

NORTH
CAROLINA

Wildlife

RESOURCES
COMMISSION

Wildlife Diversity Program Quarterly Update

Fourth Quarter 2017

Installing a bat box (Photo: Katherine Caldwell)

In This Issue:Page 2 - [Rocky River Mussel Surveys](#)Page 3 - [Brook Floater Surveys Site Visits for Dredge Material Placement on Coastal Islands](#)Page 4 - [Sea Turtle Update](#)Page 5 - [Upland Snake Survey Update](#)Page 6 - [Red-Cockaded Woodpecker Survey in Bladen County](#)Page 7 - [Pigeon and Cheoah Rivers Recovery Projects Update](#)Page 8 - [Carolina Pygmy Sunfish Monitoring](#)Page 9 - [Dan River Endangered Species Surveys](#)Page 10 - [Green Salamander Surveys](#)Page 11 - [Forest Restoration Workshop Update](#)Page 12 - [Conservation Plans Update](#)
[Bat Habitat Protection in Western North Carolina](#)N.C. Wildlife Resources Commission
October-December 2017**Rocky River/Hoosier Dam Removal Project Mussel Surveys**

In preparation for the removal of Hoosier Dam (Rocky River, Chatham County), which is planned for the summer 2018, Wildlife Commission staff completed four surveys to remove and relocate native mussels from the direct impact area at the base of the dam. Staff collected 189 Savannah Lilliput, which are state listed as endangered, from approximately 30 meters of river. They moved the mussels to suitable habitat upstream of the former impoundment. Most of these individuals were young (less than 20 mm in length), but the four largest mus-

sels were PIT-tagged to allow for future monitoring. Following demolition of the dam and stabilization of riverine habitat, these mussels can serve as a source for recolonization of the restored river reach.

All other species collected from this impact area were relocated farther downstream of the dam, to provide them with a larger buffer from any disturbance during the removal. Staff chose relocation sites with a goal of minimizing both the distance mussels were moved and the changes in habitat type, to reduce the risk of mortality due to change-induced stressors.



Savannah Lilliput from the Rocky River (Photo: Ani Popp)

Brook Floater Surveys Completed

Wildlife Commission staff surveyed five sites in four waterbodies for the Brook Floater, continuing a status assessment survey for this mussel, which is identified in the [N.C. Wildlife Action Plan](#) as a Species of Greatest Conservation Need. Brook floaters are found in North Carolina only in the Cape Fear and Yadkin-Pee Dee drainages. Staff detected no additional Brook Floaters during this period. In 2017, staff visited 55 sampling localities in 38 waterways, completing 68 surveys. They found Brook Floaters at 12 of these locations. Staff will continue monitoring Brook Floaters in 2018 to expand geographic coverage.



Brook floater (Photo: Michael Perkins)

Site Visits Conducted for Placement of Dredge Materials on Coastal Islands

Every four or five years, the U.S. Army Corps of Engineers (COE) maintains navigability of federal channels within North Carolina's coastal region. The Wildlife Commission has worked closely with the COE for about 40 years to use dredged sandy material beneficially for wildlife. During November 2017, the Wildlife Commission's waterbird biologist conducted pre-construction site visits with COE project managers to finalize plans for placement of dredged material on several islands near Oregon Inlet within the Pamlico Sound. They made additional site visits in December to ensure dredge operators adhered to construction plans so that material placed on islands was contoured like natural dunes, no sensitive areas were damaged, and gradual slopes led to shorelines.

Placement of dredged sandy material on existing islands sets back vegetative succession and provides quality nesting habitat for terns, skimmers, and oystercatchers.

Not all islands receive dredged sand; however, among the 15 islands managed by the Wildlife Commission within the Pamlico Sound, diverse nesting habitat is available for multiple waterbird species. The Wildlife Commission and COE will continue to work on islands through the winter, completing activities in March 2018 or earlier to avoid impacts to waterbirds' spring nesting activities.



Dredged material from navigation channels improves habitat for nesting waterbirds



267 Cold-Stunned Sea Turtles Observed this Winter

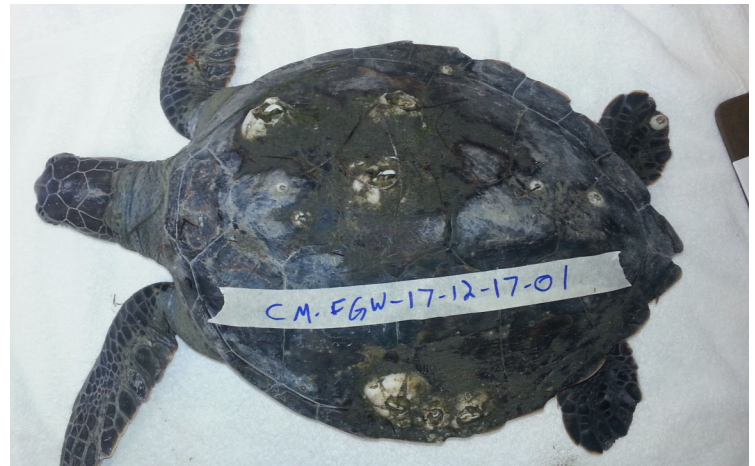
Each winter, when estuarine coastal water temperatures drop below 50°F, sea turtles wash ashore due to hypothermia, also known as cold-stunning. Cold-stunned turtles typically are healthy turtles that are exposed to cold water for prolonged periods. If turtles become too cold, the condition can be fatal. Those that survive may suffer from pneumonia, bone disease and frostbite. Although the arrival of cold-stunned turtles usually can be predicted by watching water temperatures, the size and severity of the event are less predictable.

In January of 2016, the cold-stunning event was the largest on record in North Carolina, bringing in over 2,000 turtles. This winter, Wildlife Commission staff have observed 267 cold-stunned sea turtles in North Carolina from mid-December through the end of the year. Cold-stunned turtles are also showing up in other states this year: from Massachusetts to Texas, thousands of sea turtles have been cold stunned.

Cold-stunned turtles that are found alive are brought to rehabilitation centers for treatment. Depending on the turtle's condition, rehabilitation can take as little as a few days of gradual re-warming and providing food before



release into warmer water near the Gulf Stream off the North Carolina coast, or it could require weeks of treatment with antibiotics.

All live cold-stunned sea turtles that are brought to North Carolina rehabilitation centers are tagged prior to release, allowing biologists to identify each turtle if encountered again. During this cold-stun season, biologists have identified four previously tagged turtles that were released following the mass cold-stunning event in January 2016.



A cold-stunned green turtle from December 2017. This turtle also was cold-stunned in January 2016 and was tagged and released after rehabilitation. (Photo: Frank Welles)

Support the Wildlife Diversity Program and Help Keep North Carolina Wild!

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. To make a direct donation for conservation of North Carolina's wildlife, send this form, along with a check or money order payable to the N.C. Wildlife Resources Commission, to: N.C. Wildlife Resources Commission, 1702 Mail Service Center, Raleigh, N.C. 27699-1702. Or [donate online](#) with credit card.  

Your name _____

Address _____

City/State/Zip _____ E-mail address _____

Credit Card # _____

Amount _____

Signature _____
(if paying by credit card)

Fourth Year of Upland Snake Surveys on Sandhills Game Land Completed

Wildlife Commission staff completed the fourth year of surveys on upland snakes on the Sandhills Game Land, located in Scotland and Richmond counties, as well as surrounding areas. Staff conduct these surveys to monitor species and to document relative abundance, movement, and general life history of focal species. Focal species include Northern pine snake, Eastern coachwhip, Eastern hognose snake, Southern hognose snake, pigmy rattlesnake and corn snake. Staff mark captured snakes using either PIT tags (if the snake is large enough) or by cauterizing unique scale patterns to correspond to a unique number. They use a combination of driving roads for snakes, searching cover objects, and walking forests after prescribed burning took place to search for snakes basking. Targeted snake species include listed and non-listed species in order to have some comparison of relative abundance of perceived “common”

and “uncommon” species. Staff have also increased the level of involvement in this project to include personnel from other organizations and agencies. Numerous other Wildlife Commission staff, technicians and amateur naturalists are increasing their willingness to participate in capturing target snake species so Wildlife Diversity Program staff can mark them and increase their sample size.

These data will enhance staff understanding of each species’ status in the Sandhills through data-driven surveys rather than historic surveys that only relied on observational data. Continued mark-recapture and monitoring of snake species will provide Wildlife Commission staff with much needed information to aid in management and conservation. As surveys continue, staff expect the number of re-captured individuals to increase so they can provide some information about abundance of each species.

Species	2014	2015	2016	2017	Total Individuals Marked
Eastern Coachwhip (species of special concern)	11	14	14	6 (1)	45
Eastern Hognose Snake (not listed)	8	3	4	21	36
Northern Pine Snake (state threatened)	9	4	3 (1)	15	30
Southern Hognose Snake (state threatened)	9	3	2 (1)	15	28
Corn Snake (not listed)	4	6	4	9 (1)	22
Carolina Pigmy Rattlesnake (species of special concern)	2	1	0	5	8
Total Individuals Marked	43	31	25	70	169

Number of live-captured focal snake species on Sandhills Game Land and nearby private land from 2014-2017. Numbers in parentheses indicate number of re-captured individuals.



Southern hognose snake (Photo: Jeff Hall)



Carolina pigmy rattlesnake (Photo: Jeff Hall)



Eastern coachwhip (Photo: Jeff Hall)

Baseline Survey Conducted for Red-Cockaded Woodpecker in Bladen County

Wildlife Diversity Program coordinated with staff from N.C. Forest Service, N.C. Department of Natural and Cultural Resources, U.S. Fish and Wildlife Service and The Nature Conservancy to assist with a baseline survey for the red-cockaded woodpecker (RCW) on private lands in Bladen County in December.

A baseline survey is a formal investigation of a property to locate active RCW nesting and roosting cavities, and is required prior to enrollment in the Wildlife Commission’s Safe Harbor Program. This program is designed to help al-

leviate future land use restrictions caused by the presence of an endangered species in exchange for habitat management that will benefit the RCW, an endemic species dependent on the longleaf pine ecosystem.

The private parcel recently surveyed is adjacent to the Wildlife Commission-owned Suggs Mill Pond Game Land and will add to the potential for this region to once again support not only a growing and healthy population of RCWs, but many other species such as bobwhite quail, Bachman’s sparrow, fox squirrel and ornate chorus frog.



Red-cockaded woodpecker (Photo: Scott Hartley)



Staff from the Wildlife Commission, The Nature Conservancy, U.S. Fish and Wildlife Service, and N.C. Forest Service survey for the red-cockaded woodpecker in Bladen County.



Ornate chorus frog (Photo: Jeff Hall)



Fox Squirrel (Photo: Chuck Bryan)



Bachman's Sparrow (Photo: John Carpenter)



Pigeon and Cheoah Rivers Recovery Projects Update

The Pigeon River Recovery Project (PRRP) and the Cheoah River Recovery Project (CRRP) were created to restore historic species diversity in the Pigeon River watershed and the Cheoah River. Since 2003, Wildlife Diversity Program staff have been involved in restoration efforts of the Pigeon River in North Carolina. In October, staff translocated seven species for a total of 599 fishes between the Pigeon River main stem and two tributaries (Table 1). To date,

the PRRP has reintroduced over 20 species of fish and more than 40,000 individuals into the Pigeon River watershed. In 2018, Wildlife Diversity Program staff will be reassessing overall success of reintroductions in the Upper Pigeon River.

In 2008, the Wildlife Commission received support from the Cheoah River Resource Management and Enhancement Fund and other partners to enable propagation and culture of mussel species in the Cheoah River.

As a result, the Wildlife Commission constructed the Conservation and Aquaculture Center, in Marion. Since the mussel reintroduction and augmentation began in 2012, more than 30,000 mussels have been stocked in the Cheoah River. In October, these efforts continued when staff released four species for a total 7,321 freshwater mussels (Table 2). Wildlife Diversity Program staff will continue monitoring and augmentation efforts in the Cheoah River during 2018.

Table 1. Summary of species translocated at each location.

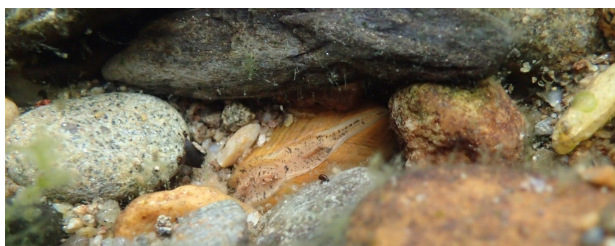
Species	Jonathan's Creek	Richland Creek	Main Stem Pigeon River	Total
Gill Darter	X	X		155
Banded Darter		X		113
Fantail Darter	X			88
Swannanoa Darter	X			49
River Redhorse			X	12
Smallmouth Redhorse			X	140
Golden Redhorse			X	42

Table 2. Summary of mussels stocked in the Cheoah River.

Species	Total Stocked
Appalachian Elktoe	26
Slippershell Mussel	991
Wavy-rayed Lampmussel	4,146
Rainbow Mussel	2,158



Banded Darter collected for translocation (Photo: Luke Etchison)



Juvenile wavy-rayed lampmussel, Cheoah River (Photo: Luke Etchison)

Staff Conduct Carolina Pygmy Sunfish Monitoring

Wildlife Commission staff began monitoring surveys for the Carolina Pygmy Sunfish, a state threatened species endemic to Columbus and Brunswick counties in North Carolina and small portions of the coastal plain in South Carolina. Staff visited a subset of the 15 sites occupied by the species during the recent North Carolina status survey (2014-2015) to assess population persistence.

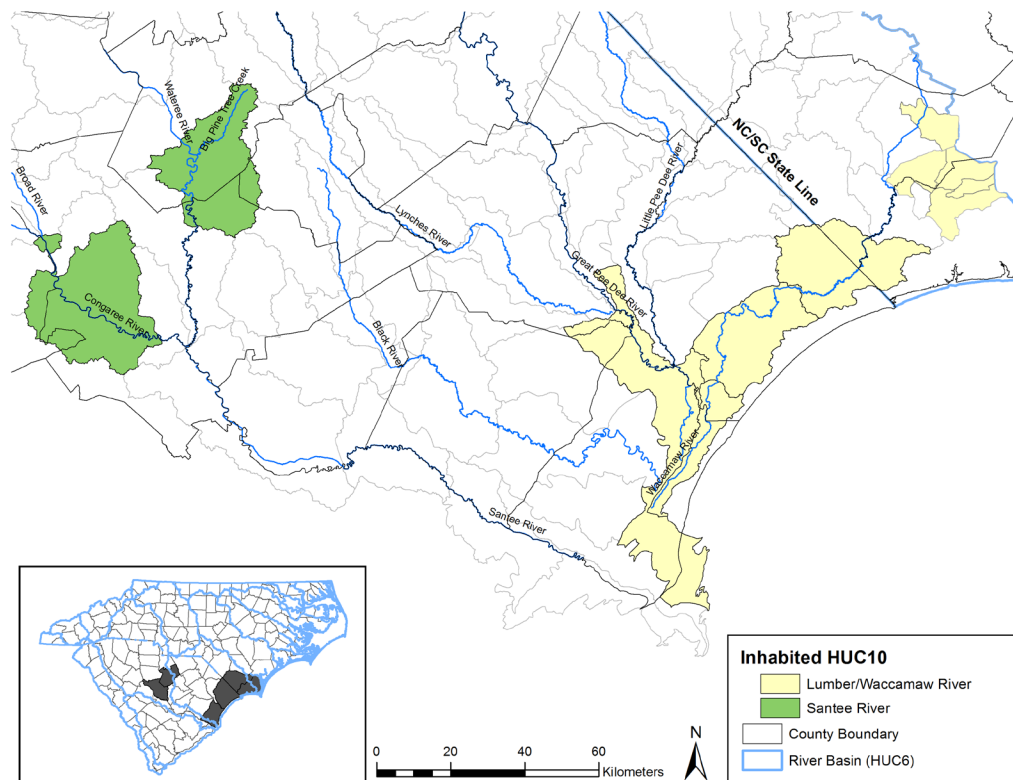
Of nine localities sampled, staff collected Carolina Pygmy Sunfish at six, including a tributary population outside the core range of Juniper Creek, newly discovered in 2015. Catch per unit effort was variable, ranging from

1-15 individuals per person-hour, comparable to most sites sampled in previous years. Due to low water levels throughout the fall, followed by a storm event prior to sampling, it is likely that populations undergo local distribution shifts in this system of interconnected swamps, streams, and ditches. In addition to the Carolina Pygmy Sunfish, staff collected other Species of Greatest Conservation Need as identified in the [N.C. Wildlife Action Plan](#). Those species included the Everglades Pygmy Sunfish (six locations) and Banded Sunfish (eight locations). Monitoring will continue in subsequent years, but the results of this brief



Carolina Pygmy Sunfish (Photo: Brena Jones)

survey indicate that Carolina Pygmy Sunfish continues to live in North Carolina. Additional surveys by a contractor are planned for 2018 in South Carolina to provide an updated distribution review for that portion of the species' range.



Carolina Pygmy Sunfish Range in NC and SC by Occupied Sub-Basin (HUC) and River Drainage

Endangered Species Surveys on the Dan River

Wildlife Commission biologists have documented the expanded the range of Roanoke Logperch and James Spiny-mussels in the Dan River mainstem, located in Rockingham County. Prior to 2007, Roanoke Logperch were only known from Virginia. Since then, the species has continuously expanded in North Carolina in the Mayo, Smith and Dan rivers.

In October, biologists recorded two new occurrences in the Dan River. They observed the most downstream record approximately 2 miles from the Virginia state line. They also noted the only record to date of a Roanoke Logperch between the Smith and Mayo rivers, a reach totaling over approximately 18 river miles. This population range increase

had been expected but not confirmed until October 2016.

A more unexpected range expansion was observed with the James Spiny-mussel. In 2000, the James Spiny-mussel was discovered in the upper Dan River and the upper Mayo River in North Carolina. In September 2016, Three Oaks Engineering collected the first ever James Spiny-mussel in the Dan River in Rockingham County. In October, Wildlife Commission biologists collected a James Spiny-mussel in the Dan River approximately 2 river miles upstream from the Virginia state line. These two collections are over 40 river miles from the population upstream in the Dan River and more evidence that the lower Dan River water quality is improving.



Roanoke Logperch



James Spiny-mussel

Second Year of Green Salamander Surveys and Disease Surveillance Efforts Completed

In the fourth quarter of 2017 Wildlife Diversity Program staff and partners completed a second year of intensive Green Salamander monitoring, inventory surveys and disease surveillance as part of a multi-state, collaborative effort to examine species status and distribution in the southern Appalachian region. Currently a threatened species in North Carolina, the Green Salamander is a petitioned species for listing under the federal Endangered Species Act, and will undergo a formal status

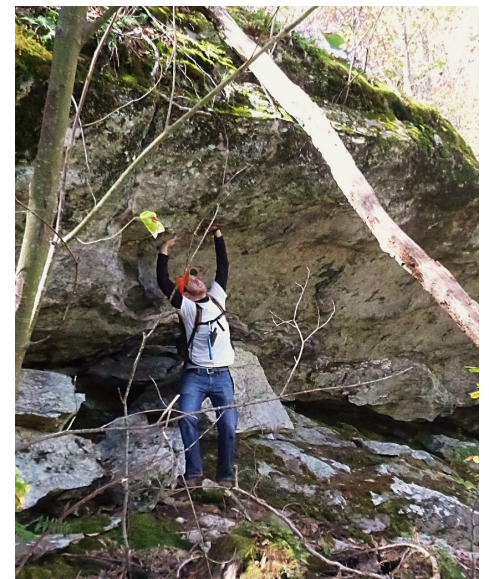
assessment in the next few years. In North Carolina, biologists' objectives in the multi-state project include monitoring historically occupied rock outcrop habitats, searching for new sites, and surveilling the health of the state's Green Salamander population. This project coincides with an ongoing conservation genetics and metapopulation study with partners.

In fall of 2017, staff and partners documented 21 new sites for Green Salamanders in Macon, Jackson, Transylvania and Henderson coun-

ties. The new site complex found in Macon County extends the Blue Ridge Escarpment population to the northwest by 1.3 miles (airline). Other significant new finds help fill in distribution gaps in southern Transylvania County. Biologists completed two years of spring, summer and fall occupancy and detection monitoring in multiple surveys at up to 55 sites, and data analysis is ongoing. Nest success for 2017 at monitored sites in the Blue Ridge Escarpment was 23 out of 31, or 74%— an improvement over 2016 (61%) but not as high as recent historical rates. By comparison, average nest success from 2010 through 2015 was 85%. Lab testing of skin swabs for amphibian pathogens, *Bd* (*Batrachochytrium dendrobatidis*), *Bsal* (*B. salamandrivorans*) and Ranavirus is also underway.



Swabbing foot of a state threatened Green Salamander as part of a disease surveillance protocol in Transylvania County (Photo: Charles Lawson)



Wildlife Diversity Technician Sam McCoy surveys a rock outcrop for state threatened Green Salamanders in Macon County. (Photo: Charles Lawson)

Wildlife Commission Staff Attend High Elevation Forest Restoration Workshop

In November, partners from the southern and central Appalachians convened in Gatlinburg, Tenn., for the High Elevation Forest Restoration Workshop. The workshop opened with Dr. Jim Rentch's presentation of a pictorial history of red spruce restoration research by the Appalachian Forest Experiment Station in the early 1900s. This set the stage for sub-

sequent talks about commercial and noncommercial stand improvement and the influence of abiotic factors on spruce forest recovery. Wildlife Diversity Program biologist Chris Kelly gave a presentation on the Flat Laurel Spruce Collaborative. The talk provided a practical illustration of how the project was developed using the latest research, planning and

mapping products from the Southern and Central Appalachian Spruce Restoration Initiatives and implemented with the help of numerous partner organizations. National Park Service staff led the group on a hike to view evidence of the November 2016 Chimney Tops fire and discussed catastrophic wildfires as a threat to high elevation ecosystems.



Attendees of the High Elevation Forest Restoration Workshop hiked the Chimney Tops Trail to see evidence of the November 2016 wildfire.



Burn scar from November 2016 wildfire on slope of Chimney Tops in Great Smoky Mountains National Park. (Photo: Chris Kelly)

Work on Conservation Plans Continues

Wildlife Diversity Program biologists continue to write conservation plans for each of the state-listed species, starting with the bog turtle (*Glyptemys muhlenbergii*). These plans will be used to direct conservation actions including research, land acquisition and outreach within the Wildlife Commission and among partners. Wildlife Commission biologists began writing

these plans last year and work on plans will continue until each listed species is covered. These plans are great news for biologists and conservation partners who are seeking concise guidance on steps to achieve species' population and habitat management goals. These plans succinctly and clearly lay out goals and objectives to species conservation along with detailing

threats to individual and population survival and growth. Research needs and economic impacts are clearly outlined as well, which is helpful for budgeting and grant procurement. Although these plans take much time and effort to complete, they are imperative for comprehensive discussions and useful, applicable action to ensure the continued survival of North Carolina's listed species.

Providing Bat Boxes in Critical Areas on Western North Carolina

As bats were settling into hibernation in western North Carolina, Wildlife Commission biologists were busy installing artificial bat roosts in the hopes that they will become occupied once bats emerge this spring.

Wildlife Commission staff partnered with N.C. Division of Parks and Recreation personnel to install a bat box in Avery County in an area with a surviving population of little brown bats. This species, once common across western North Carolina, is now rarely encountered due to its susceptibility to the fungal disease, White-nose Syndrome (WNS). Four little brown bats were captured in mistnet surveys at this site during the past two summers and one of these bats was captured during

both years. This exciting capture confirmed the individual survived winter, which is when bats typically succumb to the disease.

Mistnet captures of little brown bats in western North Carolina have declined 92 percent since the arrival of WNS and this Avery County site

(continue on next page)



A little brown bat captured at an Avery County mistnet site where a bat box was recently installed (Photo: Katherine Caldwell)

Providing Bat Boxes in Critical Areas on Western North Carolina (continued from previous page)

was the only one out of 22 to yield a capture of this species in 2017. In contrast to the species' typical roost underneath tree bark, which tends to be ephemeral, the newly installed bat box may provide long-term roosting opportunities for the survivors. This bat box will be regularly monitored to better understand the

response of survivors to WNS.

An additional bat box was installed at the Marion Depot by Wildlife Diversity and Land and Water Access staff. This box is readily visible to depot visitors, thus providing opportunities to engage in bat conservation education. It will also be regularly monitored for roosting bats.



Wildlife Diversity Technician Joey Weber assembles the wooden post that will support the bat box. (Photo: Katherine Caldwell)



Wildlife Diversity Biologist Katherine Caldwell, Wildlife Diversity Technicians Charles Lawson and Joey Weber, and Conservation Technician Austin Swann, lift a bat box into position at the Marion Depot. (Photo: Katherine Caldwell)



Wildlife Diversity Technicians Charles Lawson and Joey Weber, NC Division of Parks and Recreation Inventory Biologist Ed Corey, NC Division of Parks and Recreation Ranger Andy Sicard, and NC Division of Parks and Recreation Maintenance Mechanic Jason Jarrell hoist a bat box into position in Avery County (Photo: Katherine Caldwell)



A newly installed bat box at the Marion Depot (Photo: Katherine Caldwell)