North Carolina
Wildlife Resources Commission

Wildlife Diversity Program Quarterly Update

Third Quarter 2016

Adult and chick wood storks on nest (Photo by Annika Andersson)

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July - September 2016
N.C. Wildlife Resources Commission

Restoring Sandhills Game Land Wetlands for Amphibians

Wildlife Commission biologists assisted with the restoration of an isolated wetland on the Sandhills Game Land and continue to monitor the progress of restoration efforts. This is the sixth isolated wetland on the game land where restoration efforts have taken place over the last six years. For many decades, this wetland was completely forested because of historical land use practices such as ditching, peach tree farming and fire suppression. Staff has monitored the wetland for amphibian use over the last three years using automated frog call recorders and field surveys, which has given them a baseline to use for monitoring future amphibian colonization.

Before biologists started restoration work on this wetland, they had detected only three amphibian species and noted no successful reproduction of amphibian species. Staff will continue to manage this wetland through prescribed fire to provide better habitat for amphibians and other wildlife and plant species.

Isolated wetland restoration in progress on Sandhills Game Land

Mistnetting Migratory Landbirds to Evaluate Abundance and Bird Health

This summer, Wildlife Diversity Program biologists set up mistnets in Carolina Beach State Park to evaluate results of a recently completed study, funded by the Wildlife Commission, which mapped stopover habitat for migratory landbirds using weather surveillance radars. Although the radar analysis mapped where stopover habitat was located across the state, it couldn't determine what bird species were stopping or the condition of individual birds.

More than 350 species of North American landbirds participate in long-distance migration, traveling thousands of miles round trip annually between North, Central and South America. Because migration is extremely physically demanding, it requires places — stopover habitat — where birds can rest and find enough food to sustain themselves on their arduous journey.

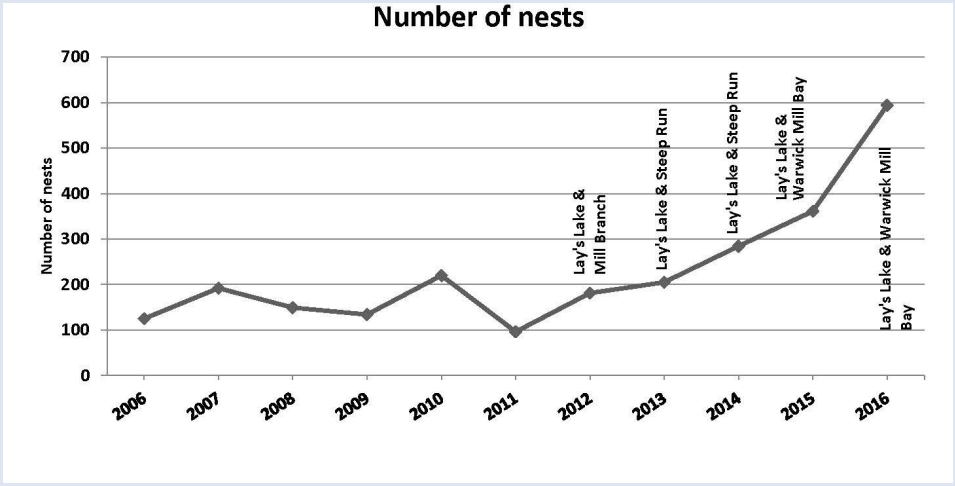
Biologists commonly use mistnets to estimate abundance more precisely abundance and evaluate bird health. Mistnets are particularly helpful during the fall when birds are often silent and very cryptic. Biologists hope to use this on-the-ground effort to expand upon the broad-scale radar analysis and further their understanding of this critical period in the life cycle of migratory landbirds.

Wildlife Diversity technician, Jacy Bernath-Plaisted, extracts a hooded warbler from a mistnet at Carolina Beach State Park.

Surveying Nesting Bird Colonies to Detect Wood Storks

During the core of wood stork nesting season, Wildlife Diversity Program staff conducted surveys of nesting colonies using kayaks (perimeter counts) and fixed-winged aircraft (aerial surveys). Thus far, they have detected four colonies in North Carolina, which is the farthest north the species breeds. In 2016, two of the colonies had nesting wood storks present and the other had great blue herons and anhingas, but no storks. Staff first recorded nesting wood storks in North Carolina in 2005. Their annual aerial and ground surveys of nesting wood storks provide estimates of nesting population size and distribution, which are especially important due to the species' federally threatened status. The wood stork nesting population is showing an increasing trend with an estimated 344 [±42 SEM (Standard Error of Mean)] and 250 (±10 SEM) active nests in each colony, respectively.

Wildlife Diversity Program staff meet annually with the Wood Stork Recovery Working Group and provide updates on population trends and colony activities.



Numbers of active Wood Stork nests in North Carolina colonies. Estimates are obtained by aerial surveys and counts from the perimeter of colonies taken from kayaks.

Wood stork adult and chicks on nest (Photo by Annika Andersson)

Tagging Sea Turtles Provides Valuable Data on Movement and Growth

Biologists with the N.C. Wildlife Resources Commission's Sea Turtle Project oversee the tagging of rehabilitated sea turtles released in North Carolina. If a tagged turtle is encountered again, called a "tag return," they can look up all sighting records of that turtle and compare growth between sightings. Additionally, because sea turtles are highly migratory, tags found on stranded turtles in North Carolina are sometimes from other states or even other countries. These tags from outside organizations allow Wildlife Commission biologists to connect with those organizations and piece together broad life history information, such as migration from a nesting beach to foraging grounds. For example, leatherbacks carrying tags from Trinidad, Costa Rica and Panama have been found stranded in North Carolina. These stranded turtles typically are encountered in the spring and early summer, when leatherbacks are migrating from their foraging grounds off Nova Scotia back to their nesting grounds in the Caribbean.

A loggerhead sea turtle receives a flipper tag while laying a clutch of eggs on Bear Island, one of two nesting beaches in North Carolina where night-time monitoring and tagging are conducted during sea turtle nesting season.

Tagging of nesting female sea turtles also occurs on two Wildlife Commission-permitted beach programs that conduct nighttime monitoring: Bear Island and Bald Head Island. During a recent sampling trip in Cape Lookout Bight, researchers with the NOAA Lab in Beaufort captured an adult female loggerhead that was carrying a flipper tag. The tag number was traced back to a record in 1998 when the turtle was tagged while nesting on Bald Head Island. While the turtle has not been observed nesting on Bald Head Island since 1998, biologists were able to confirm the turtle was still alive and had even grown 4 centimeters during that time — thanks to the tag return.

To date, more than 2,500 sea turtles in North Carolina have been tagged by the Wildlife Commission and partners, including more than 500 juvenile green sea turtles that were returned to the ocean following a major cold stun event from January through March 2016.

Preparing Listed Species Conservation Plans

Wildlife Diversity Program biologists have been preparing to write comprehensive conservation plans for all of North Carolina's listed species. A handful of aquatic species and a few terrestrial species make up the initial list of conservation plans to be completed within the year. In early August, staff with the Wildlife Diversity, Aquatic Diversity and Habitat Conservation programs met to discuss goals and roles for these conservation plans. These conservations plans will be useful in planning projects and conducting research to improve the status of these species.

North Carolina Partners in Amphibian and Reptile Conservation (NCPARC) News

Surveys and research

Wildlife Diversity Program staff reviewed 2016 head-starting efforts for the gopher frog, and met with partners at Fort Fish Aquarium and the N.C. Zoo to plan efforts for 2017. In addition to gopher frog work, the N.C. Zoo hopes to assist in work with the ornate chorus frog. The ornate chorus frog has seen significant declines and has disappeared from many historical locations.

Management and monitoring work continued at many sites in the Coastal Plain, Sandhills, and Mountains. Many Species of Greatest Conservation Need (SGCN) were targets of this work, but specifically included the bog turtle, southern hognose, mole kingsnake, pigmy rattlesnake, and many more.

At one site in Pender County, staff planted needle spikerush to assist with gopher frog breeding and foraging of tadpoles. Staff worked with N.C. Department of Agriculture to control a noxious weed at yet another site in Pender County on private property. Discovered in a pond, this Australian species named frogsmouth has never been found in North America before.

Invasive, non-native plant, frogsmouth, at private pond in Pender County (Photo by Jeff Hall)

Eastern box turtle found during monitoring work (Photo by Jeff Hall)

Workshops, training and meetings

New this year, Wildlife Diversity Program staff gave snake programs to over 50 telecommunications staff in Wilkes County. These programs, designed for linesmen and other field staff, focused on identification, conservation and safety. In the future, programs targeted at telecommunicators will be given across the state.

Two NCPARC working groups — Policy, Regulation & Trade, and Education & Outreach — met during the quarter. To learn more about these and the third working group, Research, Inventory, Monitoring, and Management, visit www.ncparc.org.

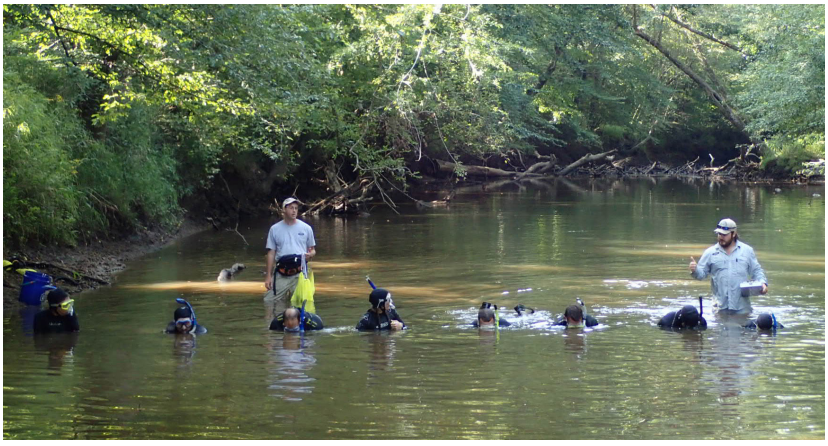
Bog turtle found during mountain survey work (Photo by Jeff Hall)

Monitoring Tar River Spinymussel Augmentation in the Tar River Basin

Aquatic Wildlife Diversity Program staff completed Tar River spinymussel augmentation monitoring surveys at six locations in Fishing and Little Fishing creeks, located in the Tar River Basin. Surveys were made possible via support from many Wildlife Commission staff (including staff from other Aquatic Wildlife Diversity Regions, Inland Fisheries Division, Lands and Water Access Section, Habitat Conservation and Director's Office) and North Carolina State University staff and students.

During the surveys, snorkelers worked along transect lines searching the stream bottom for freshwater mussels. Survey crews found over 1,000 of the released Tar River spinymussels in Fishing and Little Fishing creeks. In addition, snorkelers captured two wild Tar River spinymussels, which were transported to the Wildlife Commission's Conservation Aquaculture Center in Marion to be held as broodstock for future propagation efforts. Furthermore, thousands of other mussels representing eight species were observed, two of which are state endangered and one that is state threatened.

Propagation, augmentation and monitoring of the Tar River Spinymussel are long-term projects that are planned to continue with a hope of establishing self-sustaining populations.



Snorkeling crew beginning a survey for propagated Tar River spinymussel

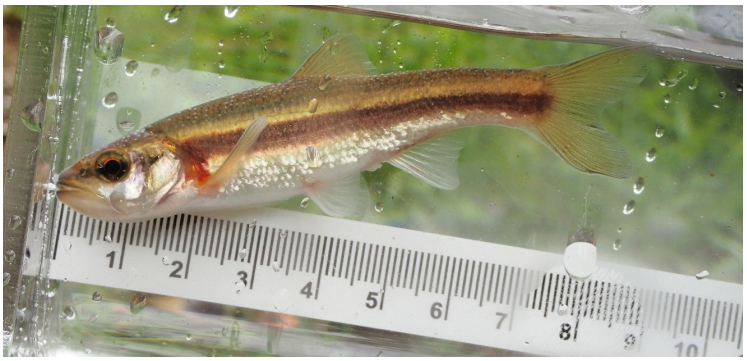
Propagated Tar River spinymussels captured during monitoring surveys

Aquatic Wildlife Diversity Research Coordinator Dr. Tyler Black (right) and Northern Piedmont Management Biologist Chris Baranski (left) process freshwater mussels collected during Tar River spinymussel monitoring survey.

Surveying Smoky Dace in Little Tennessee and Hiwassee River Basins

Smoky dace is an undescribed southern Appalachian endemic fish species, found in western North Carolina. Historically, smoky dace abundance and distribution have been poorly understood. Previous smoky dace records occurred during surveys where they were not being specifically targeted.

This summer, Aquatic Wildlife Diversity Program biologists surveyed for smoky dace at 141 sites across the Little Tennessee and Hiwassee River basins. Smoky dace were collected at 50 of 141 sites visited. Roughly, 31 of the 50 were newly documented sites. Wildlife Diversity Program biologists will continue to monitor smoky dace population and distribution in the upcoming years.



Smoky dace (Photo by Luke Etchison)

Assessing Long-term Spotfin Chub Population and Monitoring Reintroduced Population

A ten-year study to assess the long-term population status and dynamics of the federal and state threatened spotfin chub population in the Little Tennessee River was completed in August. Ten sites in the 24-mile reach between Franklin Dam and Fontana Reservoir were surveyed using visual snorkeling methods. Over the course of the study, the population has varied in abundance over time and at each site, but has continued to occupy the entire reach, and no significant trend was observed. Populations remained relatively strong at sites in the lower half of the reach, where suitable habitats were more abundant, but fluctuated much more widely at sites in the upper half, where good habitat was less abundant. Population strength appears to be negatively correlated with high flow events at times when young of the year are vulnerable.

In 2005, minimum flows were established on the Cheoah River, which enabled the subsequent recovery of several state and federally listed species, including spotfin chub. Reintroductions began in July 2009, and have included juvenile fish spawned and reared in captivity and adults translocated from the Little Tennessee River. Stockings began at the upstream end of the 9-mile reach between Santeetlah Dam and Calderwood Reservoir, with subsequent releases in the lower reach beginning in 2015.

In August, 2016, three long-term monitoring sites were established and surveyed in the Cheoah using the same techniques as in the Little Tennessee. Abundance at the uppermost site equaled the most abundant sites in the Little Tennessee, with at least three year classes observed. Abundance was lower at the middle site, and no spotfin chubs were seen at the lower site. Results exceeded expectations and we expect numbers to increase as stocking and recruitment continue at both lower sites. Partners in these projects include the U.S. Fish and Wildlife Service, Conservation Fisheries, Inc., and Brookfield Energy.

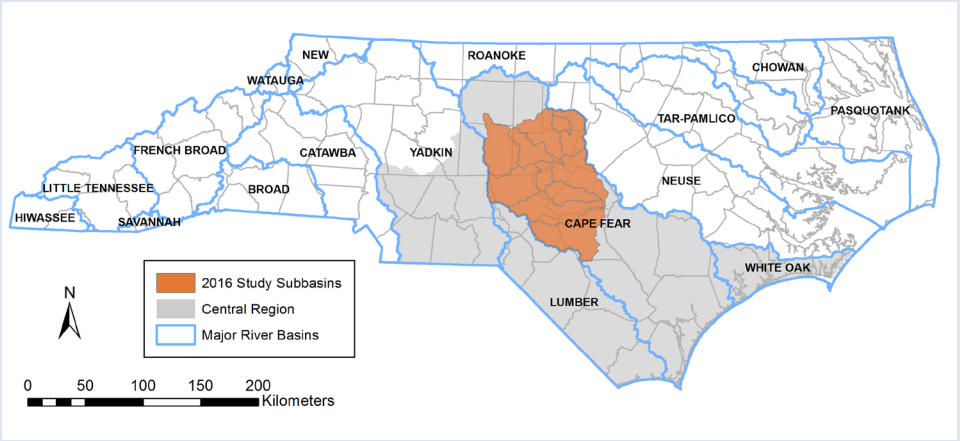
Spotfin chub (Photo by Luke Etchison)

Surveying Crayfish in Cape Fear River Basin

A red swamp crayfish showing the distinctive red tubercles on its chelae and fingers.

Staff surveyed an additional 23 sites in the Piedmont and Sandhills portions of the Cape Fear River basin (total to date = 47). Staff collected the endemic Carolina ladle crayfish at two more sites, one in Chatham and one in Alamance County. Staff found the exotic red swamp crayfish at one site in Lee County. This remains the sole collection to date of this species since the study began. Biologists continue to update records in the study area (see map). In the coming years, they will expand survey coverage into the remainder of the Central Region (shaded gray).

Map of study area and Central Region



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 donate directly to the 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 by credit card.

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Monitoring Cape Fear Shiner Augmentation Project & Rocky River Update

In September, staff resampled the Rocky River above Woody's Mill Hydropower Dam, where 350 Cape Fear shiners were translocated in 2013-2014, in designated Critical Habitat. While no individuals were collected during this visit and water levels were very low, staff observed strong populations of highfin shiners, swallowtail shiners, and spottail shiners. These species often school together with Cape Fear shiners in this complex habitat.

Evidence of successful reproduction in the form of multiple size classes of individuals is encouraging and it is possible that Cape Fear shiners are still present but not detected due to low density. Monitoring will continue in 2017.

Staff also surveyed the tailrace of the dam in September to investigate the status of mussel populations. The diverse native community included seven state listed species of the 10 species found:

- Carolina creekshell, Eastern Creekshell, Savannah lilliput, yellow lampmussel (State Endangered)
- Creeper (State Threatened)
- Notched rainbow (State Special Concern)

Discovery of the Savannah lilliput represents a new record for that reach, the only other known record in the Rocky River since 1972 and the first collection in Chatham County since three animals were collected in the Deep River in 2001.

A more comprehensive assessment of this reach is planned for the spring of 2017.

Eastern creekshell

Biologists Discover Endangered Gray Bats Roosting in Western North Carolina Bridges

In addition to conducting routine summer bat surveys, Wildlife Commission biologists discovered the federally endangered gray bat roosting in certain bridges in western North Carolina. Though gray bats have been captured in mistnet surveys in North Carolina, this species was not known to roost in the state.

After initially finding gray bats roosting in a bridge in Buncombe County, biologists radio-tagged two gray bats and tracked them to identify foraging locations and additional roost sites. Subsequent bridge surveys yielded an additional six bridges with roosting gray bats in Madison and Yancey counties. This exciting find has prompted future work aimed at identifying additional information on the occurrence and distribution of gray bats in North Carolina.

Gray bats roosting in the expansion joint of a bridge (Photo by Katherine Caldwell)

Collecting Red-spotted Newt Skin Swab Samples to Detect Chytrid

Wildlife managers and conservationists continue amphibian disease surveillance and research amid a growing concern for emerging diseases and fungal pathogens. Two of the more virulent pathogens contributing to global amphibian declines are two types of "chytrid fungus," Bd (Batrachochytrium dendrobatidis) and Bsal (B. salamandrivorans). Bsal in particular is a serious potential threat to Southern Appalachian biodiversity because it only affects salamanders and is highly fatal for some species.

Further lab experiments have Fungus shown that newts are the most susceptible to Bsal with 100% mortality of infected individuals. Though Bsal has not been detected so far in North America, researchers across the country are proactively engaged in all levels of partnerships from local outreach to field and lab research to policy decisions, ahead of any outbreak of Bsal detections in the United States.

One such partnership underway in North Carolina and throughout the region is a study with biologists at the U.S. Geological Survey (USGS). In the summer of 2016 Wildlife Diversity Program staff, in coordination with the USGS, obtained skin swab samples from red-spotted newts at ponds and wetland complexes in western North Carolina. Staff conducted dip-netting surveys and collected over 120 samples from four counties (n=30 per county). Swabs will be sent to the USGS for Bd and Bsal testing and will contribute to a larger, regional disease surveillance dataset. If Bsal ever becomes prevalent here, it may show up first in our native newt populations, effectively sounding the alarm.

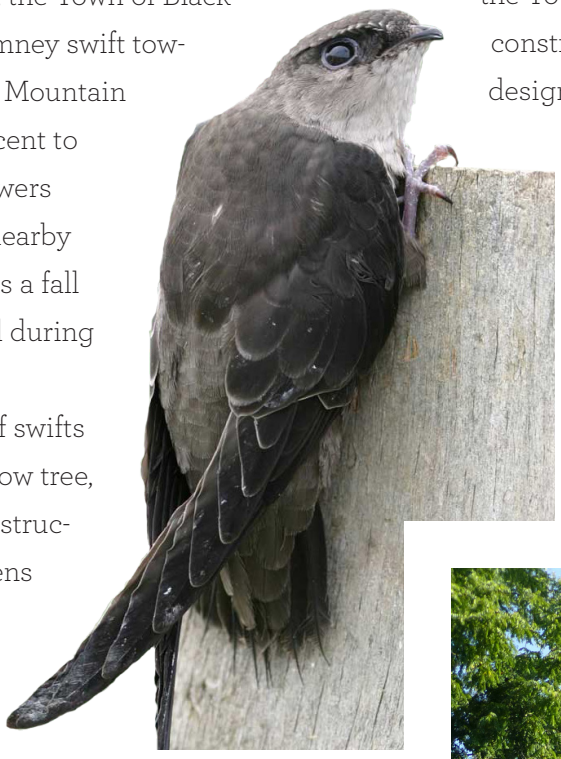
Wildlife Diversity staff preparing to swab foot of an aquatic adult red-spotted newt (above) and a terrestrial juvenile, or eft, red-spotted Newt top right) to check for presence of two types of chytrid fungus, Bd (Batrachochytrium dendrobatidis) *and Bsal* (Batrachochytrium salamandrivorans). *(Above photo by Lori Williams)*

Photo by Brenna Forester

Wildlife Diversity Program staff conduct a dip-netting survey for pond amphibians, particularly red-spotted newts, for disease surveillance. (Photo by Lori Williams)

Swift Action to Save Swifts

This summer, Wildlife Diversity staff collaborated with partners and citizens to help chimney swifts in western North Carolina. In August, the Town of Black Mountain erected two chimney swift towers— one next to the Black Mountain Library and the other adjacent to Lake Tomahawk. These towers are intended to replace a nearby chimney that swifts used as a fall roost site but was removed during a building renovation.



Chimney swift (Audubon)

Though only one pair of swifts may nest in any given hollow tree, chimney, or other suitable structure, in fall migration, dozens to thousands of swifts will spend the night together in a roost structure, depending on its size. The nightly gathering of swifts at their fall roosts is a popular wildlife viewing opportunity that had already inspired an annual swift-watching event among town residents.

Developing structures that provide wildlife viewing opportunities is a priority in the North Carolina Wildlife Action Plan. Coincidentally, the chimney swift is Audubon North Carolina's 2016 "bird of the year." Thus, this was not only an opportunity to help the swifts, but an opportunity to engage the public as well.

Partners in the bird conservation community acted quickly to address the loss of the former roost. Wildlife Diversity, Elisha Mitchell Audubon Society, and U.S. Fish and Wildlife Service staff provided technical guidance onsite selection. Locating the structures not far from the original roost and in public places was a conscious decision to maximize bird use and educational opportunities for the citizens and visitors of Black Mountain. Staff with the Town of Black Mountain's Public Works department constructed and installed the 12-foot towers, which are designed to accommodate a nesting pair or a small number of roosting swifts in the fall.

Local artist Libba Tracy painted swift silhouettes on the towers. Bird and art enthusiasts celebrated the installation of the chimney swift towers on opening night of the "For the Birds" art exhibit at the Black Mountain Center for the Arts. Everyone now awaits a swift discovery of the towers!

A chimney swift tower at the Black Mountain Library (Photo by Chris Kelly)

Behind the Scenes – The Many Aspects of Restoration Planning for Bog Turtles

Over the last few years, Wildlife Diversity Program biologists have recognized the need to restore a small bog that is home to a bog turtle population in the foothills of western North Carolina. The habitat bog turtles have relied on has been degrading and shrinking over time as a result of highly erosive stormwater flowing through the bog. Past human impacts on the landscape have also played a role. As land managers, biologists are making a priority to do what they can to restore this site and main-tain it as suitable habitat in the future. They fear if they don't act soon, they may lose the bog habitat, as well as the turtles that rely on it. However, before they can begin a restoration project, they must gather adequate informa-tion from a variety of experts to make informed decisions about the restoration design.

A small team is working to collect the information they need. Since summer 2015, Wildlife Commission staff has been tracking the movements of bog turtles in the bog and documenting their use of the habitat. Staff is record-ing the turtle locations with a high-tech GPS unit. This will tell staff whether the areas that need extensive hydrologic restoration are being used by the turtles. If the turtles are spending time in those areas, biologists would like to know the extent and seasonality so they can minimize negative impacts to bog turtles. In collaboration with the University of North Carolina at Asheville, biologists also have been recording data on the hydrology and soils of the wetland and the areas imme-diately surrounding the wetland. This information gives them knowledge about seasonal changes in hydrology, the strength of the springs, and the types of soils present on the property, as well as some clues to the land-use history on the property.

Biologists also have completed a watershed analysis, where they have learned the size of the watershed that feeds the bog and the peak flow volume and rates dur-ing storm events of different sizes. They have recorded information on bog restoration plans as well so that they can make decisions that benefit the broader bog community.

But gathering data isn't enough by itself. Biologists need input from a larger set of experts to help them refine the restoration plan. In summer 2015, in addition to collect-ing data, staff had multiple meetings with partners to gather ideas and get feedback on their restoration plan. Experts included other wildlife biologists, botanists, soil scientists, hydrologists, engineers and restoration experts. These experts represent multiple divisions in the Wildlife Commission and staffs from the N.C. Natural Heritage Program, U.S. Fish and Wildlife Service, Project Bog Turtle, and others.

Additional meetings are planned in the coming months with these partners to help Wildlife Commission staff refine the restoration design in preparation for field work in 2017.

Bog turtle survey work

Juvenile bog turtle (Photo by Gabrielle Graeter)