NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

WILDLIFE DIVERSITY PROGRAM QUARTERLY REPORT

JANUARY-MARCH 2024

The North Carolina Wildlife Resources Commission's (NCWRC) Wildlife Diversity (WD) Program is housed within the agency's Inland Fisheries (Aquatic Wildlife Diversity) and Wildlife Management 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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Cover photos from top left clockwise: Wildlife Diversity Technician, Joey Weber, searches for roosting bats under a replaced bridge on the Coastal Plain (Katherine Etchison); Wildlife Technician Kabryn Mattison holds an adult Tiger Salamander found during winter amphibian surveys (Jeff Hall); Eastern Region Aquatic Wildlife Diversity Coordinator Michael Fisk with technicians Dorian Hayes and Laureen Riggins installing mussel cages for an experiment; NCWRC's Wes Humphries and Kendrick Weeks install the metal mast for the antennas at the Mud Creek Motus Station (Chris Kelly).

Response to Sea Turtle Cold-stun Events along the North Carolina Coast in Winter 2024

by Dr. Matthew Godfrey, Sea Turtle Biologist and Sarah Finn, Coastal Wildlife Diversity Biologist

Sea turtles are ectothermic and susceptible to becoming cold-stunned when they encounter cooler water temperatures along the North Carolina coast in winter months. There were several hundred cold-stunned sea turtles found along the coast between November 2023 and March 2024 by the North Carolina Sea Turtle Stranding and Salvage Network. The variety of cooperators and volunteers who participated in the cold stun response this winter demonstrates how extensive the network is across the coastal region. Participants included: National Park Service at Cape Hatteras and Cape Lookout National Seashores, Pea Island National Wildlife Refuge, US Coast Guard at Hatteras Island and Fort Macon, NOAA-NMFS (Beaufort), NC Aquariums (Roanoke Island, Pine Knoll Shores, Fort Fisher), Fort Macon State Park, NC Division of Marine Fisheries, NCSU College of Veterinary Medicine, Duke University Marine Lab, University of North Carolina Institute of Marine Sciences (Morehead City), University of North Carolina Center for Marine Science (Wilmington), Network for Endangered Sea Turtles (N.E.S.T.), Emerald Isle Sea Turtle Project, Karen Beasley Sea Turtle Rescue and Rehabilitation Center, and dozens of private citizens who responded when they directly encountered cold-stunned sea turtles. NCWRC biologists coordinate all activities involved in response, rehabilitation, and release of these sea turtles, and maintain the sea turtle stranding and salvage database.

NC Sea Turtle Stranding and Salvage Network cooperators from the NC Aquariums and NOAA-NMFS Beaufort respond to a cold-stunned juvenile green turtle on Shackleford Banks in Carteret County, NC in February 2024.

Sandhills Winter-breeding Amphibian Monitoring

by Aubrey Greene, Wildlife Diversity Biologist/Herpetologist

A wet winter in the Sandhills has been keeping WRC biologists busy monitoring winter-breeding amphibians. The rains began in late December 2023 and spurred Eastern Tiger Salamanders (photo below) to begin migrating to ephemeral wetlands to breed. After two winters of drought conditions with minimal (if any) breeding activity, this was exciting news! Tiger salamanders are listed as a State Threatened species in North Carolina, so we monitor their populations closely. We do this by counting the number of egg masses laid in each wetland. Each female tiger salamander lays around 3 egg masses, so we can use the total number of masses to estimate the number of breeding females in the population. This year, we documented eggs at 16 wetlands throughout the Sandhills region, some of which had 100s of egg masses, indicating these wetlands house robust populations!

Wetlands are surveyed on public and private lands throughout the Sandhills region. The exciting news for tiger salamanders this year was the discovery of a new population on private lands in the Sandhills! It was reported (via HerpMapper) by a citizen who found adult tiger salamanders crossing the road on a rainy night. The adjacent landowners were kind enough to allow access to the wetlands we thought these salamanders might be using, and egg masses were found in three ponds. This finding highlights the importance of citizens reporting sightings of rare wildlife; we can't be everywhere at once and can only cover so much ground on those few warm, rainy, winter nights we get each year.

The Carolina Gopher Frog, another winter-breeding amphibian, is State Endangered, so it is important that we monitor and manage its populations. Similar to tiger salamanders, we survey

Aubrey H. Greene

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Our State Listed species are protected from take and harassment so if you see them, please observe these animals respectfully, help them cross the road if needed (and if it's safe for YOU!), and leave them be.

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for gopher frog egg masses in ephemeral wetlands starting in late winter through early spring. No egg masses were found on WRC lands in the Sandhills the past two years, so we were glad to find the first egg masses of the season on January 29th, 2024 (the earliest breeding activity ever documented in North Carolina!). To give these Sandhills frogs a leg up, we work with our partners at the North Carolina Zoo to collect part of each egg mass to be headstarted by their staff. Headstarting gopher frogs means raising the eggs and tadpoles until they metamorph into froglets which we will release back to their source locations later in 2024.

Gopher frog headstarting efforts started in 2015 in the Sandhills. With few occupied ponds in the region, WRC biologists decided to reintroduce gopher frogs at one Sandhills Game Land pond. It has been 3.5 years since the first metamorphs were released at the reintroduction pond, and we are thrilled to announce the first calling males were observed and three egg masses were found in March! This is a huge win for the Carolina Gopher Frog and we hope for continued success as more frogs are released at the site.

Aubrey H. Greene

Gopher Frog egg mass (right)
Ephemeral wetland (below)

Aubrey H. Greene

Eastern Black Rail Surveys Begin in Spring 2024

by Kacy Cook, Waterbird Biologist, and Carmen Johnson, Waterbird Biologist

The Waterbird Investigations and Management Project of the NCWRC Wildlife Diversity Program embarked on a new project to monitor and conserve the federally threatened Eastern Black Rail (right photo). The Black Rail monitoring project will also allow staff to collect data relevant to the conservation of other marsh bird species. This monitoring is one action within the draft Eastern Black Rail Conservation Plan that will be reviewed during the next quarter. Staff began field work on the Salters Creek and Turnagain Bay tracts of the Carteret County Game Lands to monitor water levels and to detect Black Rails and other marsh birds. Water level monitoring is important to identify potential Black Rail high salt marsh habitat because Black Rails, which have a tarsus length of less than 3 cm, cannot tolerate water levels above 3 cm. Staff are employing game cameras to monitor water levels and take photos of wildlife by motion-sensors. One of the game cameras detected a Sora from March 20th to 31st, 2024. Sora use the same habitats as Black Rail. Staff are also deploying Autonomous Recording Units in potential Black Rail habitat to detect their calls. Black Rail and marsh bird callback monitoring surveys in high salt marsh will begin May 1st, at the start of the nesting season.

Sora captured on a game camera in high salt marsh area

Year 4 of 5 for the NC Bird Atlas!

by John Carpenter, Eastern Landbird Biologist and Scott Anderson, Science Support Coordinator

Bachman's Sparrow carrying food (CF), one of the many behaviors that can confirm breeding in a location. *(Melissa McGaw)*

Wildlife Diversity staff continue work on the 5-year Bird Atlas Project. From Hiwassee to Hatteras, volunteers (atlasers) and staff have been scouring fields, forests, and city parks - identifying birds and recording behaviors. Observations of behaviors help confirm breeding in each of the 937 survey blocks spread across the state. Our goal is to adequately survey each of these blocks by the end of the project. To date, atlasers have contributed 197,739 checklists, confirming breeding for 203 species spread over 820 blocks. Collectively, these 2,584 atlasers and other birders have made a staggering 11,276,863 species observations since the project started in 2021!

In addition to volunteers, each year we hire skilled staff to canvass hard-to-reach corners of the state. These data will be critical to gaining a comprehensive map of distribution and habitat preferences for ~200 bird species at the end of the project.

Because North Carolina is positioned squarely in the mid-Atlantic region, many bird species only occur here in winter. Departing from most other Atlases, volunteers and staff collect observations during both the breeding and wintering seasons. In just the past winter (Nov-Feb), atlasers, staff, and other birders recorded 1,169,772 species observations.

In the coming months, we'll welcome more temporary staff to collect data and assist atlasers during the 2024 breeding season. We are closely monitoring the status of all 937 blocks using the Block Explorer (https://block-explorer.ncbirdatlas.org) ; see also Wildlife Diversity Program Fourth Quarter Report, p. 7).

Once all the data have been collected, we will continue a rigorous process to validate records and develop range maps for each bird species. These data will be crucial to monitoring changes in bird populations and distributions into the future.

STAY UP TO DATE!

If you want to stay up to date on the progress of this project, visit ncbirdatlas.org or subscribe to our monthly newsletter at news.ncbirdatlas.org

Tricolored Bats Continue to Be Found in Winter on Coastal Plain Bridges

by Katherine Etchison, Mammalogist

In January, NCWRC biologists conducted bat roost surveys at 48 bridges within the Coastal Plain region. This work is part of an effort to re-survey 120 bridges that showed presence of bats or guano in the late 1990s and early 2000s. These winter 2024 surveys mark the halfway point of the project, the objective of which is to survey all historic bridges in both the winter (January) and the active season (May) to determine if bats still use these bridges as roosts and to understand basic roosting patterns (e.g., species and number of bats present, seasonality of use, bridge types used, etc.).

During the 2024 winter surveys, tricolored bats (*Perimyotis subflavus*), a species proposed for listing as endangered by the U.S. Fish and Wildlife Service, were found roosting under seven bridges. The surveys occurred during an unusually cold period where nightly temperatures were in the 20°F to 30°F range, so it was surprising to see tricolored bats roosting on bridges where they are relatively exposed to ambient conditions. Tricolored bats typically hibernate underground throughout much of their range, but subterranean habitats like caves and

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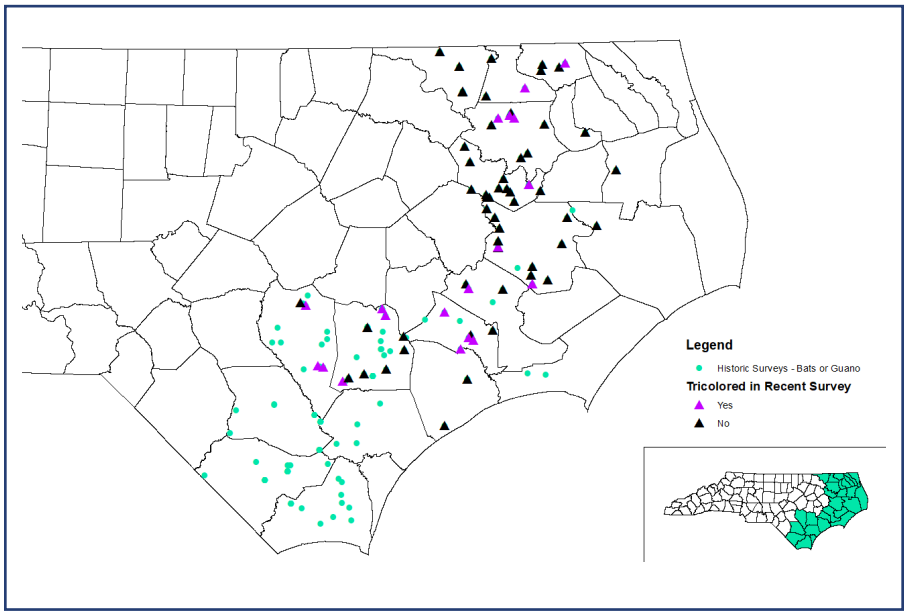
A tricolored bat roosting under an "old" bridge in January 2024 (Katherine Etchison)



Map of historic bridges with bats or guano and NCWRC tricolored bat findings

underground mines are lacking in the Coastal Plain region, so it is assumed that this bat roosts primarily in trees, culverts, and bridges in the winter on the Coastal Plain.

This project has reached the halfway point with surveys during two winter seasons and one active season completed, and one winter season and two active seasons remaining. Twenty-four percent of the bridges surveyed have yielded tricolored bat presence (23% in winter, 27% in the active season). Tricolored bats are the species most often encountered during these bridge surveys, but bats other than tricoloreds have been found at 5% of bridges and include the state special concern Rafinesque's big-eared bat (Corynorhinus rafinesquii), and common species like the big brown bat (Eptesicus fuscus), and evening bat (Nycticeius humeralis). Forty-two percent of bridges surveyed show roosting bats or evidence of bats in the form of guano. Bridges with presence of bats or guano are most often "old" bridges (70%), meaning the structure has not been replaced since the historic survey, and only 30% of bat or guano presence has occurred at replaced bridges. Of the bridges found with tricolored bat presence, 60% are "old" bridges and 40% are replaced bridges.

Now that the project is halfway through, patterns in the results are beginning to emerge, particularly with tricolored bats. Current results show tricolored bat presence at about one-quarter of bridges surveyed, tricolored bat presence during winter and during the active season, and tricolored bat presence at "old" bridges more often than replaced bridges. This project will continue until all historic bridges are surveyed, which should conclude in May 2025.

A tricolored bat roosting under a replaced bridge in January 2024 (Katherine Etchison)

Wildlife Diversity Biologist, Katherine Etchison, searches for roosting bats under an "old" bridge on the Coastal Plain (J. Weber)

Biologists Conduct Species Status Assessment for Hellbenders

by Lori Williams, Western Amphibian Biologist

In the first quarter of 2024, Wildlife Diversity staff participated in the second federal Species Status Assessment (SSA) for special concern Eastern Hellbender (*Cryptobranchus a. alleganiensis*). The first SSA was conducted in 2017 and did not result in federal protection for the subspecies within its range in the Eastern United States. Currently, only the Ozark Hellbender (*C. a. bishopi*) and the Ozark disjunct population of Eastern Hellbender are listed under the Endangered Species Act.

In fall 2023, a lawsuit by environmental organizations and a subsequent court decision, instructed the U.S. Fish and Wildlife Service (USFWS) to redo the 2017 SSA, mainly because of a flaw in how proactive conservation measures were evaluated. The expert panel of state representatives and researchers was reconvened to redo the SSA process. Each state and native tribal land was tasked with evaluating population statuses for individual streams in their jurisdiction that have had an Eastern Hellbender record since the year 2000.

By far, North Carolina has the most hellbender streams than any other state. We likely have the best of what is left of historical populations. In 2017, we assessed 155 streams, and now in 2024, the number has increased to 179, thanks in large part to the help of anglers, recreationists, and the public for sharing hellbender encounters, some of which reveal new streams. The increase in streams with hellbender presence is also due in part to continued success of environmental DNA testing to detect new populations in the state.

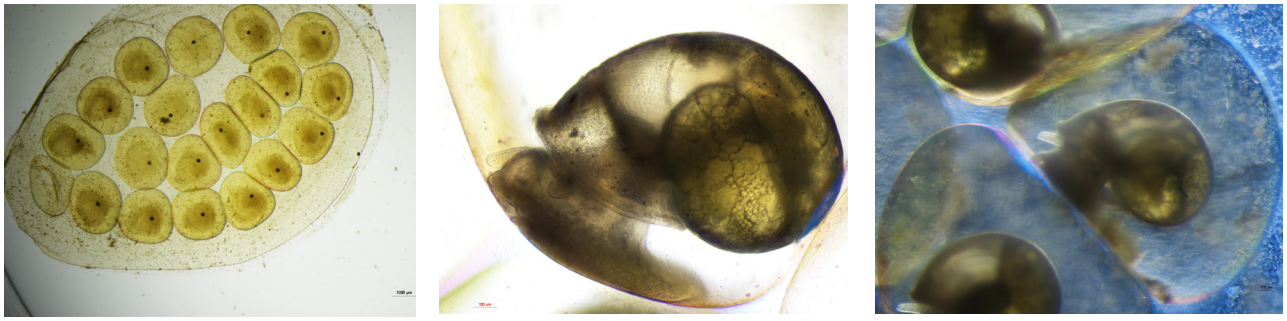
Although North Carolina has more hellbender streams than any other state, the long-term outlook for the species, even here, is not guaranteed. For example, the number of North Carolina hellbender streams where the population is judged to be failing has increased since the 2017 SSA. From 2017 to 2024, the state has seen a 10% increase in the number of streams presumed to have zero hellbenders left (an "extirpated" status) and/or presumed to have so few and isolated adults left that breeding is highly unlikely ("functionally extirpated"). We will continue to assist the USFWS in reviewing the draft SSA report when it's ready, likely in December 2024.


An important part of the federal Species Status Assessment is population structure, essentially whether all age classes are represented in a population including gilled larva (left; John Groves, 2016); older juveniles and subadults (middle; Steve O'Neil, 2012); and mature adults (right; Lori Williams, 2008).

Magnificent Ramshorn Snail Project

by: Emilia Omerberg, Central Region Aquatic Wildlife Diversity Biologist

A new study is underway at Yates Mill Aquatic Conservation Center in Raleigh to study the development of Magnificent Ramshorn snail eggs and embryos. Trials were run at room temperature as well as experimental cold treatments at (a) a constant 4 degrees C and (b) fluctuating outdoor winter temperatures for 2, 4, 8 and 10 weeks' exposure. Photos of each egg clutch as well as individual eggs were photographed weekly for the duration of the project and measurements will be taken of embryo growth rates, hatch rates, and juvenile survival.



From left to right: Clutch of snail eggs; developing Magnificent Ramshorn inside an egg; another view of developing Magnificent Ramshorn inside an egg (Emilia Omerberg)

Deep River Mussel Propagation

by: Emilia Omerberg, Central Region Aquatic Wildlife Diversity Biologist

Staff collected Margined Madtoms, which were transported to the Yates Mill Aquatic Conservation Center in Raleigh. There, the fish will serve as hosts for the glochidia larvae of Brook Floater mussels that were collected from the Deep River in the fall of 2023. The young mussels will be grown out for stocking to help boost native mussel populations in the upper Cape Fear River basin.

Brook Floater with glochidia, which look like grains of rice (Emilia Omerberg)

N.C. Partners in Amphibian and Reptile Conservation News

by Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist

NCPARC held its annual meeting virtually online through Zoom, in March of 2024 with 114 registered attendees. Talks were given by four speakers during two hour-long sessions on back-to-back days and included themes of landscape scale conservation and disease and invasive species. Additionally, the NCPARC Steering Committee, and two working groups met during this quarter. During the annual SEPARC regional meeting, staff gave an update on NCPARC activities for the past year. Staff also gave talks on herp conservation to Pfeiffer University and the Croatan chapter of the Sierra Club.

SPECIES OF GREATEST CONSERVATION NEED SURVEYS - AMPHIBIANS

Happily, numerous winter precipitation events yielded positive results for winter amphibian breeding efforts. Surveys for SGCN amphibians such as Gopher Frog, Eastern Tiger Salamander, and Mabee's Salamander yielded the largest number of egg masses detected at several sites in over 3 years. In the case of the Gopher Frog, two populations showed the largest number of egg masses ever detected. Head-starting efforts are well underway in partnership with the NC Zoo, the NC Aquariums, NCSU CMAST, Carteret Community College, and the USFWS Edenton National Fish Hatchery. These results are particularly exciting for the Holly Shelter game land population, which has seen significant restoration efforts over past two years. Over 50 egg masses were detected among 3 different ponds on the game land, each receiving some level of restoration from either Land and Water Access staff or Wildlife Management staff, or a combination of both.

Tiger Salamander egg mass (Jeff Hall)

Wildlife Diversity Biologist Aubrey Greene holds an adult female Gopher Frog captured during winter surveys (Jeff Hall).

N.C. Partners in Amphibian and Reptile Conservation News

Wildlife Diversity Technician Kabryn Mattison with portions of Gopher Frog egg masses collected for head-starting efforts (left); Female Gopher Frog (Jeff Hall)

SPECIES OF GREATEST CONSERVATION NEED SURVEYS - REPTILES

Warmer weather in March sent staff into the field searching for SGCN snakes and lizards. Staff often target areas that have recently received prescribed fire as tree stumps are more readily visible and thus more easily assessed in these more open landscapes, along with the snakes and lizards that often reside within them. Species detected during surveys included Carolina Pigmy Rattlesnake, Timber Rattlesnake, and Mole Kingsnake.

Carolina Pigmy Rattlesnake sheltering under a small log after a prescribed fire (Jeff Hall)

Design Features of NCWRC's Motus Stations in Western North Carolina

by: Christine Kelly, Wildlife Diversity Biologist

The big gap in Motus coverage in the Southern Appalachians is being filled quickly with new receiver stations. The Mountain Wildlife Diversity crew installed its third Motus receiver station in February 2024 and its fourth station in April 2024. Each station entailed designing an installation customized to each site's limitations and infrastructure. The team found that learning about details of other Motus partners' installations was helpful. This report provides a brief summary of design elements for NCWRC's four mountain region Motus stations.

The Pond Mountain Motus Station in Ashe Co, NC. Antennas are mounted on a wood utility pole and the station's battery is charged by a solar panel. The receiver box and battery are housed inside this old airplane hangar. (Chris Kelly)

The Pond Mountain Game Land Motus Station, located in the very northwest corner of the state, was operational by mid-April 2023. This is an off-the-grid dual-mode station, meaning there is no AC power, and the antennas are tuned to detect tags on both 166 MHz and 434 MHz frequencies. An old airplane hangar on-site houses the electronics but was not used for mounting antennas due to potential interference from the metal roof material. Instead, a wood utility pole was installed adjacent to the hangar by NCWRC's Land and Water Access Division staff. This is a quiet, long-range station that has sweeping views of Grandfather Mountain to the southeast and Whitetop Mountain, VA to the north. It is subject to extreme cold, wind, and ice. A solar panel is bracket-mounted to the hangar, and coaxial cables are suspended between the antennas and the hangar. The receiver (CTT Sensor Station), a 12 Volt battery, and a charge controller are housed inside the hangar, alongside tractors and other game lands equipment.

The Mud Creek Motus Station, located near Asheville Airport, was constructed in February 2024. This is another off-the-grid, dual mode station. However, given the low topography along the French Broad River, the team installed shorter antennas with fewer elements. This station is built on a raised wooden platform to clear floodwaters. It shares the platform with NCWRC's Muskellunge PIT tag reader station. The Sensor Station, 12 Volt battery, and charge controller are housed inside a locked steel box that is bolted to the floor of the platform to prevent theft.

The Mud Creek Motus Station is co-located on a platform with NCWRC Muskellunge (fish) tracking equipment (Chris Kelly)

The WH Silver Game Land Motus Station is located in the central mountains, west of Asheville. The station sits within meters of the game land's border with Great Smoky Mountains National Park and will provide coverage into the Park. This is another dual mode, off-the-grid station with all components, including the receiver and battery, mounted on a wood utility pole. This installation required elk-proofing and bear-proofing. Subsequent trips to check the receiver or battery will require climbing the pole.

These three stations join NCWRC's first Motus station installed at The Mountain Retreat and Learning Center near Highlands, NC in late 2022. Staff are preparing detailed summaries of the design elements for each station for future reference and posting QR codes that take visitors to more information on the Motus website.

Kendrick Weeks connects the antennas to the receiver at WH Silver Game Land. The battery and charge controller are housed inside a battery box, mounted on a shelf bracket. The solar panel has its own mast. (Chris Kelly)

The Sensor Station, 12 V battery, and charge controller are housed inside a locked steel box, which is bolted to the platform (Chris Kelly).

Road to Recovery

by: Christine Kelly, Wildlife Diversity Biologist

In January 2024, Scott Anderson and Chris Kelly attended the Road to Recovery meeting at the National Conservation Training Center in Shepherdstown, WV. The Road to Recovery (or R2R) is a movement that was developed as a response to the 2019 publication in the journal Science about "3 billion birds lost". It is a call to action for ornithologists who are finding that business as usual as not been as effective as it needs to be considering the rate of decline for some species. R2R names arises from acknowledgment that each species is at its own point along the road to recovery.

R2R has four guiding principles. First, focus on proactive recovery, much like biologists do for recovering federally listed species. Second, integrate social and biological sciences. The social element in wildlife conservation is often overlooked. Integration of our understanding of a species' biology and our understanding of the human dimensions involved is the goal and the path to species recovery. Third, co-production of solutions is essential. Co-production is an approach to produce actionable science through collaboration among diverse partners from the very start of a project. Fourth, engage and empower species working groups. The Golden-winged Warbler is one Tipping Point Species that was selected as a case study for a deep dive using the R2R process and principles. NCWRC was an active partner in this work, contributing to a rangewide golden-winged warbler survival study in 2022 and 2023. In the case of Neotropical-Nearctic migratory species, the pool of partners is international in scope. Breakout sessions dug into how to make international collaborations successful and how to overcome the language barrier in meetings, workshops, gray literature, and peer reviewed literature.

Scott Anderson called a breakfast meeting among partners to discuss state Wildlife Action Plans (Chris Kelly).

Esmeralda Bravo Hernández, an International Fellow for the Road to Recovery initiative, led a breakout session on Making International Collaborations Successful (Chris Kelly).

Training Opportunities to Enhance Bog Conservation

by Gabrielle Graeter, Wildlife Conservation Biologist

NCWRC staff recently participated in a couple training opportunities that will ultimately help improve our ability to restore and monitor mountain bogs. Bog turtles and their habitat – mountain bogs – are a high conservation priority in North Carolina. The bog turtle, *Glyptemys muhlenbergii*, is federally threatened (S/A) and state threatened. As part of our conservation efforts with this species, the NCWRC manages wetlands with known bog turtle populations. Unfortunately, many of these wetlands have more woody vegetation and more canopy closure than they had historically. Various factors have played a role in this change, including increased nutrient input, changes in land-use, development in the surrounding landscape, and changes from historical levels of beaver activity, and perhaps grazers and fire in some cases. Habitat management in these wetlands often consists of removing some trees and thinning the woody vegetation to create a mosaic of habitat types, with some areas as shrub-scrub and others dominated by herbaceous vegetation. Bog turtles lay their eggs on the ground within the wetland and thus, require areas with full sun so the eggs can incubate properly.

NCWRC staff members after attending the field portion of a two-day NCWRC chainsaw training course.

To conduct this habitat management in mountain bogs, we must have training to operate chainsaws and other power tools. Two new temporary staff members involved in this project took a 2-day chainsaw training course provided by NCWRC staff, and Gabrielle Graeter, NCWRC Conservation Biologist, also attended the field training day to gain additional hands-on experience. These new skills will help us accomplish more on the ground as we work to restore these mountain bogs.

NCWRC staff also attended drone training in February 2024 provided by NCDOT's Unoccupied Aircraft Systems (UAS) Program unit. The UAS and its camera will document wetland conditions pre- and post- bog habitat management activities. Previously, we took photos at ground-level to document our work, but ground-level photographs do not adequately illustrate what has been accomplished. In addition to better and more efficient site coverage by UAS, its images and other data collected by its software programs can be used with GIS applications. Another practical use of UAS is to monitor the extent of wetland hydrological and erosion changes within a bog seasonally and over time. Staff who attended the training and want to be drone operators must each obtain a Remote Pilot Certificate. Likewise, there are logistics to be sorted out within NCWRC about equipment and procedures with drone usage, but we are hopeful that we will be able to use this incredible technology soon!

NCWRC Biologist, Gabrielle Graeter, practicing flying a drone during a 2-day training session with NC DOT's Unoccupied Aircraft Systems (UAS) Program staff in February 2024.

Biologists Work to Learn Impacts of Lyngbya on Native Mussels

by: Michael Fisk, Eastern Region Aquatic Wildlife Diversity Coordinator

Aquatic Wildlife Diversity staff are working with NC State University to determine the impacts of lyngbya and the treatment of lyngbya on native mussels. Lyngbya is a noxious, filamentous blue-green algae that forms dense mats along the bottom primarily in lakes and reservoirs. These mats persist all year long but can proliferate in the summer forming dense mats from the surface to the bottom. These mats become a nuisance to lake front homeowners as they are visibly unappealing and can inhibit aquatic recreational activities. To help manage this nuisance species, the lyngbya is treated with algaecides. Lyngbya has dermatoxins and it's also unclear how these dense mats alter water chemistry and affect benthic organisms like mussels. To better understand the interactions between lyngbya and mussels, the Commission is using propagated tidewater muckets, *Atlanticoncha ochracea* in areas with and without lyngbya as well as areas where lyngbya is being treated with algaecides. The mussels have been placed in cages and will be monitored throughout the summer to document growth and survival. These findings will help guide management of this noxious species.

Lyngbya topping out in Lake Gaston.

Eastern Region Aquatic Wildlife Diversity Coordinator Michael Fisk (left) with technicians Dorian Hayes (middle) and Laureen Riggins installing mussel cages for an experiment