



Wildlife Diversity Program Quarterly Update

First Quarter 2018



Peregrine Falcon by Chris Kelly

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Wildlife Diversity Program Staff Begin Wayne's Black-throated Green Warbler Monitoring Efforts in Coastal Plain

Wildlife Diversity Program staff have started monitoring populations of Wayne's black-throated green warblers to help them understand better where the species occurs. Wayne's black-throated green warbler is a small songbird that migrates to North America every spring to breed in the South Atlantic Coastal Plain from southeastern Virginia to central South Carolina. They are common in the swamp forests of northeast North Carolina, especially at Alligator River National Wildlife Refuge, but biologists know

little about their distribution in the Coastal Plain, where large areas with seemingly suitable habitat are unoccupied.

Biologists are focusing their monitoring efforts in southeastern counties using point count surveys. Their goals are to estimate the abundance and generate a new distribution model, which will ideally help locate new areas for conservation. They are simultaneously documenting occurrences of several other avian Species of Greatest Conservation Need to help maintain progress with other Wildlife Action Plan priorities.



"Wayne's warbler" at Singletary Lake State Park, in Bladen County (Photo: John P. Carpenter)

American Oystercatcher Wintering Surveys Conducted

On Feb. 5 and 6, 22 people from eight organizations (state, federal, nongovernmental) conducted a survey of wintering American oystercatchers along North Carolina’s coast. Wildlife Management Division and Wildlife Diversity Program staff coordinated ground surveys and performed the aerial survey, along with Law Enforcement Division staff and staff from Manomet Conservation Science. This was the third complete winter survey of American oystercatchers in North Carolina, and part of a full Atlantic and eastern Gulf Coast survey.

The American oystercatcher is a Species of Greatest Conservation Need and species of concern in North Carolina, as well as other states along the Atlantic and Gulf coasts. The survey provides a population estimate during winter when oystercatchers roost in flocks at specific sites along the coast. Surveys are conducted within two hours of high tide, when oystercatchers stop foraging and roost on high ground, safe from predators and disturbance – often near inlets of barrier islands, accumulations of oyster shells (shell rakes) along shorelines, and sometimes on docks. Roosting flocks are counted easily compared to dispersed foraging oystercatchers, and leg bands can be read to identify

Year	Total American Oystercatchers	Error	American Oystercatchers in NC
2003	10,971	±298	647
2013	11,285	±13	799
2018*	?	?	836

American oystercatchers found in winter in the Southeast and North Carolina



American oystercatcher winter roost



American oystercatcher roost -aerial survey



American oystercatcher in defensive posture (Photo by Annika Andersson)

individuals and obtain information on movement and survival.

Preliminary estimates indicate an increase in numbers of wintering American oystercatchers in North Carolina. Wildlife Commission and partners will continue to monitor wintering American oystercatchers and work to protect important roost sites from erosion and disturbance from human activities as well as from predators.



Cold-Stunning Season is Fourth Highest Recorded

This past winter, Wildlife Commission biologists coordinated the response to stranded sea turtles that became cold stunned by chilly coastal water temperatures. Cold stunning is a natural phenomenon that occurs each winter in North Carolina. This winter's cold stunning season began on Dec. 10, 2017 and continued until March 21, 2018, producing 329 cold stunned sea turtles with the majority observed in December.

In North Carolina, cold stunning can occur any time during the months of November-March, depending on the timing of the first cold snap. A season can be prolonged by periodic warming of water temperatures, but it is very uncommon for one to span four consecutive months.

Only three other seasons spanned a longer timeframe: November 2008-March 2009 when 111 cold stunned turtles were observed during the 5-month period; November 2012-April 2013 when 163 cold stunned turtles were observed during that 6-month period; and November 2013-March 2014 when 208 turtles cold stunned during that 5-month period.



A cold stunned green turtle found washed ashore in Cape Lookout Bight (Photo: Cape Lookout National Park Service)



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Headstarting Program for Ornate Chorus Frogs Begins

In the first quarter 2018, Wildlife Commission biologists and partners at the NC Zoo began a headstarting program for ornate chorus frogs, an extremely rare species in the state. They have been successful in rearing gopher frogs over the past four years and this year was the first opportunity to attempt to headstart chorus frogs in captivity.

They are raising approximately 200 chorus frog tadpoles in mesocosms at the zoo that will likely metamorphose into juvenile frogs in May or June. Ornate chorus frogs in the Sandhills region are currently only known

from four sites, all on Ft. Bragg Army Base. All other historic populations in the region have been extirpated for various reasons.

If captive rearing is successful, juvenile chorus frogs will be released at their natal ponds to augment declining populations and other juveniles will likely be released at sites where the species no longer occurs. Along with habitat restoration, headstarting of frogs can play a major role in reversing the decline of imperiled species such as gopher frogs and ornate chorus frogs.



Gopher frog metamorph from headstarting effort (Photo: Jeff Hall)



Ornate Chorus Frog (Photo: Mark Bailey)



Gopher frog headstarting tanks (Photo: Jeff Hall)

Monitoring of Savannah Lilliput Mussels Continues

Wildlife Commission staff continued monitoring survival of PIT-tagged Savannah Lilliput mussels (state listed as Endangered) that were relocated from the former impoundment and tailrace of Hoosier Dam in Chatham County to avoid impacts of dam removal.

Over 200 individuals were moved in 2017 and distributed between three sites: two in the Rocky River upstream of the former impoundment and a third at the mouth of Bear Creek where it joins the river downstream of the dam. A subset of 26 individuals were tagged between June and November and monitoring has been conducted five times.

Twenty-five tags (96%) have been detected at least once. There have

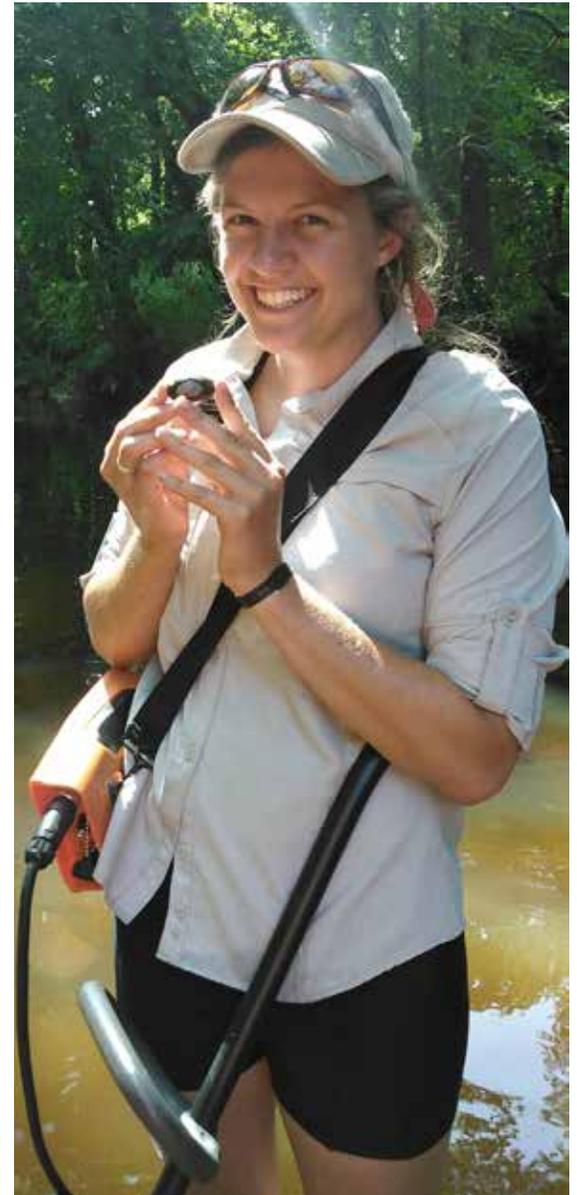
been four mortalities, three in Bear Creek (one in June 2017, two in March 2018) and one in the Rocky River (March 2018), leaving 22 (85% of total) extant tagged animals.

Of those, 14 were detected and confirmed alive in March 2018. Several untagged individuals have also been incidentally observed alive during the most recent survey, further indicating persistence of translocated mussels.

Efforts will continue in 2018, including additional translocations of other state-listed mussel species from the dam tailrace before structure demolition planned later this year.



Savannah Lilliput from Rocky River (Photo by Ani Popp)



Wildlife Commission biologist Ani Popp with tagged Savannah Lilliput detected alive after relocation in the Rocky River (Photo by NCWRC)

Conservation & Management Plan for Unique Wetland Underway

In the first quarter of 2018, Wildlife Diversity Program staff teamed up with a number of academic, non-government organizations, and independent researchers to continue drafting a conservation and management plan for a rare, unique wetland complex in Buncombe County. The site provides learning and research opportunities for local universities and is highly valued for its unparalleled biodiversity, including the most reptile and amphibian species (at least 40) known from any single site in the state or region. Southern Appalachian bogs, floodplain forests, vernal pools, semi-permanent pools, and beaver swamp forest are some of the habitat types present.

Currently, the site is at risk from a proposed road-widening project. Therefore, it is imperative that staff and partners continue to update site species records, monitor populations, collect ecological data, monitor habitat use and condition, and write a management plan.

Two of the rare amphibians present include state special concern mole salamander and state special concern four-toed salamander, both of which migrate to shallow vernal pools, bogs, and other wetland habitats to breed each year. Further, based on previous research a decade ago by Tim Herman (Bowling Green University), the four-toed salamander population at this site appears to represent a unique,

highly divergent offshoot of the lineage. This special population may be the last one remaining in North Carolina, with fewer than three other sites known in the world at present.

While partners at UNC-Asheville have documented both species in one section of the site complex in recent years, it had been 10 years since Wildlife Diversity Program staff had updated records in other parts of the complex, notably those habitats closest to the current highway and therefore most in harm's way from any new road construction or expansion.

In February, staff and volunteers conducted a series of three rainy-night visual surveys to observe surface-active salamanders moving toward breeding pools or already active in pools. They documented hundreds of more common species such as spotted salamander, red-spotted newt and wood frog, but they were successful at finding the rare ones, mole salaman-



Wetland habitat characterized by shallow, fishless pools that may dry seasonally; these habitats have all been lost in much of western North Carolina. (Photo by Jim Petranka)



The Four-toed Salamander is a rare, state special concern species found in certain types of wetland habitats; recent phylogenetic research has revealed extraordinary diversity in some of North Carolina's populations. (Photo by Jim Petranka)

der and Four-toed Salamander, in the part of the site complex that they were targeting.

This information is crucial for biologists' data collection efforts and will help them advise the Department of Transportation on ways to avoid or at least minimize impacts to rare habitat and species as the road project progresses.



Floodplain seasonal pools with moist sphagnum moss provide critical breeding habitat for many amphibian species, including rare, state-listed four-toed salamanders. (Photo by Jim Petranka)

Carolina Northern Flying Squirrel Winter Box Surveys & Training Days at Grandfather Mountain

In January, biologists and rangers from N.C. State Parks, the National Park Service, and the Grandfather Mountain Stewardship Foundation bundled up and helped Wildlife Commission staff haul fresh squirrel boxes up the steep trails at Grandfather Mountain.

Attendees checked and replaced worn boxes and learned to capture and handle Carolina northern flying squirrels.

This effort was prompted by recent engagement with the State Parks and Stewardship Foundation staff who are interested in supporting the Wildlife Commission's annual squirrel box monitoring effort.

In turn, they will be sharing their new flying squirrel knowledge with park visitors.



Grandfather Mountain State Park flying squirrel survey crew from left to right: Park Superintendent Sue McBean, Wildlife Commission technician Clifton Avery, Wildlife Commission biologist Andrea Leslie, Wildlife Commission biologist Chris Kelly, State Park Inventory Biologist Ed Corey, and Park Rangers Luke Appling and Andy Sicard. Bob Cherry missing from photo. (Photo by Chris Kelly)



Chris Kelly transfers a birch bark nest from a rotten squirrel box to a new box with help from Park Ranger Andy Sicard, State Park Inventory Biologist Ed Corey, and Wildlife Commission technician Clifton Avery. (Photo by Sue McBean, NC Parks)

Technical Guidance: Golden-winged Warbler Focal Areas

Two U.S. Forest Service proposals in the early planning stages have potential to provide important songbird habitat. Wildlife Commission staff toured the Buck and 12 Mile project areas on the Nantahala and Pisgah National forests, respectively. Both fall within Golden-winged Warbler Focal Areas. Wildlife Commission staff brought the "Best Management Practices for Golden-winged Warblers" to the U.S. Forest Service's attention starting in 2012. Now, the

U.S. Forest Service is routinely assessing new projects' potential to impact this species and, where appropriate, is incorporating the BMP into project designs.

The 12 Mile project presents a unique challenge to create habitat for the burgeoning elk population and for a variety of game and nongame wildlife. The Buck Project is a great demonstration of working to appropriately site timber harvest so that multiple conservation goals are achieved.



Wildlife Commission biologist Lori Williams performs a balancing act in a wetland on the Nantahala National Forest. (Photo by Chris Kelly)

Peregrine Falcon Nesting Update

As peregrine falcons were returning to their breeding territories this winter, Wildlife Commission staff were busy ramping up nest protection measures. This was inspired by the recent publication of biologists' analysis of peregrine falcon breeding performance that points to unacceptably low nest success in North Carolina's peregrine population despite acceptable territory occupancy and productivity levels. Although some factors potentially contributing to nest failure are beyond biologists' control as man-

agers, those that can be controlled, such as human disturbance, are the focus of management efforts.

For example, new sources of disturbance, including slacklining and drone flying are currently being addressed by land managers. Agency staff are collaborating with rock climbers in an on-going effort to improve signage posted at closed cliff sites, including regulatory and interpretive signs.

Working closely with the U.S. Forest Service and Carolina Climber's

Coalition, they established and posted a closure at a newly documented eyrie. Agency staff also advised rangers at Hanging Rock, Chimney Rock, and Grandfather Mountain State Park as they incorporate more information about peregrine falcons into their educational programming.

Finally, in response to an increased demand for presentations about peregrine falcon biology, populations, and recreation, staff invested much time in developing appropriate presentation materials.



Wildlife Commission staff assisted the U.S. Forest Service in posting seasonal cliff closure signs. (Photo by Chris Kelly)



Female peregrine falcon perched at eyrie. (Photo by Chris Kelly)

Tending the Wetland for Bog Turtle Habitat

Bog turtles and their habitat – mountain bogs – are a high conservation priority in North Carolina. The bog turtle is federally threatened (S/A) and state threatened. As part of the Wildlife Commission’s conservation efforts with this species, the agency owns and manages several wetlands with known bog turtle populations. Habitat management in these wetlands usually consists of removing invasive plant species and thinning woody vegetation. However, drastic times call for drastic measures. A bog turtle wetland in Wilkes County had a severe head-cut problem that needed attention. Head-cutting is when a channel grows in the upstream direction, becoming wider and deeper, due to the erosion of soil in its banks and bed. If left unchecked, the wetland would have eventually been lost or greatly reduced in size, and only severely incised channels would have remained.

In January 2018, wetland habitat restoration work began at this site to correct the existing head-cuts, and prevent them from continuing to degrade and reduce the size of bog turtle habitat. A combination of log and rock sills were used to reduce the slope of the channels, removing the head-cut and reducing erosion.

In addition to stabilizing the wetland outlet channels, new wetland habitat was created. Previously, the area on the east side of the wetland

was several feet higher in elevation than the wetland itself due to previously having been filled, and had a steep drop-off down to the wetland. That area was dry, and contained mostly blackberry and goldenrod. Based on Wildlife Commission biologists’ knowledge from ongoing hydrologic monitoring, this area was excavated to make it level with the wetland and water table. Later this spring, a variety of wetland plants and seeds, including soft rush, multiple sedges, and wetland ferns, will be planted in this area to facilitate its transformation into wetland. Before the first shovel ever hit the ground, this wetland was studied extensively. Repeated measurements of the hydrology, including depth to water table and flow rate of water in the channels, were taken. Likewise, the movements and habitat selection of the bog turtles here were monitored continuously since the summer of 2015 with radio telemetry. In fact, it is because of the bog turtles’ movements that restoration work was conducted during the winter. The turtles hibernate during winter; thus the contractors did not have to worry about the turtles moving in and out of the work zone. Continued hydrologic and bog turtle monitoring will allow biologists to determine the effectiveness of the restoration, utilize adaptive management to make improvements, and inform future restoration projects.

They hope to observe the habitat expansion area successfully transform into wetland habitat, and the resident bog turtles will move in.



Wildlife Diversity Biologist Gabrielle Graeter searches the head-cut channels thoroughly for bog turtles and other wildlife prior to the restoration work.



A close-up view of the stabilized primary head-cut channel, immediately post-restoration, with the log sills in place, erosion matting, and transplanted wetland plants between log sills.



A view of the restoration site immediately after work was completed, in January 2018.

Winter Bat Monitoring Efforts Yield Two Highlights and a Glimmer of Hope

Wildlife Commission biologists ramped up bat monitoring efforts this winter with 35 caves and mines surveyed across the Mountains (22) and Piedmont (13). They surveyed seven mountain hibernacula for the first time since the arrival of white-nose syndrome (WNS) in 2011 and found five new hibernacula in the Piedmont. Fungal swabs were taken at all Piedmont hibernacula to determine presence of the fungus that causes WNS with results expected later this spring. Caves are less common in this region of the state, so inactive mines are the primary habitat for hibernating tri-colored bats. Counts of this species have declined 97% in mountain hibernacula and though numbers are much lower in the Piedmont,

sites that have been surveyed across multiple years appear stable. Two highlights occurred this season, one of which was the discovery of the largest hibernaculum of tri-colored bats in the Piedmont, which was found on a Wildlife Commission game land. Another highlight occurred at a Cherokee County cave where staff counted 43 little brown bats. This cave is the largest remaining hibernaculum of little browns in the state, and although numbers have declined 83% from the pre-WNS average, the decline has been much less steep than at other sites. Bats at this site have persisted longer than at other WNS-infected hibernacula, which offers a glimmer of hope for this species.



Hibernating tri-colored bats in an inactive mine (Photo by Katherine Caldwell)



Hibernating little brown bats at a Cherokee County Cave (Photo by Katherine Caldwell)



Wildlife Commission biologist, Katherine Caldwell, ascends a rope after surveying for bats on the lower level of a cave. (Photo by Scott McCrea)



Land Conservation Biologist, Brooke Massa, searches for hibernating bats in an inactive mine. (Photo by Olivia Munzer)