



NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

WILDLIFE DIVERSITY PROGRAM QUARTERLY REPORT

OCTOBER-DECEMBER 2021





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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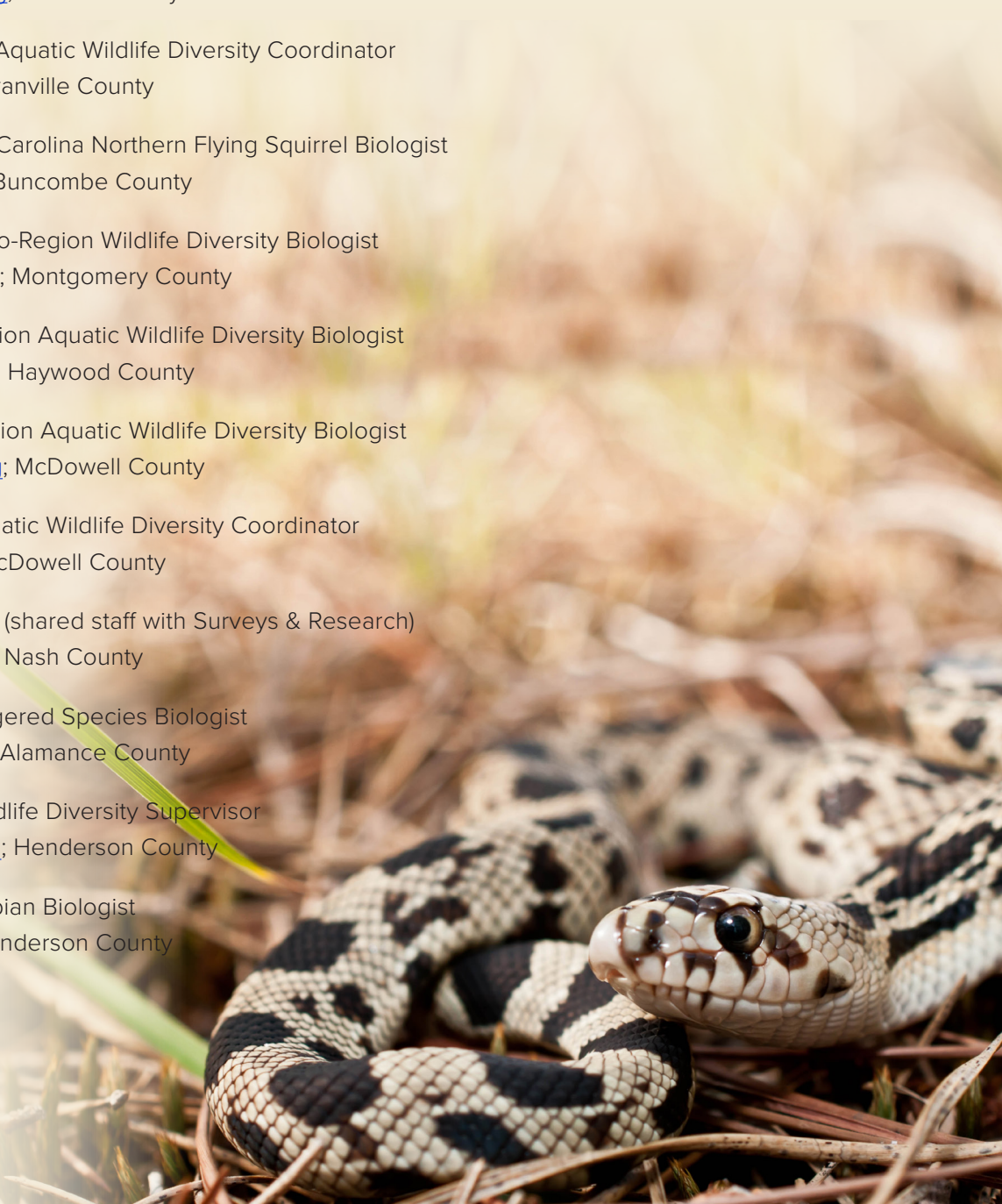




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Cover photos from top left clockwise: NCWRC Wildlife Technician Clifton Avery sets up a camera on a peregrine falcon nest ledge to monitor nesting activity (Tom Caldwell); Constance Powell makes notes on vegetation during a scouting trip in November 2021 (Carmen Johnson); NCWRC Technician Mike Martin prepares to capture an Eastern Coachwhip (Jeff Hall); Alligator Biologist Alicia Davis holds a recently tagged alligator during fall surveys (NCWRC).



Black Rail Surveys to Start Spring 2022

by Carmen Johnson, Waterbird Biologist

The Waterbird Team recently began planning for surveys of the federally threatened Eastern Black Rail that will begin in spring 2022. The Black Rail is a small, sparrow-sized, secretive marshbird, and it's estimated that only 40 to 60 pairs remain in the state. The decline is thought to be largely due to loss of habitat from sea level rise. Much still needs to be learned about the subspecies, and research is being carried out in several Atlantic and Gulf Coast states. The Waterbird Team is collaborating with Dr. Sue McRae at East Carolina University to learn more about the species on state

lands and how to best manage for them.

Three sites along the North Carolina coast have been identified where the species has been detected within the past 10 years. Scouting trips were made to these sites in late 2021, with biologists looking at vegetation, water level, and microtopography that meet the needs of the species. Call-response surveys will be used this spring and summer at points with potentially suitable habitat in hopes of detecting the birds and will help the team to plan future work to learn more about the species.



Constance Powell makes notes on vegetation during a scouting trip in November 2021 (Photo: Carmen Johnson)



Black Rail (Agami Photo Agency); Potential Black Rail habitat (Photo: Carmen Johnson)





Landowners Are Key Component of NC Birding Atlas' Future Growth

by John P. Carpenter, Eastern Landbird Biologist

A primary goal of the [North Carolina Bird Atlas](#) is to engage the public in conservation work. NCWRC staff expect this will be accomplished several ways, including increased awareness of avian conservation by private landowners. The importance of this group's participation in the atlas cannot be understated — over 85% of property in North Carolina is privately owned. The ability to access non-public land for the atlas is not only important to increase the data quality, but also provides safer, more productive places for agency technicians and volunteers to

work and demonstrates support for the agency's mission.

During this fourth quarter of 2021, staff reached out to over 100 landowners and received permission to access over 73,000 acres of private property to survey birds for the benefit of the NCBA. These private landowners represent a vast array of interests: small single-family farms, non-profit organizations, timberlands and Limited Liability Companies.

Staff will continue to conduct this important outreach during the life of the project and are optimistic that the number of



positive interactions they've had with private landowners will continue to grow. With a little luck and some persistence, they hope many of these relationships develop into lifelong opportunities that will benefit all of North Carolina's wildlife.



Private property in Brunswick County, NC (JP Carpenter)



Using PIT Tags to Determine Sea Turtle Longevity

by Dr. Matthew Godfrey, Sea Turtle Biologist

How long do sea turtles live? The answer remains a mystery, largely due to the logistical challenge of designing a tag that remains attached to the turtle over years and decades. New information collected by sea turtle nesting beach projects provides some insight. In the last three nesting seasons in North Carolina, a combination of physical and genetic tags has revealed that eight loggerhead females have been actively laying eggs in North Carolina for at least 20 years. One turtle was first tagged with a metal flipper tag while attempting to nest on Camp Lejeune in June 1995. Metal tags applied to sea turtles

have a relatively high rate of failure after a few years, as is the case with this turtle, who was given new flipper tags in 2001. In 2003, she was also given a passive integrated transponder (PIT) tag in her left front flipper. PIT tags have a higher retention rate than metal tags but require a scanner to be recognized. Her genetic ID has also been documented through DNA analysis of a sample of fresh eggshell from her nests. These three sources of information combined have revealed that this turtle has continued to nest every few years in North Carolina and was last seen in 2019 while laying eggs on Bald Head Island.

Other turtles actively nesting on North Carolina beaches include a turtle first tagged in 1998, another in 1999, and five in 2002. The estimated minimum age of maturity for loggerheads in the NW Atlantic is 30-35 years, which means these tagged sea turtles are at least 50 years old. More precise estimates at this time are not possible, because tagging effort is low in North Carolina, and PIT tags were used only from the early 2000s. However, we expect greater understanding of sea turtle longevity as tagging efforts and genetic sampling continue.



*An adult female loggerhead nesting on Onslow Beach in Camp Lejeune, North Carolina
(Dr. Matthew Godfrey)*



Two Protected Species Most Encountered During Sandhills Snake Surveys

by Dr. Jeff Humphries, Eastern Amphibian and Reptile Biologist

This year ended the seventh year of a mark-recapture study of selected snake species on the Sandhills Game Land in Scotland and Richmond Counties. The purpose of this study is to gather information about population size, population status (declines or increases over time), movements, growth and other aspects of the natural history of each species. Staff are targeting a mixture of snakes perceived as “rare” and “common” in the state. Survey methods include driving roads, walking habitat, and checking artificial cover throughout the year. Snakes are marked with PIT tags and scale marking. Over seven

years, biologists have encountered 541 individuals of the six species targeted. Of note is the very small number of recaptures of any of the species. Differences in road mortality among the different species is becoming evident. Interestingly, two of the species that are considered Species of Greatest Conservation Need (Northern Pinesnake and Eastern Coachwhip) have been encountered the most during this study. This does not mean these species are not in need of conservation, but the high encounter rate specifically in the Sandhills is encouraging and likely a result of large areas of well managed habitat on the game land. This study will continue for

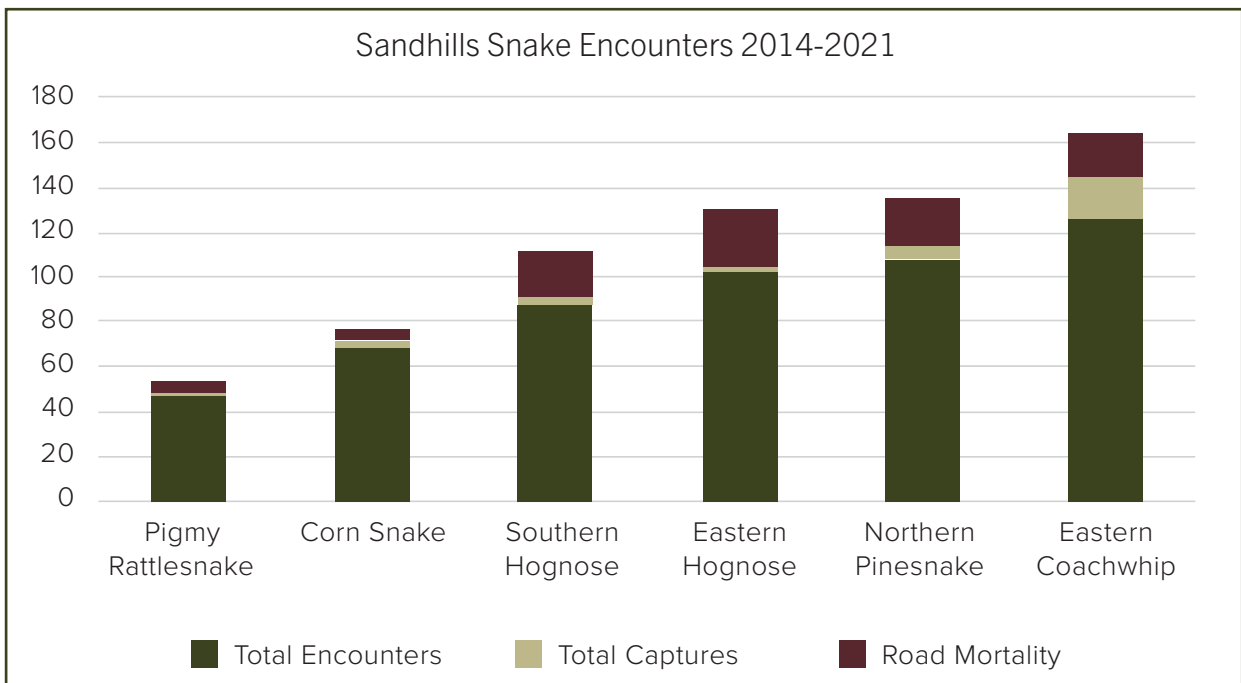
at least three more years and data will then be compiled and analyzed to provide a baseline for research and monitoring.



Northern Pine Snake (Jeff Hall)



Eastern Coachwhip (Jay Ondreicka)



Snake encounters over seven years in the Sandhills of North Carolina, including recaptures and road mortality.



Staff Secure Entry to Bat Hibernaculum before Winter Hibernation Begins

by Katherine Etchison, Mammalogist

Each year, NCWRC staff visit an Avery County mine that serves as an important hibernaculum to several bat species to secure the site against unauthorized entry. Bats are sensitive to disturbance when hibernating, especially species susceptible to White Nose Syndrome, so preventing unauthorized entry during winter is key. Multiple trips were made

to the mine during October and November to make necessary repairs before bats returned to the mine to hibernate. A portion of the security fence was partially buried from a small landslide and further compromised by vandals, so additional posts were installed, and the fencing was removed and replaced. Weak areas of the security fence were also

repaired, and a damaged lock was replaced. A thorough search of the area was performed to ensure no other points of entry had been breached. Security cameras in the area were also maintained, and photos were turned over to law enforcement. A hibernaculum survey will be performed in January to monitor hibernating bats in the mine.



Western Wildlife Diversity Supervisor, Kendrick Weeks, repairs the security fence surrounding an Avery County mine. (Katherine Etchison)



Conservation Technician, Joe Tomcho, Western Wildlife Diversity Supervisor, Kendrick Weeks, and Wildlife Diversity Technician, Kyle Shute, repair the bat gate inside an Avery County mine. (Katherine Etchison)



Zachary Lesch-Huie of The Access Fund and Mike Reardon of the Carolina Climbers Coalition point to the ledge where peregrine falcons attempted to nest at Big Lost Cove Cliff in Avery County in 2021.

Lynn Willis of High South Creative

Cameras and Climbers Answer Lingering Questions about Falcons

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

Every year, biologists monitor peregrine falcons nesting on cliffs by watching them from afar through spotting scopes. To get a closer look, the NCWRC partners with rock climbers to access the ledges. These brief but exciting visits often answer a lot of questions staff couldn't answer from hours of watching through scopes. For instance, the climbers can see if the nest ledge is protected from the elements by an overhanging roof and if it is inaccessible to mammalian predators. Prey remains found during these excursions tell biologists

about the birds' diets. At Big Lost Cove, climbers from The Access Fund and Carolina Climbers Coalition discovered remains of blue jays and woodpeckers. They also found a rodent latrine in an adjacent ledge.

Climbers also help deploy cameras in nest ledges. In October, the Appalachian Mountain Rescue Team retrieved two cameras that were installed in a nest ledge in Rutherford County back in January and set up new cameras. The goal was to better understand why this site suffers chronic nest failure. They

found a few things: southern flying squirrels can access this ledge, which could result in egg predation. The falcons never laid eggs at this ledge in 2020 despite spending lots of time there. Though falcons mostly hunt birds, they will prey on bats and other mammals opportunistically. On two occasions, a falcon was pictured clutching a bat for its early morning breakfast. This also brings to mind the question of whether there are enough prey in the Hickory Nut Gorge for nesting pairs to raise a family. And most surprising was camera

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Joel McCombs of the Appalachian Mountain Rescue Team perches outside the peregrine ledge at Chimney Rock (Corey Winstead)



A male peregrine falcon (foreground) tidies the “nest scrape” while the female (background) looks on. Notice the blue-gray and white coloring and smaller size of the male compared to the brownish-gray and cream coloring of the larger female



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What is causing chronic nest failure among peregrine falcons?

A camera deployed on a nest ledge in Rutherford County provided biologists with at least one possible reason why this site suffers chronic nest failure: southern flying squirrels can access this ledge, which could result in egg predation.

documentation of a subadult female falcon in late winter and early spring that observers never saw from their spotting scopes. An adult female replaced her later in the season.

The remoteness of most of the peregrine falcon nest ledges in the mountains poses a challenge for powering cameras and relaying images during the breeding season. This fall, the Carolina Climbers Coalition and

NCWRC Wildlife Diversity Technician Clifton Avery deployed a camera in another peregrine nest ledge. This camera will transmit footage wirelessly to a home camera on the ground. The resident pair of falcons showed up on camera immediately, and the male set to work smoothing the nest “scrape” while his mate looked on.

Nest cameras are only useful at cliffs where the falcons return

to the same nest ledge each year. At some cliffs, they rotate between ledges, making it a guessing game as to where to deploy a camera. Where nest cameras are a good option, biologists hope they will provide insight into causes of nest failure, turnover of individuals, and more. They can be the eyes and ears of biologists, and hopefully save staff time and thousands of miles of driving.



A hatchling Green Salamander active on wet, bare rock. Note the blue coloring, as it can take many months to develop normal coloration.

Ben Dalton

Staff Document Highest Number of New Green Salamander Sites in a Single Season

by Lori Williams, Western Amphibian Biologist

In fall 2021, Wildlife Diversity staff and a longtime volunteer conducted rock outcrop surveys for state threatened Green Salamander that occupies the Blue Ridge Escarpment of western North Carolina (Henderson, Transylvania, Jackson and Macon counties). They completed the most surveys ever in a fall season for the species (n=743) at

462 individual rock outcrop sites and documented the highest number of new sites in a single season (n=41). Out of the 743 surveys, 237 had at least one Green Salamander for a success rate of 31.9%, almost identical to efforts in fall 2020 (736 surveys, 32.3% success).

As an important indicator of nest success, at least one hatch-

ling Green Salamander was documented in 22 surveys at 19 individual rock outcrop sites. At just one site, they observed at least nine hatchlings on the rock surface and nine others climbing shrubs by their nest rocks at heights of more than 12 feet above ground. Other habitat used by hatchlings, yearlings, older juveniles and adults

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included not only the usual rock crevices and out in the open on bare rock but also on the rock surface under rock tripe and within moss, under bark pieces or other natural cover on top of rocks, and on mature trees and shrubs adjacent to rock outcrops.

Trees, and even tall shrubs like rhododendron and mountain laurel, next to rock outcrops, are critical for providing shade and keeping humidity and moisture at suitable levels for salamanders. It is established in literature the role trees and shrubs play for Green Salamanders, which are highly adapted to climb them, in terms of aiding dispersal and providing refugia and foraging opportunities, but biologists' actual observation of this unique habitat use is not very common.

In fall surveys, staff attempted to focus more on looking in trees and shrubs than in years past. In addition to hatchlings at several sites, they found four adults and older juveniles climbing trees, 6-8 feet high and up. On one occasion, an adult Green Salamander was observed 7 feet high, and 45 minutes later, it had climbed to over 12 feet high (and still climbing).

Staff will continue these critical population monitoring and inventory surveys for Green Salamanders yearly. Going forward, they will focus especially on learning more about habitat use by all age classes, hatchlings through adults.



An adult Green Salamander climbing 12 feet high (and still going) up a magnolia tree (Ben Dalton)



When moist, rock tripe provides excellent cover and camouflage for this Green Salamander (red arrow). (Ben Dalton)



Bog Learning Network holds “Bogs & Brews” virtual meeting in December

by Gabrielle Graeter, Conservation Biologist/Herpetologist

The Bog Learning Network (BLN) is a consortium of scientists and land managers working to advance the restoration and management of [Southern Appalachian Bogs](#). It provides a forum for sharing information and experiences about bog management and conservation and helps bog managers find resources and assistance. Strategies of the BLN include coordinating protection efforts for Southern Appalachian wetlands, supporting on-the-ground conservation, facilitating and providing learning opportunities, and increasing BLN membership and outreach. Annual learning opportunities that the BLN offers include field trips and “work-and-learn” workdays, whereby a bog manager gets much needed assistance in the field with a project, and simultaneously the participants learn about bogs and various bog management techniques.

When the pandemic began in early spring 2020, the Bog Learning Network’s (BLN) annual meeting, scheduled for April, was postponed indefinitely. The BLN steering committee waited until late summer 2021 to see if an in-person meeting would be possible but concluded that a virtual meeting would be the safest way to connect with members. There-

fore, the BLN Steering Committee, on which NCWRC’s Gabrielle Graeter serves, planned the December 2021 “Bogs and Brews” virtual meeting.

The December 2021 virtual meeting was relatively short and held at the end of the day so people could have a “brew” of their choice (tea, coffee, beer, etc.) and sit back and enjoy the meeting without worrying about getting “Zoom fatigue.” The meeting included updates from

the BLN leadership and several sub-committee leaders, followed by a variety of interesting talks – illegal turtle collection, the influence of site history on bog turtle abundance, community classification of Kentucky’s bogs, and the use of native ferns as a biological control for an invasive plant species. During a session titled “Postcards from the Field,” several BLN members shared slides and talked for a few minutes each about an exciting

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Figure 1. In fall 2021, a Bog Learning Network Work-n-Learn workday was held with participation limited to 10 people for safety due to the pandemic. Here are the participants learning about the history of the wetland and property as well as the objectives for the workday.



project. The meeting was a great success – 111 people registered and at least 62 people attended the meeting live! Although it was not as good as meeting in person, the virtual format allowed the BLN leadership to share some important BLN updates, hear about recent work by several members, and connect with many of the BLN members.



A screenshot of participants in the December 2021 virtual Bog Learning Network’s “Bogs and Brews” meeting.

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





N.C. Partners in Amphibian and Reptile Conservation News

by Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist

During this final quarter of 2021, field highlights included upland snake surveys, Neuse River Waterdog surveys, and placement of monitoring devices. Upland snakes encountered during this quarter included Eastern Diamondback Rattlesnake, Carolina Pigmy Rattlesnake, Southern Hognose Snake, Northern Pine Snake and Eastern Coachwhip. Surveys were conducted at numerous sites along the Coastal Plain and into the Sandhills. Additionally, through a contact with a private landowner in Pender County, staff were able to catch and photograph an Eastern Coral Snake. Records for this species are very few and far

between so this was particularly rewarding. Neuse River Waterdog surveys were completed at seven Craven County historical sites. Unfortunately, the salamanders were only detected at one of the seven localities. Numerous automated audio recording devices (aka Frogloggers) were deployed for detection of winter-breeding anurans such as Ornate Chorus Frog and Gopher Frog. Trail cameras were installed to observe behaviors of rattlesnakes, most notably targeting the Eastern Diamondback Rattlesnake. Analysis of automated data will be ongoing in future quarters.



Pine Barrens Gentian from Onslow County blooms in the fall in open grassy habitat, such as is found in longleaf pine savannas (Jeff Hall)



Eastern Coral Snake found in Pender County (Jeff Hall)





Neuse River Waterdogs (left) found at only one of seven historical sites in Craven County (right)

During upland snake surveys in the Coastal Plain and the Sandhills, staff encountered several species, including (top left) Eastern Diamondback Rattlesnake, Eastern Coachwhip (middle left)

All photos by Jeff Hall





Alligator Monitoring Continues in 2021

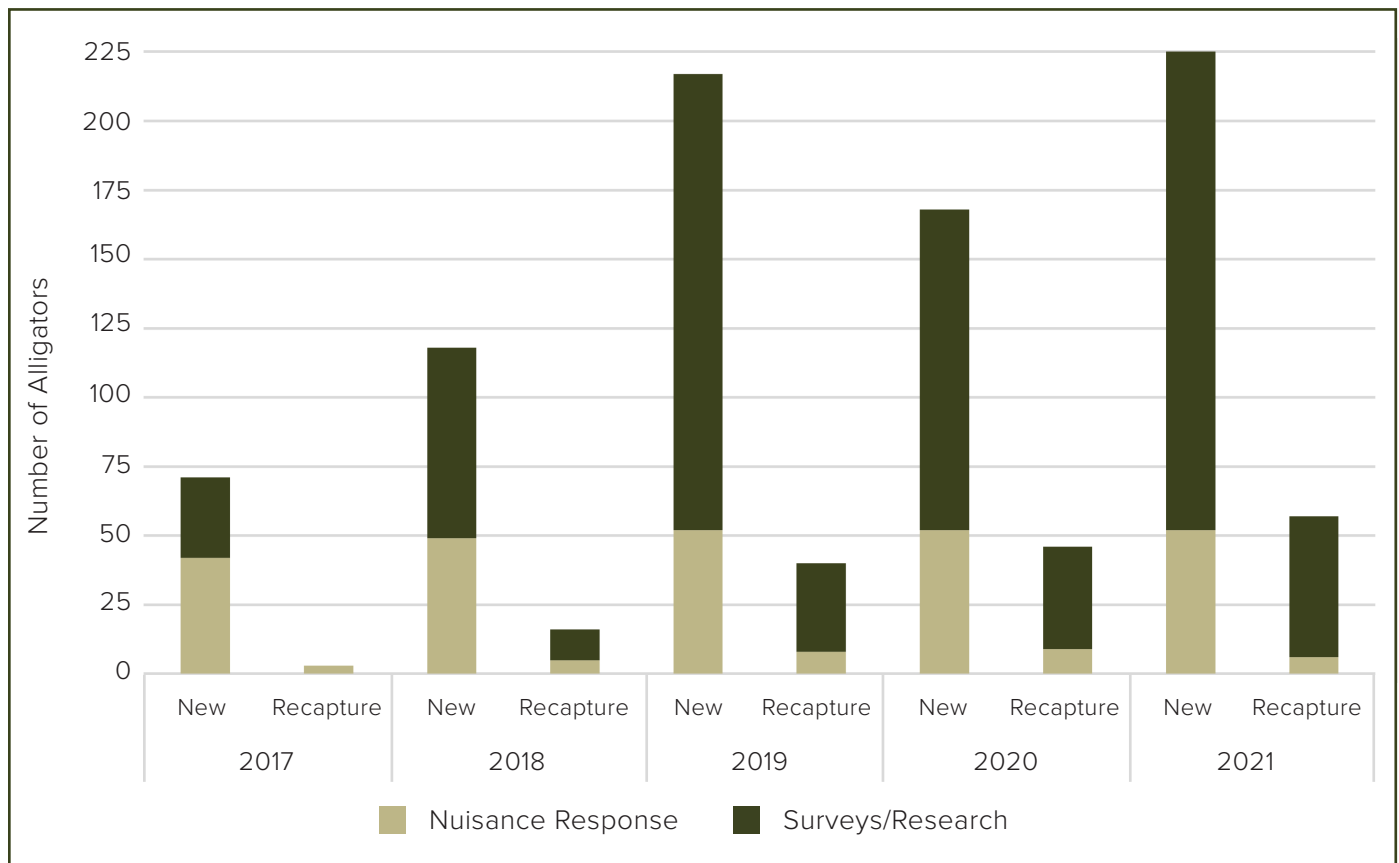
by Alicia Davis, Alligator Biologist

In spring 2017, NCWRC initiated a new marking and data collection protocol for all alligators handled by agency staff and permitted external handlers, including Alligator Control Agents, Jurisdictional Alligator Handlers, and scientific researchers*. First, every handled alligator is scanned to determine if it has already been tagged. Handlers mark all new captures with an internal Passive Integrated Transponder (PIT) tag, collect two

tissue samples from tail scutes, determine sex, take body size measurements, and record GPS coordinates of locations of capture and release. Measurements and locations are recorded for all recaptured individuals. To date, 800 wild alligators have been captured, marked and released in North Carolina using this method. Data were collected from 283 alligators in 2021, 57 of which were recaptured individuals that had been marked previously.

These data are of great benefit to the agency’s alligator conservation efforts. Equipped with this information, biologists are able to learn more about growth rates and movements of individuals at different life stages, evaluate the effectiveness of various management practices, and identify communities that could benefit most from outreach programs with guidance on coexisting with alligators.

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Wild Alligators Captured, Marked, and Released in North Carolina by Year (2017-2021)

* Scientific researchers include Dr. Stephen Dinkelacker, Framingham State University and Dr. Scott Belcher, NC State University



In addition to data collection from live alligators, NCWRC began collecting data from all dead alligators in 2017. To date, data have been collected from 61 dead alligators, 53 of which were found dead. Of the 13 alligators that were found dead in 2021, three were hit by motor vehicles, one was inadvertently captured and drowned in a commercial pump, six appeared to have been illegally killed, and the cause of death for three alligators was not apparent. One of the six poached alligators

was found shot in a remote area where it had been relocated six months prior.

In rare situations in which alligators are found in locations far outside of alligator range, agency staff must assume that those individuals have been illegally kept in captivity. Due to concerns about potential disease introductions and/or habituation to being fed by humans, those individuals are not released into habitats that support wild alligator populations; rather, those individuals must be transferred to permanent captiv-

ity or euthanized. Two alligators were euthanized in 2021 for these reasons. Within the range of natural alligator occurrence, one additional alligator was euthanized in 2021 due to severe injuries from a motor vehicle strike.

Femurs and other tissue samples were also collected from each dead alligator. In 2022, stored alligator femurs will be sent to a laboratory where growth rings in bone cross-sections will be analyzed in an attempt to age each individual.

Alligators Mortalities in North Carolina by year (2017-2021)

Mortality type	2017		2018		2019		2020		2021		Total Records
	New	Recap	New	Recap	New	Recap	New	Recap	New	Recap	
Euthanization	0	0	0	0	1	1	2	1	3	0	8
Found Dead	5	0	9	0	3	0	18	5	12	1	53
Total	5	0	9	0	4	1	20	6	15	1	61



NCWRC staff mark and collect data from all hatchlings found at nest sites. (Alicia Davis)