



NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

WILDLIFE DIVERSITY PROGRAM QUARTERLY REPORT

October-December 2020





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.

Wildlife Diversity Program Staff

Dr. Sara Schweitzer, Wildlife Diversity Program Coordinator
sara.schweitzer@ncwildlife.org; Wake County

Todd Ewing, Aquatic Wildlife Diversity Program Manager
todd.ewing@ncwildlife.org; Wake County

Scott Anderson, Bird Conservation Biologist
scott.anderson@ncwildlife.org; Wake County

David H. Allen, Eastern Wildlife Diversity Supervisor
david.h.allen@ncwildlife.org; Jones County

Sierra Benfield – Aquatic Endangered Species Biologist
sierra.benfield@ncwildlife.org; Alamance County

John P. Carpenter, Eastern Landbird Biologist
john.carpenter@ncwildlife.org; New Hanover County

Alicia Davis, Alligator Biologist
alicia.davis@ncwildlife.org; Wake County

Katharine DeVilbiss, Central Region Aquatic Wildlife Diversity Biologist
katharine.devilbiss@ncwildlife.org; Granville County

Katherine Etchison, Mammalogist
katherine.etchison@ncwildlife.org; Buncombe County

Dr. Luke Etchison, Western Region Aquatic Wildlife Diversity Coordinator
luke.etchison@ncwildlife.org; Haywood County

Michael Fisk, Eastern Region Aquatic Wildlife Diversity Coordinator
michael.fisk@ncwildlife.org; Lee County

Sarah Finn, Coastal Wildlife Diversity Biologist
sarah.finn@ncwildlife.org; New Hanover County

Andrew Glen, Eastern Region Aquatic Wildlife Diversity Biologist
andrew.glen@ncwildlife.org; Alamance County

Gabrielle Graeter, Conservation Biologist/Herpetologist
gabrielle.graeter@ncwildlife.org; Buncombe County



Dr. Matthew Godfrey, Sea Turtle Biologist
matt.godfrey@ncwildlife.org; Carteret County

Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist
jeff.hall@ncwildlife.org; Pitt County

Dr. Jeff Humphries, Eastern Amphibian and Reptile Biologist
jeff.humphries@ncwildlife.org; Orange County

Carmen Johnson, Waterbird Biologist
carmen.johnson@ncwildlife.org; Craven County

Brena Jones, Central Region Aquatic Wildlife Diversity Coordinator
brena.jones@ncwildlife.org; Granville County

Chris Kelly, Western Bird and Carolina Northern Flying Squirrel Biologist
christine.kelly@ncwildlife.org; Buncombe County

Allison Medford, Piedmont Eco-Region Wildlife Diversity Biologist
allison.medford@ncwildlife.org; Montgomery County

Dylan Owensby, Western Region Aquatic Wildlife Diversity Biologist
dylan.owensby@ncwildlife.org; Haywood County

Michael Perkins, Foothills Region Aquatic Wildlife Diversity Biologist
michael.perkins@ncwildlife.org; McDowell County

TR Russ, Foothills Region Aquatic Wildlife Diversity Coordinator
thomas.russ@ncwildlife.org; McDowell County

Andrea Shipley, Mammalogist (shared staff with Surveys & Research)
andrea.shipley@ncwildlife.org; Nash County

Mike Walter – Aquatic Endangered Species Biologist
michael.walter@ncwildlife.org; Alamance County

Kendrick Weeks, Western Wildlife Diversity Supervisor
kendrick.weeks@ncwildlife.org; Henderson County

Lori Williams, Western Amphibian Biologist
lori.williams@ncwildlife.org; Henderson County





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Cover photos (clockwise from top): A birder observes a Northern Harrier (Photo: Allen Boynton); Red Crossbill (Photo: Christine Kelly); Biologists with a woodrat caught in a trap (Photo: Colleen Olfenbuttel); Green Salamander with hatchling (Photo: Ben Dalton); David Turner, Northern Coastal Management Biologist, captures subadult in Hyde County (Photo: Alicia Davis)



Waterbird Team Begins Preparations for Spring Nesting Season

Carmen Johnson, Waterbird Biologist

In preparation for nesting season, the Waterbird Team built several chick shelters to be used in a colony of Least Terns at Emerald Isle. A species of special concern in North Carolina, Least Terns nest on bare sandy beaches, dredged-material islands, or gravel rooftops by making a small scrape in the sand where they lay one to three eggs, each slightly smaller than a thumb. Once chicks are mobile, the shelters provide a place for them to get out of the sun and avoid potential avian predators, including gulls. Before nesting begins, signs and symbolic fencing (string and flagging) will be set up around the site, and the chick shelters will be placed at that time and secured from high winds by a stake.

Volunteers with the Emerald Isle Beach Bird Stewards help the N.C. Wildlife Resources Commission (NCWRC) monitor the colony and will document use of the shelters throughout the spring and summer.



Least tern in flight (John Lynch); inset photo - Least tern egg and chick (Photo: Annika Andersson)



First Case of Fibropapillomatosis Found in Kemp's Ridley Sea Turtle in NC

Dr. Matthew Godfrey, Sea Turtle Biologist

Fibropapillomatosis is an infectious disease in sea turtles and is characterized by tumors that grow both internally and externally on the soft skin around flippers, tail and head of the animals. Although primarily found in Green Sea Turtles, it has been documented in all species, and outbreaks of this disease are thought to be linked to altered or degraded environments.

Fibropapillomatosis is regularly observed in sea turtles that inhabit the waters of Florida but rarely has been seen in turtles in Georgia and the Carolinas. At the end of June 2020, a live but severely debilitated Kemp's Ridley Sea Turtle was found in the swash zone of the beach on Oak Island in Brunswick County.

Volunteers with the Oak Island Sea Turtle Protection Program recovered the turtle and transported it to the Karen Beasley Sea Turtle Rescue and Rehabilitation Center in Surf City, Pender County. The turtle died overnight, and a necropsy was performed by NCSU College of Veterinary Medicine.

One striking feature of this turtle was the presence of a large tumor on its right front flipper. Samples of tissue were collected for analyses of the tumor. Histopathology of the tumor tissue confirmed that the tumor was from fibropapillomatosis, and a blood sample tested positive for chelonid herpesvirus 5 (ChHV-5), which is associated with this disease. This is the first confirmed case of fibropapillomatosis found in a stranded Kemp's Ridley Sea Turtle in North Carolina. The NC Sea Turtle Stranding and Salvage Network continues to work closely with the NCSU College of Veterinary Medicine to track this disease in North Carolina sea turtles.



Stranded Kemp's Ridley Sea Turtle from Oak Island, NC with fibropapillomatosis tumor on its front flipper. (Photo: Suzan Bell)



Snake Surveys Continue on Sandhills Game Land & Nearby Areas

Dr. Jeff Humphries, Eastern Amphibian and Reptile Biologist

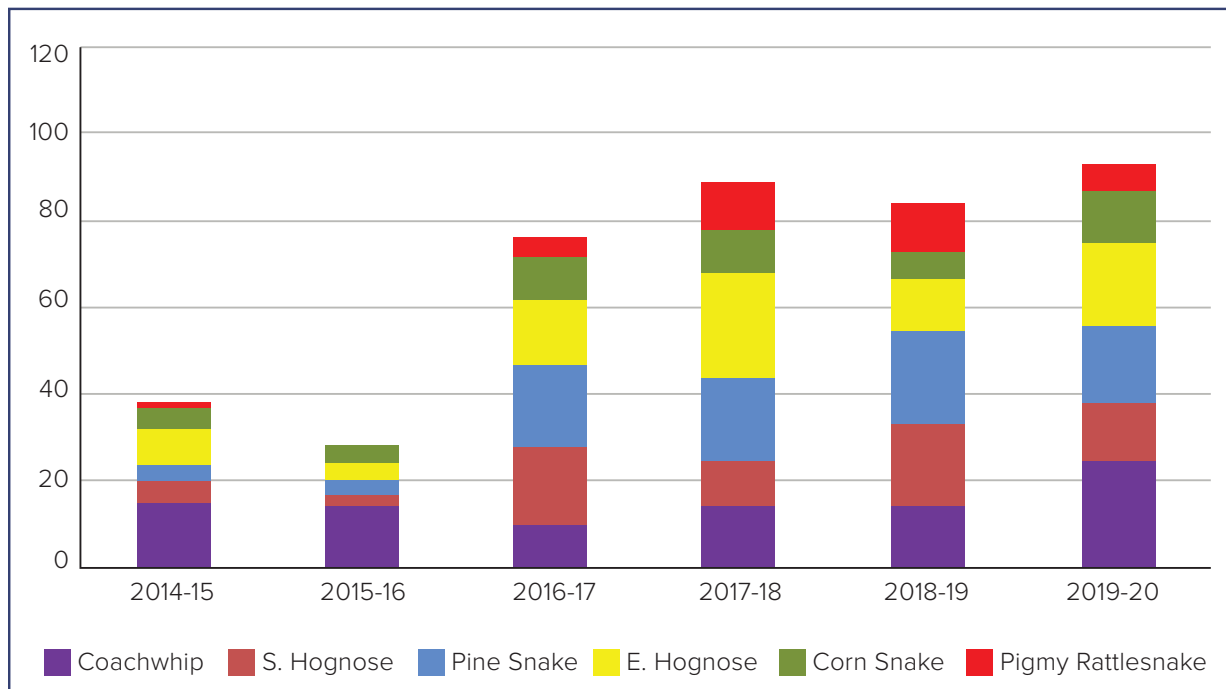
During the last quarter of 2020, NCWRC biologists finished the 7th year (2014-2020) of targeted snake species surveys and mark-recapture on the Sandhills Game Land. They chose a group of snake species on which to focus, including perceived “common” and perceived “rare” species to monitor over the long-term. These species include: Eastern Hognose Snake, Southern Hognose Snake, Eastern Coachwhip, Northern Pine Snake, Corn Snake and Pigmy Rattlesnake. Surveys are mainly done by the same, small group of biologists to maintain consistency across years. By the end of 2020, the group documented 460 individuals

(including road mortalities) of the target snake species on Sandhills Game Land and nearby property. When possible, biologists mark individuals with injectable PIT tags to attempt to build population estimates and gather information about movements of each species. They have marked 375 individual snakes over the survey period, but have only recaptured 27 individuals, sometimes several years apart. This project is ongoing, and data continue to be analyzed, but some interesting trends are already evident. For example, though number of snakes observed per year varies due to

numerous factors, the proportion of each species compared to total number of snakes captured (community composition) remains relatively stable. Long-term projects like this are key to monitoring populations and can inform management decisions.



Southern Hognose Snake (Photo: Dr. Jeff Humphries)



Composition of six snake species encountered on the Sandhills Game Land from 2014-2020. Though snake encounters over time varies, the relative proportion of each species encountered remains relatively stable.



N.C. Partners in Amphibian and Reptile Conservation News

Successful Reproduction of Eastern Diamondback Documented from Road-killed Snake

by Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist

Fall snake surveys proved fruitful in the Coastal Plain and Sandhills. However, some species, such as Southern Hognose Snake, were found in fewer numbers. Those species of conservation interest, which were documented during this quarter, included: Eastern Hognose Snake, Eastern Kingsnake, Eastern Ribbon Snake, Eastern Coachwhip, Pigmy Rat-

tlesnake, Timber Rattlesnake and Eastern Diamondback Rattlesnake. The Eastern Diamondback Rattlesnake sighting was a road-killed individual found by Camp Lejeune staff on base, and although unfortunate that it was road-killed, it was an extremely valuable find. The specimen was a young snake, likely a 2-year-old animal. This is especially hopeful since it rep-



resents successful reproductive effort for the species, something that biologists have been unable to document prior to this sighting.



Wildlife Diversity Program staff documented several snake species of conservation interest during fall surveys in the Coastal Plain and Sandhills, including the Eastern Coachwhip (top left) and Pigmy Rattlesnake (bottom left). (Photos: Jeff Hall)



N.C. Partners in Amphibian and Reptile Conservation News

"Frogloggers" and Trail Cams Deployed to Detect Amphibian and Reptile Species

by Jeff Hall, Partners in Amphibian and Reptile Conservation Biologist

Late in the quarter, NCWRC staff deployed numerous automated devices of both audio and photographic design. Approximately 20 automated audio data recorders, AKA "frogloggers," were deployed at wetlands across the Coastal Plain and Sandhills. Staff hope later analysis of the frogloggers will lead to detections of frog species of conservation interest, such as Gopher Frog, Southern Chorus Frog and Ornate Chorus Frog.

Eight automated trail cameras were deployed on Camp Lejeune to continue survey efforts for the Eastern Diamondback Rattlesnake, as well as other snake species of interest. Although a December day when the cameras were installed, it was warm enough that three individual diamondbacks were seen during the visit. Later analysis of head pattern confirmed that all three were individuals that had been sighted before. One of those individuals was first sighted by Lejeune staff in 2011, and it was a large adult at that time. That individual is likely 15-20 years old or older.



Automated audio data logger, AKA "froglogger" (Photo: Jeff Hall)



One of three Eastern Diamondback Rattlesnakes found while setting up trail cameras (Photo: Jeff Hall)



North Carolina Bird Atlas Launches in March

by John Carpenter, Land Bird Biologist

A group of government agencies, universities, and nonprofit organizations is kicking off the New Year by launching the North Carolina Bird Atlas. The state-wide community science survey will harness the power of thousands of birdwatchers to map the distribution and abundance of birds from the Blue Ridge Mountains to the Outer Banks.

The Bird Atlas begins this spring and will take place through 2026. Organizers are encouraging bird enthusiasts of all experience levels to get involved by visiting ncbirdatlas.org and registering for updates.

Bird atlases are large-scale, standardized surveys and have taken place in states across the country since the 1970s. North Carolina

Bird Atlas organizers include the NCWRC, NC State University, N.C. Natural Heritage Program, North Carolina Audubon, the U.S. Fish

and Wildlife Service, the University of North Carolina at Wilmington and Catawba College. observers will fan out across each block recording the birds and bird behaviors they see. All data are submitted through eBird, an easy-to-use online database of crowd-sourced bird observations.

The project comes at an important time for bird conservation. A recent study published in the journal *Science* found a steady decline of nearly three billion North American birds since 1970, primarily as a result of human activities.

Gathering observations through the North Carolina Bird Atlas helps by giving researchers a more comprehensive picture of bird populations across North Carolina. Ultimately, the data help state wildlife officials, land managers and conservation organizations make important conservation decisions.



and Wildlife Service, the University of North Carolina at Wilmington and Catawba College.

The Bird Atlas will divide the state into 937 “blocks,” each roughly 10 square miles. Working with regional coordinators, volunteer



A birder observes a Northern Harrier in flight (Photo: Allen Boynton)



Staff Begin Study to Determine Climate Change Impacts on Mussels

by Michael Fisk, Eastern Region Aquatic Wildlife Diversity Coordinator

This fall, Wildlife Diversity Program staff assisted NC State University graduate student Joseph McIver collecting Tidewater mucket, *Leptodea ochreacea*, to be used as part of a study focused on climate change and its impacts on native mussels. Gravid females were collected and transferred to the Harrison Lake National Fish Hatchery in Virginia to be used as broodstock.

Progeny will be used to conduct salinity and water temperature experiments at NC State University that will help understand the impacts of climate change, and specifically salinity associated with sea level rise, may have on native mussels in the Coastal Plain of North Carolina.



Tidewater mucket collected during surveys on the Chowan River in Gates County (Photo: NCWRC)

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





Alligator Monitoring Continues in 2020

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.

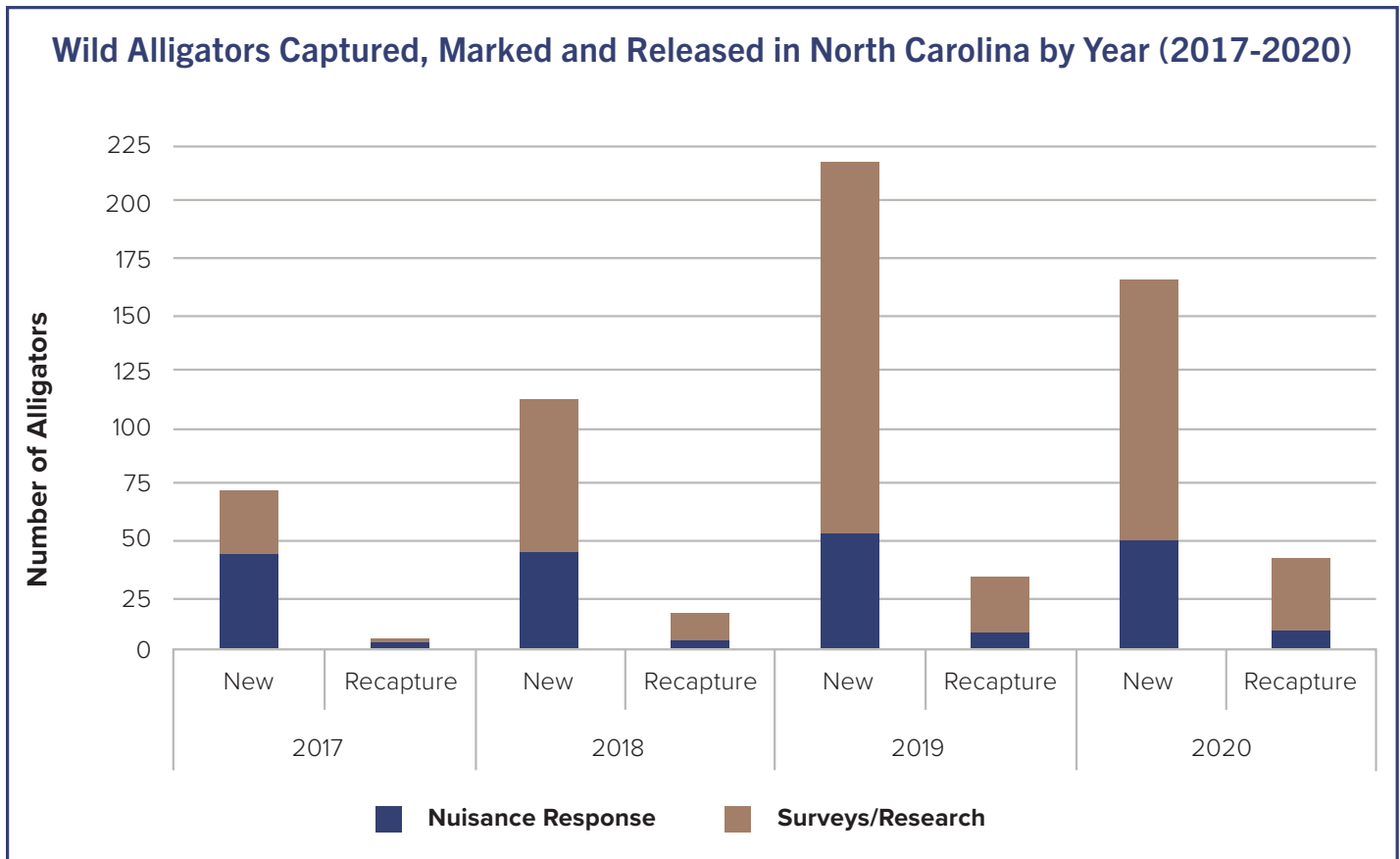
Every handled alligator is first scanned to determine if it has already been tagged. Handlers mark all new captures with an internal Passive Integrated Transponder (PIT) tag, collect two tissue samples from tail scutes, determine sex, take body size measurements, and record GPS coordinates of locations of capture and release. Measurements and locations are recorded for all recaptured individuals. To date,

568 wild alligators have been captured, marked and released in North Carolina (Fig. 1) using this method. Data were collected from 207 alligators in 2020, 41 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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Figure 1. Wild Alligators Captured, Marked and Released in North Carolina by Year (2017-2020)





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 44 dead alligators, including 25 in 2020. While alligators are rarely euthanized in North Carolina, three required euthanization in 2020; two were severely injured by motor vehicle strikes, and one was suffering from extreme emaciation and deterioration of overall body condition. Of the 22 alligators that were found dead, nine were hit by motor vehicles, 11 appeared to have

been killed illegally, one was inadvertently captured and drowned in a commercial pump filter, and one appeared to have either been cannibalized by a larger alligator or died from some other non-anthropogenic cause. Data and tissue samples, including femurs, are also collected from each dead alligator. In 2021, 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.

Table 2. Alligator Mortality Events in North Carolina (2017-2020)

Mortality Type	2017		2018		2019		2020		Total Records
	New	Recap	New	Recap	New	Recap	New	Recap	
Euthanization	0	0	0	0	1	1	2	1	5
Found Dead	5	0	9	0	3	0	17	5	39
Total	5	0	9	0	4	1	19	6	44

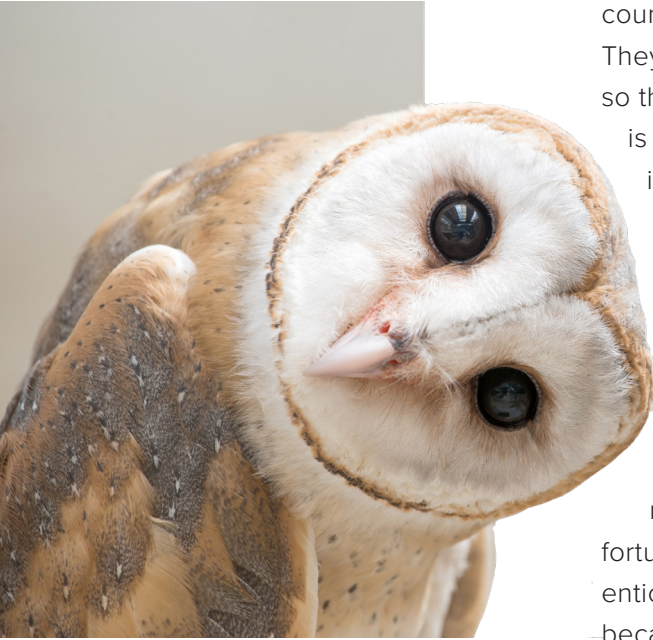


Newly hatched alligator from a 2020 season nest in North Carolina (top left); David Turner, Northern Coastal Management Biologist, captures subadult in Hyde County (right) (Photos: Alicia Davis)



Staff Begin Installation of New Prototype Nest Boxes for Barn Owls

by Allison Medford, Piedmont Eco-Region Wildlife Diversity Biologist



(Photo: Anan Kaewkhammul)

The Barn Owl is a [N.C. Wildlife Action Plan](#) Species of Greatest Conservation Need (SGCN) that has had little investigation in the past several decades, and biologists know little about its distribution and abundance across the state. In 2018, Wildlife Diversity Program biologist Allison Medford undertook a monitoring scheme for Barn Owls statewide. With the help of John Isenhour, District Conservation Biologist in District 6, Chris Kelly, Wildlife Diversity Program biologist in the mountains, and her technician, Clifton Avery, staff are preparing to install nest boxes on properties with Barn Owls across the state.

Barn Owls are difficult to survey and monitor using typical sampling techniques like point

counts and driving transects. They are secretive and nocturnal, so the best way to monitor them is by finding nests or monitoring occupied nest boxes as well as asking the public for sightings. In 2019, NCWRC sent out a news release seeking information on Barn Owls from the public. A few reports of owls and a ton of requests for nest boxes flooded in! Unfortunately, Barn Owls are not enticed to colonize an area just because a nest box is installed on a property — it is not an “if you build it, they will come” situation. Because of that, staff efforts are focused on properties that have verified Barn Owl presence. Staff will install fewer nest boxes with this stipulation but expect to have more occupied boxes.

The current Barn Owl Project is an offshoot of a project started by the New Hope chapter of the Audubon Society (NHA) in 2012. Chapter members installed 27 boxes in the northeast Piedmont but none of them have ever been occupied. The NHA used plastic, commercially available boxes that are relatively light and easy to install. NCWRC biologists have used a larger plywood design that has seen some successful occupancy in the mountains, though not for a few years. The

design is suitable for installation inside a building, however. The roofing materials necessary to make the box weatherproof make the plywood box very heavy and cumbersome. John Isenhour and Allison Medford noted that the occupancy of commercially available Barn Owl boxes is quite low in North Carolina likely because of a combination of poor placement and unsuitability of the size and

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One of several “tote box” prototype nest boxes staff have begun installing on properties with known barn owls. (Photo: Allison Medford)



type of box. They have attempted to combat both factors by only installing boxes on occupied habitat and by designing a new type of nest box. The new box uses plastic water totes and is much larger than standard boxes — it is more similar in size to a deer blind, which is a favorite nest site of the state's Barn

Owls. They have one prototype installed and are refining the design this season. Although a truck and winch are necessary to install these water tote nest boxes, they are relatively easy to install and are designed to withstand weather better than plywood versions. Water totes are relatively inexpensive and easy

to come by and modifications take little time. Project biologists are preparing to conduct site visits this spring and will install nest boxes on appropriate properties. Please contact Allison Medford ([allison.medford@ncwildlife](mailto:allison.medford@ncwildlife.gov); 910-975-9393) if you have any questions or wish to discuss this project.

First Documented Active Red Crossbill Nest in North Carolina in 30 Years

by Christine Kelly, Western Bird and Carolina Northern Flying Squirrel Biologist

Fall Red Crossbill surveys, planned for the high elevation Red Spruce forest, were relocated to lower elevation pine stands when it became apparent that the 2020 spruce cone crop was meager. The Red Crossbill is a medium-sized songbird with a short, notched tail and an unusual, twisted bill that crosses when closed. It is state listed as Special Concern.

Tipped off by birders' reports in eBird, NCWRC staff found small flocks of Red Crossbills in cone-bearing White, Pitch and Table Mountain Pines in Jackson, Henderson and Macon counties. On Oct. 13, technician Clifton Avery found an active Red Crossbill nest at DuPont State Recreation Forest approximately 50 feet up in a Pitch Pine on the edge of a granitic dome. Bill size and call notes were consistent with Type 1 Appalachian Red Crossbill. Calling nestlings were tended by a pair of adults that delivered food and

carried away fecal sacs. On Oct. 14, the adults were accompanied by a subadult. Young apparently fledged between Oct. 18 and 20. This marks the latest crossbill nest on record in North Carolina as well as the first active nest documented in North Carolina in 30 years. Unfortunately, the nest was gone following a high wind event when staff returned with a climber in November to retrieve it.



Red Crossbill (top photo); Red Crossbill nest in Pitch Pine (Photos: Christine Kelly)



Staff and Partners Plant Spruce Trees to Benefit Birds and Mammals

by Christine Kelly, Western Bird and Carolina Northern Flying Squirrel Biologist

Progress was made on two high elevation forest projects in October and November. First, with help from Haywood Community College forestry students and Pisgah Ranger District employees, NCWRC staff planted Red Spruce seedlings for the Flat Laurel Project. The over-Zoomed, field-starved students were game to plant even in the soaking front bands of Hurricane Zeta. In November, an American Conservation Experience (ACE) crew helped NCWRC and Cheoah Ranger District staff plant more spruce for Carolina Northern Flying Squirrels in the Unicoi Mountains and complete release work around the new and previously planted

seedlings. Red Spruce is shade tolerant, but like most trees, it will grow more rapidly with access to sunlight. Rather than underplanting beneath a hardwood canopy — an approach that requires later release work to get sun on the seedlings — this year's batch of seedlings was planted in small pockets of open canopy to take advantage of ample sunlight. At Flat Laurel, these were small tree fall gaps that had filled in with blackberry (bottom right photo). In the Unicois, these were canopy gaps created by dead American Beech, killed by beech bark disease. With some maintenance the first few years, seedlings planted in these small groves reach out over

the competing blackberry. Biologists look forward to these conifers maturing to provide cover for the Carolina Northern Flying Squirrels and food for the N.C. Listed Special Concern Red Crossbill.

Wildlife Diversity technician Clifton Avery Wildlife Diversity Technician Clifton Avery uses a brushcutter to knock back blackberry prior to planting Red Spruce seedlings this fall. (top photo); A tree fall gap where blackberry has been knocked back for spruce seedlings (Photos: Christine Kelly)



*Red Crossbill
(Photo: Wang LiQiang)*



Partners For Fish and Wildlife Program Expands On-the-Ground Conservation for Bog Turtles

by Gabrielle Graeter, Conservation Biologist/Herpetologist

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 its conservation efforts with this species, the NCWRC manages wetlands with known Bog Turtle populations. Unfortunately, many of these wetlands have more woody vegetation and canopy closure than they likely 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 differences from historical levels of grazers, fire and beaver activity. The plant communities and wildlife that rely on these open canopy, predominantly herbaceous vegetation areas can begin to decline if biologists do not act.

Bog Turtles lay their eggs in a nest on the ground within the wetland. Nests require full sun so the eggs can properly develop. The turtles also need areas for

basking. The bog habitat management goal is to create a mosaic of various habitat types, with some areas as shrub-scrub and others predominantly herbaceous vegetation without canopy.

Much of the bog habitat management that the NCWRC has done in the past has been funded using State Wildlife

Grants but those funds have become limited in recent years. Moreover, past management has relied heavily on assistance from volunteers for workdays, but that has its limitations as well. Volunteers may not have experience or the skills for the work; they can be unreliable; and they may not be as motivated to work hard and complete the job as a paid worker. Plus, the work requires hard physical labor while working in deep mud and it is not for everyone! Volunteers are more appropriate for filling in when

a few extra hands are needed, as opposed to being the primary workers.

This is where the Partners for Fish and Wildlife Program (PFW) has been such a big help — the PFW funding has allowed the NCWRC to contract out the work, and accom-

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Funding from the Partners for Fish and Wildlife Program allowed NCWRC biologists to contract out Bog Turtle habitat management work to complete large-scale vegetation management at five sites in western North Carolina in 2020.



Juvenile Bog Turtle (Photo: Gabrielle Graeter)



Bog Turtle (Photo: Jeff Hall)



plish much more than would have been done otherwise. The PFW program provides technical and financial assistance to landowners interested in restoring and enhancing wildlife habitat on their land.

Many of the Bog Turtle populations NCWRC is working to conserve are on privately owned land. NCWRC applied for and was awarded PFW funding on behalf of interested private landowners. In 2020, despite the challenges due to Covid-19 restrictions, agency staff completed large-scale vegetation management at five

sites in western North Carolina with this PFW funding (Figure 1). This work was completed over 10 workdays in October. Habitat management in these wetlands consisted of cutting most trees within the wetland, treating invasive plant species, and thinning out woody vegetation. Some sites were quite grown over with shrubs and trees and the difference after the work was completed was dramatic (Figure 2). The Bog Turtles at these sites will benefit from having a mosaic of habitat types and more directly sunlit areas for nesting and basking.



Figure 1. Recently cleared area in wetland in fall 2020 at one of the PFW-funded sites. All cut woody stems are treated with wetland-approved herbicide to reduce re-growth. (Photo: Gabrielle Graeter)



Figure 2. This small area was opened up to allow more sunlight to reach the ground and improve bog turtle nesting habitat. (Photo: Gabrielle Graeter)

Record Number of Surveys Completed for Green Salamanders

by Lori Williams, Western Amphibian Biologist



Adult Green Salamander found in fall surveys (Photo: Ben Dalton)

In fall 2020, Wildlife Diversity Program staff, volunteers and partners focused rock outcrop surveys on the state threatened Green Salamander (*Aneides aeneus*) and the newly described, and proposed state endangered, Hickory Nut Gorge Green Salamander (*Aneides caryaensis*). Collectively, they completed the most surveys ever in a single season for these species with 194 in the Hickory Nut Gorge in Henderson, Buncombe and Rutherford

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counties and 736 in the Blue Ridge Escarpment population of Henderson, Transylvania, Jackson and Macon counties for a total of 930 surveys.

In the Hickory Nut Gorge, 44 surveys (22.7%) produced at least one Hickory Nut Gorge Green Salamander with six new sites discovered. In the Blue Ridge Escarpment population, staff found at least one Green Salamander in 238 surveys (32.3%) with 29 new sites discovered.

Objectives for the Hickory Nut Gorge Green Salamander surveys included an attempt to re-visit, at least once, every known historical location and conduct multiple surveys at as many of those sites as possible. Questions remain about this species' current distribution within the Hickory Nut Gorge as well as the dire need for a better understanding of population status of this exceedingly rare, endemic species.



Wildlife Diversity technician, Ben Dalton, surveying rock out-crop crevices for Green Salamanders (Photo: Lori Williams)

The newly described and proposed state endangered Hickory Nut Gorge Green Salamander (*Aneides caryaensis*) is an exceedingly rare, endemic species.

Their focus for monitoring and inventory surveys of Green Salamanders (Blue Ridge Escarpment population) included updating records at historical sites in Macon, Jackson, Transylvania and Henderson counties, on private properties as well as on state and federal lands. Some sites in Nantahala National Forest were targeted for their proximity to upcoming timber harvest projects and/or concern over long-term population decline. Specifically, for the DuPont State Recreational Forest population, they reprised a previous study examining effects of prescribed burning on Green Salamander populations and microhabitat conditions after seeing possible declines in recent years after repeated burning in some forest units. This objective entailed surveying three times each a randomly chosen subset of known sites that received multiple burns in recent years, as well as, a set of control sites that has not received management treatments.

Both the Blue Ridge Escarpment projects and the Hickory Nut Gorge project will continue in 2021.



An adult female Green Salamander with one of her hatchlings; when found, the hatchling was missing part of its tail, which will regenerate in time (Photo: Ben Dalton)



Woodrat Surveys Conducted in Western North Carolina

by Andrea Shipley, Mammalogist

The Appalachian Mountains of North Carolina are home to both the Allegheny and the Southern Appalachian woodrat. Both woodrat populations are distributed throughout western North Carolina (WNC), where they have a potential range overlap in Buncombe and McDowell counties, referred to as the “zone of contact.” Neither species has been studied or monitored for over two decades; thus, little is known about their current status.

A pilot study of the species was initiated in summer 2020, and its objectives are to determine the (1) best camera trap techniques for long-term monitoring of Allegheny woodrat colonies; (2) genetics of Allegheny woodrat (*Neotoma magister*) hybridization with Southern Appalachian woodrat (*Neotoma floridana haematoresia*); and (3) presence and potential exposure of woodrat colonies to raccoon roundworm (*Baylisascaris procyonis*). Staff will also look for signs of reproduction at each colony site, such as capturing either an adult female plus an adult male, or an adult female and a subadult of either sex.

During summer 2020, seven of 18 historical colony sites were surveyed, and 14 individual woodrats were captured in the Linville Gorge “zone of contact” area, as well as nearby Allegheny woodrat sites. Signs of reproduction (subadults) were documented at four of the seven sites. Numbers of males and females captured were nearly equal, but more adults than subadults were captured.

Tissue and flea samples were taken from each woodrat for analyses of genetic species identification and potential flea borne diseases, respectively. Staff deployed unbaited camera traps at 6 occupied trap sites to document woodrat activity and persistence, as well as mesocarnivore presence. To date, we have collected 29,816 photos from 13 of 21 cameras.

During spring and summer 2021, staff will visit 11 other historical colony sites to trap and deploy cameras, and plan to explore new potential colony sites, pushing westward in the region. They will continue to take tissue and flea samples from trapped individuals, and cameras will remain active for long-term monitoring of woodrats.

The Allegheny Woodrat is a medium-size rodent, brownish-grey in color, with white undersides and feet. Its most distinctive characteristic is its tail, which is completely covered with hairs approximately one-third of an inch long and is prominently bicolored; nearly black above and white below.



Woodrat in a trap (Photo: Colleen Olfenbittel)



Biologists with a woodrat caught in a trap (Photo: Colleen Olfenbittel)



Mine Gate Repairs Ahead of Bat Hibernation Season

Katherine Etchison, Mammalogist

Protections for an important bat hibernation site were restored by NCWRC staff from the Wildlife Management, Law Enforcement, and Land and Water Access divisions ahead of winter. Gates and fencing for this site were breached during the past year, resulting in unauthorized entry. This site houses up to seven species of hibernating bats, including the tricolored bat and little brown bat, which have become rare because of the fungal disease white-nose syndrome. In 2008, winter counts in this site were as high as 1,800, but by 2016 the count dropped to 11 bats. The most recent count was 23 bats, showing a small increase in survivors consistent with trends seen in other hibernacula in the mountains. Continued protection at this important site will prevent disturbance of bats when they are most vulnerable, hopefully aiding the survival of these rare bats.



Western Wildlife Diversity Supervisor, Kendrick Weeks, and Senior Officer, Jared Thompson, install hinges to a recently breached gate.



Western Wildlife Diversity Supervisor, Kendrick Weeks, and Wildlife Diversity Technicians, Kristi Confortin and Clifton Avery, reinstall barbed wire to the security fence surrounding a bat hibernaculum.



Conservation Technician, Joe Tomcho, prepares to fix an interior gate while Wildlife Diversity Technician, Kristi Confortin, provides a light source. (All photos: Katherine Etchison)

NORTH CAROLINA

the Recovering America's Wildlife Act

Sustaining North Carolina's Diverse Fish & Wildlife Resources

The Recovering America's Wildlife Act (H.R. 5650) is a bipartisan bill that, if passed, would dedicate over \$20 million annually to North Carolina to conserve and restore nearly 500 nongame fish and wildlife species of greatest conservation need, as well as their habitats. RAWA would allow North Carolina to invest in proactive, voluntary, incentive-based, non-regulatory conservation on both private and public lands.



BE A PART OF THE ACTION

The N.C. Wildlife Resources Commission and species experts have identified **nearly 500** species of greatest conservation need in North Carolina. Without conservation and management now, many of these species may not get the conservation work needed to keep them common and off the federal list.

TODAY is the time to invest in the future of our wildlife. Americans love and need our wild places. We want to see wildlife thrive. Through the Recovering America's Wildlife Act, we would secure funding and ensure the health of fish and wildlife for generations to come.

Our Nature. Our Nation. Our Future.

Learn more and share your support of the
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THE WILDLIFE DIVERSITY PROGRAM



The Wildlife Diversity Program was established in North Carolina in 1983 to prevent nongame species from becoming endangered by maintaining viable, self-sustaining populations of all native wildlife, with an emphasis on species in decline.

More than 700 nongame animals call North Carolina home. Many nongame species, including mammals, birds, amphibians and reptiles, freshwater mussels and fish, are common and can be seen or heard in your own backyard. Other nongame animals, such as bald eagles and peregrine falcons, were, at one time, considered endangered, but now soar high in the sky, thanks to the work conducted by wildlife diversity biologists.

The men and women who work for the Wildlife Diversity Program are dedicated to conserving and promoting nongame wildlife and their habitats through a variety of survey and monitoring programs, species management, and habitat conservation or restoration projects. These programs and projects target nongame animals and their habitats, but game species — such as deer, turkey, mountain trout, and black bass — also benefit because they share many of these same habitats.

You can learn more about the many projects and programs conducted by wildlife diversity personnel on behalf of nongame and endangered wildlife by visiting www.ncwildlife.org/wdp.

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