is housed within the agency's Wildlife Management and Inland Fisheries divisions. Program responsibilities principally include surveys, research and other projects for nongame and endangered wildlife species. Nongame species are animals without an open hunting, fishing or trapping season.

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*Henslow's Sparrow (Frode  
Jacobsen)*



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Cover photos from top left clockwise: Wildlife Diversity Technician, Kyle Shute, searches for hibernating bats in a Macon County cave (Katherine Etchison); Partners in Amphibian and Reptile Conservation Biologist Jeff Hall holds an adult Neuse River Waterdog (Kabryn Mattison); Western Bird and Carolina Northern Flying Squirrel Biologist Christine Kelly inspects an audio recorder unit installed to detect saw-whet owls; and Partners with NCSU CMAST and NOAA Beaufort respond to a remote cold stun on Cedar Island. (Larisa Avens, NOAA Beaufort)





## Staff Detect No Gopher Frog Breeding Activity in the Sandhills this Season

by Dr. Jeff Humphries, Eastern Amphibian and Reptile Biologist

During the first quarter of 2022, N.C. Wildlife Resources Commission biologists in the Sandhills continued their annual Gopher Frog surveys. Gopher Frogs are one of the rarest frogs in North Carolina and currently only occur in six to seven populations statewide. On the Sandhills Game Land, staff have been monitoring breeding of these frogs since 2010. During that time, frogs have bred every year except for 2011-2013 when water wasn't present in any breeding wetlands.

During this year's breeding season, Gopher Frogs did not attempt to breed in any known breeding wetlands, despite some wetlands being at least partially full of water. This year's lack of breeding may just be an anomaly, but could have something to do with climate change and changes in the patterns of rainfall events this time of year. Regardless of the cause of lack of breeding, monitoring these wetlands annually is key to tracking the health of populations of Gopher Frogs and other species of concern.



Gopher frogs mating underwater in the Sandhills of North Carolina in 2021 (Michael Martin)

## 161 Cold-Stunned Sea Turtles Stranded this Winter

by Dr. Matthew Godfrey, Sea Turtle Biologist



During winter months, NCWRC biologists and the North Carolina Sea Turtle Stranding and Salvage Network respond to sea turtles that strand due to hypothermia or cold-stunning along the NC coast. The 2021-22 winter produced 161 cold-stunned sea turtles from late November through February, but most of these cold stuns occurred over 3 consecutive cold snaps in January. There were 92 live turtles that were taken to rehabilitation centers, 54 of which have been released to date. Most cold stuns are recovered from Cape Lookout Bight and Pamlico Sound along Hatteras, but cold-stunned turtles can sometimes be found in more remote locations, such as Cedar Island.

Partners with NCSU CMAST and NOAA Beaufort respond to a remote cold stun on Cedar Island. The subadult loggerhead was alive and had been cold-stunned. It was transported to the Karen Beasley Sea Turtle Rescue and Rehabilitation Center. (Larisa Avens, NOAA Beaufort)



## Aerial Surveys for Inland Wading Birds Begin

by Carmen Johnson, Waterbird Biologist; Constance Powell and John Lynch, Wildlife Technicians

In late March 2022, the NCWRC Waterbird Team began an effort to conduct aerial surveys for inland nesting long-legged wading birds. Flights were scheduled to search for nests before leaf-out to prevent foliage from hampering detectability by surveyors. Heron and egret colonies can be found along the edges of marshes, estuaries, ponds, lakes, Carolina bays, and rivers. Here, the birds can forage in the shallow water and build their nests in water-surrounded trees that protect them from mammalian predators.

These surveys provide the NCWRC with data to better understand these populations and aid management decisions. Staff are grateful to Laura Early with the non-profit SouthWings, who organized the flights for them, and especially to volunteer pilot Art Falk who flew them in his Cessna 182Q.

Staff also are thankful to have had the experienced help of Eastern Wildlife Diversity Supervisor Dave Allen on two of their surveys this spring. Dave retired at the end of March, and they are honored he spent some of his last days with the NCWRC in the field with them.



Art Falk's Cessna 182Q (Constance Powell)



Technicians Constance Powell and John Lynch ready to fly (Constance Powell)





## Eastern Chipmunk Survey Reveals Eight New County Records

by Andrea Shipley, Mammalogist

In March 2021, the NCWRC's statewide mammalogist received an observation of an eastern chipmunk in the southern Coastal Plain. This observation was the first within the central or southern Coastal Plain region of North Carolina. Because she was curious if the observation was due to a one-time anthropogenic event or natural range expansion, she developed a public survey with the NCWRC's Human-Wildlife Interactions (HWI) program and communications team, which used a press release and an newsletter announcement for participation in the survey, requesting specific information including address or

GPS location of the observation and a clear photo. Observations that included both pieces of information were defined to be "confirmed." The agency began receiving observations in July 2021, most of which were unable to be confirmed. During this quarter, a database of all confirmed observations was developed, the results of which expanded the state range of the eastern chipmunk in North Carolina significantly. To confirm natural range expansion in the Coastal Plain, staff will continue to sur-

vey the public through an observation request using a press release and social media.

Live capture efforts at the confirmed observation sites are

**Eastern chipmunk observations have been confirmed in eight new counties: Anson, Brunswick, Cumberland, Dare, Franklin, Montgomery, New Hanover, Richmond and Union.**

planned for fall 2022, to collect museum specimens and genetic samples. A new state range map for eastern chipmunks will be developed based on results of the survey.





## Staff Prepare for Second Season of Henslow's Sparrow Research Project

by John Carpenter, Eastern Landbird Biologist

During the first quarter of 2022, preparations have been made for the second field season of the agency's Henslow's Sparrow (HESP) research project. This collaborative effort, which includes North Carolina State University and the U.S. Geological Survey's North Carolina Cooperative Fish and Wildlife Research Unit, is designed to help biologists better understand how these state-listed endangered sparrows are responding to habitat management on the NCWRC's Voice of America Game Land. Biologists are conducting surveys to estimate population size and using cutting-edge tracking equipment developed by Cellular Tracking Technologies to map movements and habitat use of male Henslow's Sparrows. To harness the power of this equipment and detection system, they established two sensor stations, each equipped with a 30-ft. antenna and paired with a grid of "nodes" that continuously communicate with each other to track the movements of birds wearing a solar-powered transmitter. Preliminary results indicate that the HESP population includes 392 males (95% Confidence Interval: 314-539 males) and an annual population growth rate of 2%. Tracking data are being evaluated to produce territory and home range estimates, which will include maps that predict a sparrow's probability of using an area within the game land. On a related note, the Henslow's Sparrow Draft Conservation Plan was available for public comment for 30 days during this quarter. Staff will review and respond to comments, then present the plan to the Commission Board. Species conservation plans present biological information, causes of decline, conservation goals and potential conservation actions, and are intended to guide agency efforts to maintain and increase populations of declining species in North Carolina.



Male Henslow's Sparrow wearing a solar-powered transmitter  
(Emily Nastase/NCSU)





## Northern Saw-whet Owl Bioacoustics Project Expands

by: Christine Kelly/ Western Bird and Carolina Northern Flying Squirrel Biologist

In late winter 2022, it was time for the next step in a bioacoustics project for Northern Saw-whet Owls. This effort was initiated last year when Wildlife Diversity staff did a trial run using large audio recorder units (ARUs) from the NCWRC's wild turkey study. The article, "[State of the Gobble](#)," was featured in the January/February 2022 issue of *Wildlife in North Carolina* magazine.

To sample extensive areas in remote parts of the owl's range, biologists need a smaller, compact ARU. In March 2022, Dr. DJ McNeil from the University of North Carolina-Wilmington helped Commission biologists deploy five dozen small ARUs across four massifs in western North Carolina.

The objective this season is to record as many calls of

northern saw-whet owls as possible. These calls will be used to build a call recognizer that can sort through thousands of wave files to detect the signature of an owl call. Thus, this go-around, biologists biased sampling sites to locations with recent or historic records of a saw-whet owl. These ARUs were

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retrieved in April 2022. NCWRC biologists are planning the next phases with Dr. McNeil. We anticipate deploying ARUs randomly across the potential range of the owl. They will use information from their trial study to inform the design of a long-term monitoring program that will answer questions such as, “What is the occupancy rate of northern saw-whet owls in conifer, mixed-species, and deciduous forests?”, “At what time in the spring are the owls most detectable?”, and “What time of night do they call the most?” These questions will help biologists fine-tune their sampling to the season and time of night when the owls are most easily detected on an ARU to facilitate long-term monitoring.



*Top left: During deployment, Wildlife Diversity Technician Clifton Avery spotted this saw-whet owl poking its head out of a nest box in spruce forest managed by the NCWRC.*

*Top right: Dr. DJ McNeil deploys a small ARU for owls in March 2022; Left: A small Automated Recording Unit attached to a red spruce tree in saw-whet owl habitat (Photos: Christine Kelly)*





## Biologists Find Increases in Tricolored and Rafinesque’s Big-eared Bats during Winter Bat Surveys

by Katherine Etchison, Mammalogist

Long-term hibernacula surveys in the mountains detected generally stable count numbers in winter 2022, except at two caves on a property in Macon County. These caves harbored 80 tricolored bats, an increase of 60 from the last count in 2018. Winter counts of tricolored bats in the North Carolina mountains have declined by 95% since the arrival of White-nose Syndrome (WNS) in 2011. The increased numbers at these caves are en-

couraging, and may be evidence of reproduction by WNS survivors and potential immigration from a nearby cave that experienced a landslide in 2020. Factoring in the bats from the nearby cave, this is still an increase of 47 tricolored bats since 2018.

Rafinesque’s big-eared bats are not known to be susceptible to WNS but are sensitive to human disturbance at winter and summer roosts. Habitat loss is also a threat to the species.

Two large hibernacula for this species in Swain County have shown fluctuating, but generally declining counts over the last two decades. This year’s count of 827 Rafinesque’s big-eared bats was the highest since 2009 and continued an increase first noted in 2019. This growth could be an indication that disturbance and habitat loss are not threats to this particular population in the Great Smoky Mountains.

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Wildlife Diversity Technician, Kyle Shute, searches for hibernating bats in a Macon County cave. (Katherine Etchison)







Eight long-term hibernacula in the North Carolina Piedmont were surveyed by Habitat Conservation Division staff, seven of which experienced increases in tricolored bats numbers. One-hundred-forty (140) tricolored bats were counted across all sites,

which is an increase of 52 bats from the 2019 survey. The fungus that causes WNS has been detected in six Piedmont counties, but visible signs of the disease have been encountered in only two hibernacula. It is interesting that the spread of WNS has been much slower and less deadly in the Piedmont and may be due to multiple factors, including lower densities of bats at hibernacula and shorter or more intermittent hibernation periods.



*Left photo: A tricolored bat shows visible signs of White-nose Syndrome in a cave in Macon County. Below: Hibernating Rafinesque's big-eared bats in a mine in Swain County (Photos: Katherine Etchison)*







## Zigzag Salamander Surveys Conducted in Buncombe, Madison Counties

by Lori Williams, Western Amphibian Biologist

In early spring 2022, Wildlife Diversity staff focused terrestrial surveys on a rare, little-studied, woodland salamander in the mountain region, the Southern Zigzag Salamander. Listed as state Special Concern and a Species of Greatest Conservation Need in the N.C. Wildlife Action Plan (2015), Southern Zigzag Salamanders can be difficult to find outside of early spring because of their tendency to remain underground in loose, well-drained soils and rocky slopes during the warmer months of the year. The

distribution of these salamanders is poorly understood and currently includes only three mountain counties in the greater French Broad River Valley: Buncombe, Madison, and Yancey (historical museum records also include one record each from Henderson and Haywood). Biologists' main objective this spring was to expand their knowledge of where the species occurs. Staff surveyed 20 sites in Buncombe and Madison counties, finding Southern Zigzag Salamanders in seven, six of which were at new

sites. All were found on public lands, including both the east and west sides of the French Broad River. In past surveys, the relative abundance of Southern Zigzag Salamanders has been low compared to more commonly found salamanders, and this spring's results were similar with only 42 individuals found in total. Future survey work will continue to focus on understanding distribution of this rare species in North Carolina.

*Bottom photo: Adult Southern Zigzag Salamanders typically have more muted coloration overall, but the orange "wash" under the arms is a good clue for identifying the species regardless of age. Right photo: The Southern Zigzag Salamander gets its name from the reddish-brown stripe with irregular edges on its back, particularly evident in younger individuals (Photos: Ben Dalton)*







## Planning and Coordination are Key in Implementing Bog Turtle Conservation Projects with the Partners for Fish and Wildlife Program

by Gabrielle Graeter, Conservation Biologist/Herpetologist

Bog turtles and their habitat — mountain bogs — are significant conservation concerns in North Carolina; therefore, the NCWRC prioritizes conservation and management of wetlands with known bog turtle populations. The bog turtle (*Glyptemys muhlenbergii*, federally- (S/A) and state-listed threatened) and mountain bogs face a myriad of threats, such as predation, fragmentation by roads, excessive shading from woody vegetation, and changes in hydrology.

Much bog habitat management by the NCWRC has been funded using State Wildlife Grant funds and has relied heavily on assistance from volunteers during workdays and has been small in scale. Recently, the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program (PFW) funding received by NCWRC has helped reduce the need for volunteers during bog habitat management and restoration projects. The PFW Program focuses on privately owned lands, and through the program, NCWRC provides technical and financial assistance to landowners interested in restoring and enhancing wildlife habitat. Through the PFW Program, NCWRC is working with con-

tractors and private landowners to accomplish much more bog habitat enhancement than would have been possible otherwise.

For example, at one site, staff from multiple divisions, including Engineering and Habitat Conservation, completed a design, addressed permitting needs, and lined up a contractor to help restore hydrology in a former wetland that was impacted by a driveway (Figure 1). Soon, contractors will reduce woody

vegetation in an area of the wetland that has become overgrown and too shaded for bog turtles. Additionally, non-native invasive plants, such as multi-flora rose, will be removed.

At a second site, a restoration design plan will address severe head-cutting erosion that is affecting wetland hydrology. At a third site, staff will improve bog turtle nesting habitat and protect

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Figure 1. A former wetland that will have its hydrology restored in spring 2022 with USFWS's Partners for Fish and Wildlife program grant to the NCWRC (Gabrielle Graeter)



nests with predator excluder cages until the eggs hatch in late summer. The fourth project involves installing a short wildlife fence to create a safe under-road passage for bog turtles and other wildlife via existing bridges (Figure 2). For each of these sites' projects, NCWRC staff developed detailed landowner agreements and project plans, and organized many meetings with partners and the private landowners to ensure success.



Figure 2. Examples of wildlife exclusion fencing used to reduce bog turtle mortality on roads (from [Animexfencing.com](http://Animexfencing.com)). This type of fencing will be installed using PFW funds at a property in North Carolina to direct bog turtles and other small wildlife into existing under-road passages. (Gabrielle Graeter)

## How YOU Can Support Wildlife Conservation in North Carolina

Whether you hunt, fish, watch, or just appreciate wildlife, you can help conserve North Carolina's wildlife and their habitats and keep North Carolina wild for future generations to enjoy.

How? It's as easy as 1, 2, 3.

- 1 Donate to the Nongame and Endangered Wildlife Fund by checking Line No. 30 on your N.C. State Tax Form.
- 2 Purchase a Wildlife Conservation Plate, which features an illustration of a Pine Barrens Treefrog, for \$30, with \$20 going to the agency's Nongame and Endangered Wildlife Fund.
- 3 Donate to the Wildlife Diversity Endowment Fund, a special fund where the accrued interest — not the principal — is spent on programs that benefit species not hunted or fished. [ncwildlife.org/donate](http://ncwildlife.org/donate)







## N.C. Partners in Amphibian and Reptile Conservation News-Amphibians

by Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist

The first quarter of 2022 was historically poor for many breeding amphibians. As an example, this is the first year since staff have been monitoring for Gopher Frogs (15 years now) when no breeding was detected in any of the seven populations in North Carolina. Similarly, poor breeding conditions existed for the Ornate Chorus Frog and Southern Chorus Frog.

On the other hand, survey efforts for the Neuse River Waterdog proved very fruitful. As with the past several years, NCWRC staff supported efforts of a graduate student at N.C. State University and helped conduct surveys at several sites. One of the sites staff surveyed this year held some historical numbers, but in a good way! On day two of surveys (traps are set on day one), staff caught 46 waterdogs at a site including one trap that held 14 individuals. Among those 46 animals, staff caught two adults that were very large, including two nearly 12 inches in length. Day



Clockwise from top left: Partners in Amphibian and Reptile Conservation Biologist Jeff Hall holds an adult Neuse River Waterdog (Kabryn Mattison); Wildlife Diversity Technician Kabryn Mattison with recently trapped Neuse River Waterdogs (Jeff Hall); Southern Chorus Frog from Beaufort County (Jeff Hall)





## N.C. Partners in Amphibian and Reptile Conservation News-Reptiles

three yielded 18 waterdogs, day four included eight and day five held six. Total captures for the week included 78! Images of each animal were recorded each day, so staff will be combing through those images to determine whether any animals caught on subsequent days were recaptures. Staff are excited to see these salamanders doing so well at a site!

### REPTILE SURVEYS

Reptile surveys in February and March proved successful as well. Large acreages of land managed by state and federal agencies received prescribed fire across eastern North Carolina, allowing for increased survey effort. Staff encountered many snake Species of Greatest Conservation Need such as Eastern Diamondback Rattlesnake, Carolina Pigmy Rattlesnake, Mole Kingsnake and Scarlet Kingsnake.



Among the species staff found during reptile surveys in February and March were (clockwise from top left) the Carolina Pigmy Rattlesnake in Carteret County, Scarlet Kingsnake from Brunswick County and Eastern Diamondback Rattlesnake from Onslow County. (Photos: Jeff Hall)





## Staff Conduct Least Brook Lamprey Surveys in the Tar and Neuse Basins

by Michael Fisk, Eastern Aquatic Wildlife Diversity Coordinator

The Wildlife Diversity Program Staff surveyed for Least Brook Lamprey for the second year in a row to collect data on the distribution and life history of this unique fish. The objectives of these surveys were to update the known distribution of the species and describe spawning habitat. In February and March, staff visually surveyed streams in the Tar and Neuse Basins by walking stream banks, searching for spawning individuals. Surveys were restricted to shallow streams with good visibility.

A total of 97 Least Brook Lamprey were observed from 7 unique sites. Of these, 47 Least Brook Lamprey were collected from Bens Creek, Bear Swamp, and Little Shocco Creek in the Tar Basin. In the Neuse Basin, 50 Least Brook Lampreys were collected from Pearl Creek, Beddingfield Creek, and two unnamed tributaries that flow into Middle Creek and the Little River.

On average female Least Brook Lamprey were slightly larger than males and ranged from 103–145 mm and averaged 127 mm compared to males that ranged 100–143 mm and averaged 124 mm. Least Brook Lamprey were found excavating nests and actively spawning in the crests of riffles and runs with moderate flows. Mean nest depth was 10.2 cm (range 2–26 cm) and water



Least Brook Lamprey (Michael Fisk)

temperature ranged from 11.3 C°–17.3 C° during observed lamprey activity.

Additional surveys were conducted in the Roanoke Basin to document lamprey spawning during the same time frame. These efforts were based on 2021 observations from a local Halifax County resident, Rufous Johnson, who provided video of spawning lampreys in the Quankey Creek watershed around Halifax. A group including Mr. Johnson, NCWRC staff and Bryn Tracy and Fritz Rhode with NC Fishes, documented American Brook Lamprey in this watershed in an unnamed tributary of Quankey Creek and in Little Quankey Creek. The American Brook Lamprey, listed as a species of Special Concern, is known to occur in the upper Roanoke Basin in Virginia, however, these are the first records of the species in

this basin in North Carolina. It also expands the range of the species within North Carolina where previous records were restricted to Western North Carolina in the French Broad Basin in Madison County. A total of 17 individuals were observed. Mean total length for females was 153 mm (range = 143–159 mm). Male mean total length was slightly larger at 156 mm (range = 139–165 mm). American Brook Lamprey were observed actively excavating nests and spawning as well as migrating upstream to spawning habitats.

Future surveys will target spawning individuals in February and March of 2023 and this summer staff will survey for juvenile lamprey throughout their range in the Eastern Region. Information collected from juvenile surveys will help gain a better understanding of the life history of these cryptic species.