North Carolina
Wildlife Resources Commission

Wildlife Diversity Program Quarterly Update

Fourth Quarter 2015



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N.C. Wildlife Resources Commission

Red-Cockaded Woodpecker Update

Staffs with the Wildlife Diversity Program, N.C. State Parks and the U.S. Fish and Wildlife Service once again worked together to protect the federally endangered red-cockaded woodpecker (RCW) in North Carolina. They translocated a group, or family of RCWs, from private property in Pender County, where their habitat was scheduled for harvesting, to Jones Lake Park in neighboring Bladen County.

Without their involvement, this group would not have been able to survive the loss of their foraging habitat and cavity trees, which take an average minimum of six years to excavate.

Wildlife Commission staff installed artificial cavities in early 2015 on state park land. These artificial cavities will be managed and protected in perpetuity. This effort was one step in the development of a comprehensive management plan for the RCW in the Bladen Lakes region, which one day may act as a corridor for linking, sustaining and buffering Sandhills and Coastal Plain RCW populations.

The Wildlife Commission will continue to provide technical assistance in monitoring this population and has taken a lead role in producing a draft management plan.

Raising a net to capture a roosting red-cockaded woodpecker (Photo by Melissa McGaw/NCWRC)

Red-cockaded woodpecker (Photo by Scott Hartley)

Waterbird Update

The Coastal Waterbird Biologist coordinated International Shorebird Surveys (ISS) among partners following protocol established during a 2012 workshop led by U.S. Geological Survey researchers. Each partner surveys assigned sites during fall and spring migration periods. The data are uploaded into the ISS eBird node.

The Coastal Waterbird Biologist and two temporary technicians surveyed New Drum Inlet Shoals and the shorelines of New Dump Island near Atlantic, within the Pamlico Sound.

During fall 2015, they conducted four counts and summarized data so trend assessments can be made over time. They detected the following shorebird species in the greatest numbers:

- Black-bellied plover
- Semipalmated plover
- Sanderling
- Short-billed dowitchers
- Small sandpipers (peeps – semipalmated, western and least sandpiper)

The standard error of the mean reflects variability in numbers of birds over dates of the survey. The marbled godwit, for example, was detected in three of the four surveys, with 44 detected in September, but only one in August and seven in October.

As biologists continue to collect these data, they will learn when the greatest numbers of species migrate through North Carolina. Further, when data from all partners are summarized, they will identify sites of great importance for each shorebird species. This spring, they will conduct these surveys in March, April and May.

Species	Fall 2015 (n=4) Mean	SEM
Peep species		
Sanderling		
Black-bellied plover		
Short-billed dowitcher		
Dunlin		
Semipalmated plover		
Ruddy turnstone		
Whimbrel		
Willet		
American oystercatcher		
Marbled godwit		
Red knot		
Piping plover		
Lesser yellowlegs		
Wilson's plover		

Sara Schweitzer and Edye Kornegay survey shorebirds at New Drum Inlet Shoals during fall 2015 International Shorebird Surveys.

Piping plovers and semipalmated plovers use shoals and mud flats as foraging habitat during fall migration. One piping plover was detected on each of two surveys, of four surveys conducted during fall migration.

Coastal Plain and Piedmont Reptile and Amphibian Update

Wildlife Commission biologists completed field work and preliminary data analysis on a 3-year project examining the environmental health of 16 isolated wetlands throughout the Coastal Plain. They partnered with the N.C. Division of Water Resources and funded the project through a State Wildlife Grant and a grant from the U.S. Environmental Protection Agency.

The project examined vegetation, hydrology, macroinvertebrates and amphibian assemblages across a spectrum of isolated wetlands. Wetland types included open-canopy natural isolated wetlands, closed-canopy natural isolated wetlands, isolated wetlands where the Wildlife Commission has conducted restoration efforts to open canopies, and mitigation wetlands meant to offset Department of Transportation projects.

Wildlife Commission biologists focused on determining amphibian assemblages at each site using a variety of sampling methods, including egg mass surveys, dipnet surveys for larval amphibians, and automated recorders to determine which species called at a particular wetland over the 3-year sampling period.

Biologists ranked each wetland according to a "specialist ranking," which incorporated both species richness and wetlands that supported species that are 1) rare across the landscape and 2) rely primarily on open-canopy isolated wetlands. Preliminary results show that open-canopy isolated wetlands ranked highest, followed by Wildlife Commission restoration sites. Closed-canopy isolated wetlands and DOT mitigation sites ranked nearly the same as each other, but much lower than other wetland types.

These results, coupled with data on vegetation, hydrology, and macroinvertebrate assemblages, will be published in a final report and submitted to a peer-reviewed journal during the next year.

A Wildlife Diversity Program biologist conducts amphibian egg mass surveys at an open-canopy isolated wetland.

Hawksbill Sea Turtle Nests Confirmed on North Carolina Beach

In the summer of 2015, two documented hawksbill sea turtle nests were laid on southern Hatteras Island, north of Hatteras Inlet.

These nests surprised Wildlife Commission biologists because hawksbill sea turtles are primarily tropical and subtropical, generally found in marine and coastal areas between 30° S and 30° N. Nesting populations are found closer to the equator, and often but not always on remote islands or archipelagos such as the Seychelles in the Indian Ocean or Milman Island off of Australia. In the Northwestern Atlantic, nesting occurs on sandy beaches in the Caribbean, and occasionally in Florida.

Newly emerged hawksbill sea turtle hatchling from Brazil. Hatchlings of loggerhead and hawksbill sea turtles share similar size and coloration, but hawksbills have four pairs or lateral scutes on the carapace, while loggerheads have a small fifth pair, near the shoulders.

In North Carolina waters, there have been several records in the past 20 years of juvenile hawksbills found either incidentally captured in fishing gear or stranded dead on the coast, making it a rare species in the state.

The two nests found in the summer of 2015 were originally identified as loggerhead nests; however, in late 2015, the eggs were confirmed as hawksbill from genetic analysis of eggshell samples collected from each nest.

The genetics data also confirmed that both nests were laid by the same adult female hawksbill sea turtle, and given that there was a 53-day gap between the two nests, this female may have laid two or three more nests elsewhere (successive nests laid by individual hawksbill sea turtles in the same season are separated by ~14 days). The earlier nest, laid in July, produced 61 hatchlings, and the second nest, laid in September, was lost to a storm even though the eggs had been relocated higher up the beach. These nests are the furthest north reproductive activity ever documented by this species, in the Northern Hemisphere.

Carolina Pygmy Sunfish Update

In December 2015, Wildlife Commission staff completed a 2-year status survey for the state-threatened Carolina pygmy sunfish, which is currently under review by the U.S. Fish and Wildlife Service. These diminutive fish, which reach a maximum length of 1.3 inches, ware endemic to Columbus and Brunswick counties in North Carolina and a small portion of the Santee River drainage in northeastern South Carolina.

The Carolina pygmy fish is one of three pygmy sunfish species found in North Carolina, all of which are restricted to the Coastal Plain and are unrelated to other sunfishes, such as bluegill or redbreast sunfish.

Staff visited 81 survey sites over two years, 49 within the Juniper Creek drainage, a tributary to the Waccamaw River and partly in game lands since 2005, and 32 sites in adjacent connected sub-basins.

While staff detected the Carolina pygmy sunfish at only 15 of these localities, over half were previously unrecorded locations. These fish still are primarily restricted to Juniper Creek. In 2015, staff captured a small number of fish in a stream that joins the Waccamaw River several miles downstream of Juniper Creek, which, in combination with two extremely high-water years, may be a demonstration of the species' ability to migrate with flow to take advantage of ephemeral conditions inherent to the cypress swamps and roadside ditches they prefer. Local densities remain relatively high in available habitats. In addition, staff found new localities for several other priority species, including the banded sunfish and the golden topminnow. The latter continues to expand its range northward through the Waccamaw River drainage. Staff will continue to monitor Carolina pygmy sunfish populations and will submit study results to the U.S. Fish & Wildlife Service in 2016.

Surveying for Carolina pygmy sunfish on Honey Island Swamp, a tributary to Juniper Creek (Photo by Brena Jones)

Carolina pygmy sunfish (Photo by Brena Jones)

Juniper Creek (Photo by Brena Jones)

Golden topminnow (Photo by Brena Jones)

Brook Floater Surveys Conducted in the Upper Catawba River Basin

In October through December, Wildlife Diversity Program biologists conducted surveys in the upper Catawba River basin for the brook floater, a state-endangered species of freshwater mussel that is also being considered for federal listing status by the U.S. Fish and Wildlife Service.

Biologists found almost 300 brook floaters, including a newly discovered population in Mulberry Creek that is likely one of the largest in the state. Additional surveys in Upper Creek, Wilson Creek, and Linville River extended the known range of this species in each stream. Next year, biologists plan to continue brook floater surveys and monitoring in the upper Yadkin-Pee Dee river basin.

Aquatic Wildlife Diversity technician Danielle Crocker displays a brook floater found in the Linville River in December. This was the first mussel survey ever conducted in the Linville Gorge Wilderness by Commission biologists and extended the brook floater's known range in the Linville River by more than five river miles. (Photo by Michael Perkins)

A state-endangered brook floater found in Mulberry Creek. This population was newly discovered in October and is likely one of the largest in the state. (Photo by Michael Perkins)

Biologists Coordinate Piedmont Bat Hibernacula Surveys

Brooke Massa and Allison Medford are collaborating on a hibernacula survey this winter in the Piedmont. One of the swabs that Massa submitted from this survey last year tested positive for *Pseudogymnoascus destructans*, the fungus responsible for white-nose syndrome (WNS).

Although biologists hope to find no more positive samples, it is particularly important that they monitor and sample as many mine shafts as they can in order to gain a greater understanding of bat populations and potential WNS impact in the Piedmont.

Biologists attempted to get more study sites through a letter campaign but met with very little success. The GIS database used to identify the mine shafts and property owners was not up-to-date and most of the shafts are caved in or otherwise no longer accessible. While the public was willing to assist the biologists, they were not able to find appropriate shafts.

Massa and Medford will visit five or so mine shafts the last week of January. These are all mines that have been visited before. They have two additional mine owners that they have not heard from, but hope to add them to their schedule.

Imperiled Freshwater Mussel Augmentations in the Tar and Neuse River Basins

In October, Wildlife Diversity Program staff released nearly 5,400 freshwater mussels propagated by the Wildlife Commission's Conservation Aquaculture Center and the N.C. State University Aquatic Epidemiology and Conservation Laboratory. Releases included Tar River spinymussel, Atlantic pigtoe and chameleon lampmussel in the Tar River basin and Triangle floater in the Neuse River basin. Staff will be monitoring the survival of the stocked mussels and plan to conduct additional releases of Tar River spinymussel in 2016.

Chameleon Lampmussels

Aquatic Wildlife Diversity Biologist Tyler Black releases Tar River Spinymussels in the Tar River basin

Aquatic Wildlife Diversity Biologist Tyler Black and Technician Matthew Bolton release chameleon lampmussels in the Tar River basin

Green Salamander Surveys Yield Exciting Results

In fall 2015, staff, partners, and volunteers conducted over 170 surveys to continue long-term monitoring of state-endangered geen salamanders at historical rock outcrop sites and new, potential sites. They observed green salamanders in approximately half of those surveys.

Significant survey results included success updating historical records at two sites in Jackson County where green salamanders had not been detected for many years. One of these sites previously and consistently yielded multiple salamanders each survey, but it had been at least five years since the last green salamander was seen. The second historical Jackson County site had not produced a record of a green salamander for at least the past 14 years.

Another highlight of the quarter was that partners with Highlands-Cashiers Land Trust and The Wilderness Society discovered a significant, new population in Macon County that extended the known distributional range by nearly 2.5 miles to the west. Similarly, in Henderson County, volunteers found new salamander locations on private lands, extending the edges of the species' distribution into new areas, while staff documented four new locations on state property in southern Transylvania County. Finally, two more miscellaneous records were reported of ground-dwelling green salamanders found at a camp building and under bark on a fallen log. These continued reports of incidental sightings of green salamanders not directly associated with rock outcrops are fascinating and increase biologists' understanding of their dispersal, movements and use of the forested landscape as a whole.

A significant, new population of state endangered green salamander was found in 2015, Macon County. (Photo by Lori Williams)

Top photo: A state-endangered green salamander hanging from a rock ledge, Transylvania County. (Photo by Alan Cameron)

An incidental observation of a dispersing state-endangered green salamander found in leaf litter next to a camp building, Henderson County (Photo by Steve O'Neil)

Biologists Analyze Data from Carolina Northern Flying Squirrel Acoustic Surveys

In 2015, Wildlife Commission staff resampled 12 novel sites situated in high-quality habitat in three seasonal sampling sessions — spring, summer and fall— to examine possible seasonal differences in detecting Carolina northern flying squirrels using acoustics. Staff spent the last quarter of 2015 analyzing these data. Acoustic surveys successfully documented the presence of Carolina northern flying squirrels, which are listed as state and federally endangered, in parts of the Great Smoky Mountains and Plott Balsams, where nearby nest box surveys have yielded low-to-no captures, despite the high-quality habitat.

In the Smokies, staff recorded northern flying squirrels in two locations off Clingman's Dome Road and off the Heintooga Spur Road. In the Plotts, staff recorded northern flying squirrels in new locations and confirmed continued presence at previously known sites opposite Fork Ridge overlook.

The trill is the best diagnostic call and was most frequently recorded in the spring, especially from mid to late May. The upsweep is the second best diagnostic call and was most frequently recorded in the summer. Whistles are the most commonly recorded call but require further scrutiny to distinguish from similar southern flying squirrel whistles or bat calls. Whistles were most frequently recorded in summer.

The efficacy of using acoustic surveys to detect flying squirrel presence could be improved with a larger reference call library. To supplement the library, biologists attempted to record "known" Carolina northern flying squirrel calls in the wild by using anechoic chambers set around nest boxes occupied by squirrels. The anechoic chamber is a simple chamber constructed from pieces of insulation foam board that create an optimal acoustic environment, amplifying volume and minimizing recording of background noises.

Staff fit the chamber over a nest box occupied at the time of deployment by a northern flying squirrel. The entrance hole to the box remained

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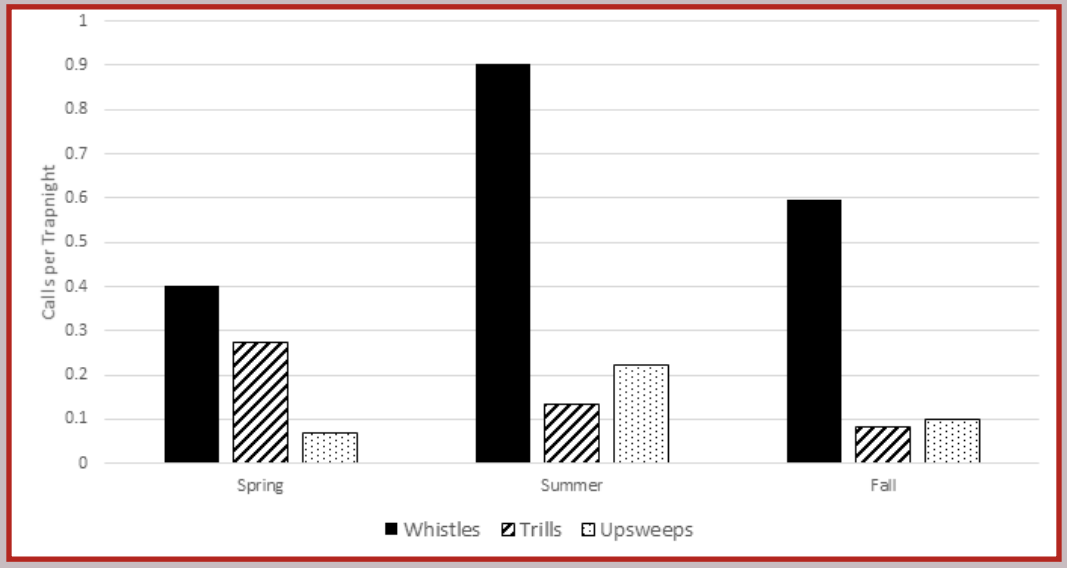

Number of .wav files with calls per trap-night for three call types across spring, summer, and fall 2015 sampling sessions.

unobstructed, allowing the squirrel to enter and exit. The detector was placed at the base of the tree with the microphone attached to a mic cable and fed through a hole cut into the chamber. To discourage abandonment of the nest box, staff filled the anechoic chamber with polyfil material.

Staff recorded 10 trill calls from juvenile Carolina northern flying squirrels during the mid-April trial and obtained images of the mother and pups. Though similar in structure to the adult trill, the juvenile trills were strongly ultrasonic (22-55kHz), which would make the calls inaudible to most predators. The "delta frequency" value was also much larger for the juvenile trills than the adult trills. Biologists also recorded several unfamiliar calls from the pups.

Carolina northern flying squirrel (Photo by Chris Kelly)

Anechoic chamber and trail camera set up around an occupied nest box (Photo by Chris Kelly)

Interior view of anechoic chamber and microphone with side wall removed (Photo by Chris Kelly)

Project Bog Turtle Meeting Provides Opportunity for Information Sharing and Collaboration

Project Bog Turtle is an independent volunteer-led conservation initiative dedicated to helping southern populations of bog turtles and their habitats. It was founded in 1995 as a conservation program of the North Carolina Herpetological Society. PBT members, which include the Wildlife Commission, hold an annual meeting to bring together everyone involved in bog turtle conservation efforts and research in the southern population of this species in order to share ideas, updates on status and research results.

Wildlife Commission staff assist in meeting planning and setting up the agenda as needed.

The 2015 meeting was held in November at the N.C. Zoo in Asheboro, with a large turnout of PBT members, state and federal agency representatives and university researchers.

Attendees covered many topics including: updates on population monitoring and habitat management projects from state representatives; presentations on research results from university professors and students; and information sharing regarding funding and conservation efforts at the federal level. The meeting also provided a good opportunity for PBT members to solicit others for assistance with field work or other collaborative projects.

This year a number of biologists who work primarily with bog turtles in the northeast attended the meeting. Their attendance at the meeting was very valuable for everyone involved because the results of monitoring and research often are not reported or published for many years and everyone was able to share information in a timely and collaborative manner.

Among the key speakers were researchers who are looking at bog turtle-related issues, such as genetics, movement, habitat use and wetland hydrology. The meeting provided a great opportunity for researchers to share information with the group and each other, and PBT hopes the communication and sharing that come from these meetings will lead to more effective conservation actions on the ground.

Juvenile bog turtle. Photo by Gabrielle Graeter

Biologists Conduct Analysis of Bat Survey Data and Prepare for Winter Bat Surveys

Wildlife Commission biologists conduct annual bat surveys across the Mountain Region, which have resulted in an extensive amount of data spanning many years. Analysis of these data yield valuable bat population trend information for many species in the region. This is especially important in light of white-nose syndrome (WNS), a deadly fungal disease that occurs across western North Carolina.

Considerable time and effort were devoted to preliminary analysis of these data, which is a crucial step in the survey and monitoring process.

Data analysis is ongoing, but preliminary results suggest declines in four species affected by white nose syndrome: little brown bat, northern long-eared bat, Indiana bat, and tri-colored bat. Further analysis will indicate the degree of decline for these species.

Surveyors prepare to conduct a winter bat survey using decontamination equipment to minimize the spread of WNS. Photo by David Riggs, Myotisoft

In addition to data analysis, biologists prepared for winter bat surveys, which begin in January. These surveys involve conducting counts of hibernating bats in caves and mines across western North Carolina. Since the onset of WNS in North Carolina, preparation for these surveys has become more intensive in order to provide thorough decontamination of equipment following each survey. This decontamination process minimizes the likelihood of spreading fungal spores that cause WNS.

Winter bat surveys are included in the aforementioned data analysis and will allow biologists to determine of population trends at long-term monitoring sites.

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