North Carolina
Wildlife Resources Commission

# Wildlife Diversity Program Quarterly Update

**Fourth Quarter 2016**

*Loggerhead Shrike (Photo by John Carpenter)*

## In This Issue:



October-December 2016
N.C. Wildlife Resources Commission

## Christmas Bird Count Continues Through Early January

The National Audubon Society's annual Christmas Bird Count (CBC) is the oldest, active citizen science bird project in the nation. Beginning on Christmas Day 1900, the new holiday tradition was initiated to encourage outdoorsmen to count birds during the holidays. Every year since, from mid-December through early January, tens of thousands of volunteers brave the often cold and wet weather to take part in this effort.

This holiday season, volunteers conducted 434 surveys and counted over 12 million birds throughout the Americas!

Wildlife Commission staff assist with numerous counts throughout the state — approximately 50 each year in the state. One count is the Holly Shelter and Lea-Hutaff Island count, which is centered within a coastal fringe forest containing a diverse mix of habitats where species of greatest conservation need, such as piping plovers and Bachman's sparrows, can be found. N.C. Audubon and other organizations use data collected in this long-running census to assess the health of bird populations and to help guide conservation actions.

*Piping plover (Photo by John Carpenter)*

*Bachman's sparrow (Photo by John Carpenter)*

## 2016 Sea Turtle Nesting Season Highest on Record

The 2016 sea turtle nesting season ended on a high note with 1,621 loggerhead sea turtle nests observed, the highest number on record in North Carolina, and well above the normal range of variation (see graph). Loggerhead sea turtles lay their eggs on the sandy ocean-facing beaches of North Carolina between May and early September.

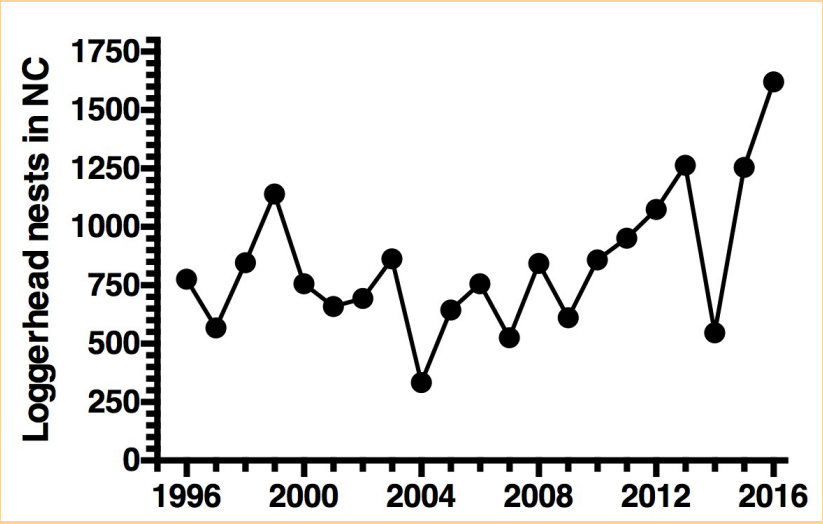
Although records of sea turtle nests in North Carolina go back to the 1960s, standardized monitoring for all freshly laid sea turtle nests in the state wasn't put into place until the mid-1990s.

Adult female loggerhead sea turtles will lay multiple clutches of eggs during a single summer. They usually skip one to three years between reproductive cycles. It is common to see year-to-year fluctuations in the numbers of loggerhead sea turtle nests laid in a nesting population because not all adult females will reproduce in a given year.

While 2016 was a record year, it is possible that the number of reproductive females has not changed significantly. Rather, they laid more clutches of eggs per female than normal.

Biologists should be able to address this issue, using data generated by a cooperative project with the sea turtle programs in South Carolina and Georgia.

Regardless of the cause of the record number, the increased number of nests resulted in an increased number of hatchlings that were able to enter the ocean, which may help increase the number of reproductive females in the future, once the 2016 hatchlings reach maturity in about 35 years.




Annual number of loggerhead sea turtle nests observed in North Carolina.

*Adult nesting female loggerhead turtle on Bald Head Island*

## American Oystercatcher 2016 Survey Shows 439 Nesting Pairs in North Carolina

This quarter, the Waterbird Project team compiled results from an American oystercatcher survey coordinated in May and June 2016. In North Carolina, three federal and three state agencies, Audubon North Carolina, and several volunteers collaborated to survey barrier, natural and dredged-material islands for American oystercatchers.

Team members coordinated this standardized survey with similar agencies in Virginia, Georgia and Florida. They mapped and plotted the North Carolina coast and surveyed 136 plots in eight weeks. Team members recorded 439 nesting pairs of American oystercatchers, an increase over previous surveys of this species. Most pairs were on barrier islands. The second greatest number of pairs was on natural islands and the lowest number of pairs was on dredge-material islands. Four pairs were on mainland shoreline shell rakes.

Most pairs of American oystercatchers on barriers islands (195 pairs) were within federally managed areas — on national seashore or national wildlife refuge properties. Natural islands supported the greatest number of pairs (159), and included marsh, sandy shoal and shell islands within sounds and rivers. The lowest number of oystercatchers were nesting on dredge-material islands managed by Audubon and the Wildlife Commission (Figure 1).

From these data, biologists will make management decisions, including identifying areas of greatest importance and conservation need, as well as determining areas that may need habitat enhancement to support more nesting pairs.

Team members presented and discussed survey results at the November 2016 meeting of the American Oystercatcher Working Group. Two scientific journal articles on this survey, as well as prior work with American oystercatchers in North Carolina, will be published in a special edition of the journal Waterbirds in February 2017.

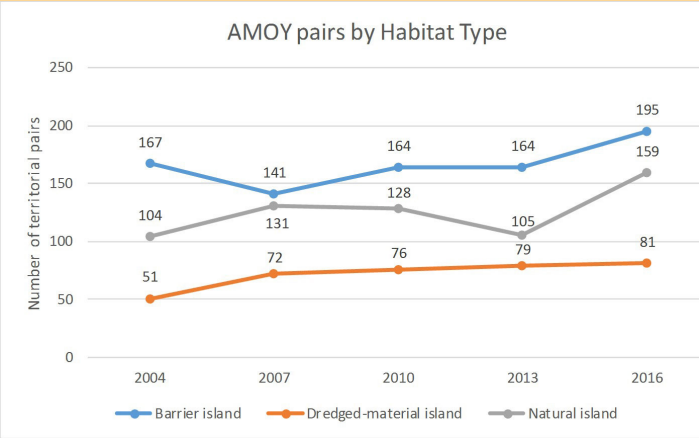



Fig. 1. American oystercatcher pairs by habitat

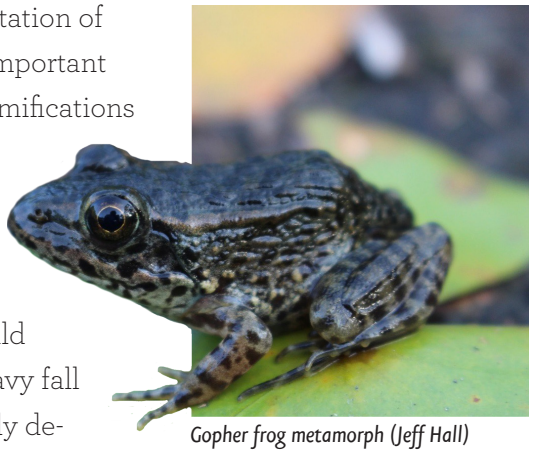
*Nesting site for American oystercatchers*

## Gopher Frog Fall Breeding Documented for Second Time on Sandhills Game Land

During the fourth quarter, Wildlife Commission biologists documented fall breeding of gopher frogs for the second time in two years. Gopher frogs typically breed in February or March. In 2015, staff documented fall breeding for the first time in North Carolina. This year's breeding data suggest that fall breeding may not be that uncommon. Biologists documented gopher frog egg masses at two wetlands on Sandhills Game Land in October, including a newly created wetland.

Staff collected several eggs from each egg mass for an ongoing genetics study, which also will determine whether the same frogs breed in both spring and fall.

The documentation of fall breeding is important because it has ramifications for when surveys should be done for this species — surveys for egg masses should be done after heavy fall rains to accurately determine breeding efforts, population size and other population parameters.



*Gopher frog metamorph (Jeff Hall)*

## Biologists Attend Occupancy Modelling Class with Darryl MacKenzie in Raleigh

All biologists know the feeling: They fail to document a target species after conducting an exhaustive survey in excellent habitat and are left wondering: "Is it really there but I just missed it?" This scenario is reflected in all of their datasets and requires special attention and statistical analysis.

To that end, in October, staff attended the "Modelling Patterns and Dynamics of Species Occurrence Workshop." Dr. Darryl MacKenzie taught the class, coming to Raleigh all the way from New Zealand. Occupancy monitoring reports if the target species was detected or not detected during a survey, allowing biologists to calculate detection probability. Most importantly, this approach recognizes that a species is not always detected with certainty, even when present. During week one, students learned about single-season and multi-season occupancy models and used software programs "Presence," "RPresence," and "OpenBugs." During week two, Dr. MacKenzie dove into multi-state and species co-occurrence models. Wildlife Commission biologists will apply what they learned to survey design and data analysis.


*Gabrielle Graeter and Lori Williams discuss an occupancy model for green salamanders with Dr. Darryl MacKenzie, while sitting beneath a whiteboard of occupancy modelling equations. (Photo by Chris Kelly)*

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

### *Fall and Winter Amphibian Breeding Surveys*

Monitoring for fall and winter amphibian breeding began during the fourth quarter. Staff surveyed ponds in Brunswick, New Hanover, Pender, Onslow and Carteret counties. Staff targeted Species of Greatest Conservation Need (SGCN), including Mabee's salamander, ornate chorus frog, southern chorus frog and gopher frog. In addition to viewing ponds, staff placed dataloggers used for recording frog calls (AKA "froglog-gers") at many locations. Staff will revist these locations later in the year to extract the data, and listen to the files for species of interest.

*Froglogger (Photo by Nathan Shephard)*

*Research site for amphibian egg masses (Photo by Jeff Hall)*

### *Upland Snake Surveys in the Sandhills*

Staff continued long-running fall monitoring of upland snakes in the Sandhills. In addition, staff assisted with radiotelemetry efforts of the N.C. Museum of Natural Sciences. Species undergoing telemetry research include southern hognose snake, eastern coachwhip and eastern chicken turtle, all of which are Species of Greatest Conservation Need in the North Carolina Wildlife Action Plan.

*Eastern coachwhip with telemetry radio inside (Photo by Jeff Hall)*

## Green Salamander Surveys Show Much Lower Nest Success in 2016

In fall 2016 Wildlife Commission staff and volunteers continued monitoring state endangered green salamanders, documenting the species in 125 out of 364 (34 percent) rock outcrop surveys (n=130 sites) in the Hickory Nut Gorge and the Blue Ridge Escarpment populations. An extreme drought in southwestern North Carolina likely influenced staff's ability to find salamanders in the majority of surveys.

Other work included an ongoing green salamander nest ecology study in Henderson and Transylvania counties. Staff monitored 23 nests in 2016, but nine nests were abandoned and failed, including five at one site. Staff documented nest success with photos of hatching in progress or with observations of active hatchlings and egg residue later in the fall surveys.

Overall, nest success in 2016 was 61 percent, which was much lower than in all the previous years of this monitoring effort. Although the exact cause of nest failure is unknown, and while predation of females cannot be ruled out, drought conditions in the critical time of late spring may have been a factor. A lack of fitness or increased stress in nesting females could cause them to abandon the egg clutch.

Finally, staff and volunteers continued habitat data collection at nest rocks for a collaborative project with UNC-Asheville to examine and quantify rock crevice characteristics compared to random, suitable crevices never used for nesting. These efforts will increase biologists' overall understanding of nesting ecology and habitat needs of this rare salamander.

*An ovipositing female green salamander. Eggs are laid in a cluster attached to the ceiling of a rock crevice suitable for nesting. (Photo by Alan Cameron)*

*A brooding female green salamander on guard with her clutch of eggs (Photo by Alan Cameron)*

*A female green salamander attending her nest of emerging hatchlings (Photo by Alan Cameron)*

*Green salamander (Photo by Lori Williams)*

## Loggerhead Shrike Surveys Underway

In December, Wildlife Diversity Program biologists attended a loggerhead shrike trapping/banding workshop in western Virginia, conducted by staff from natural resource agencies in Virginia and West Virginia. Because these raptor-like songbirds are rare but still present in North Carolina, Wildlife Commission biologists are interested in contributing to the research of an international Loggerhead Shrike Working Group.

Shortly after the meeting, staff began a road survey for loggerhead shrikes in the southern Foothills through the northern Piedmont to get a better understanding of where they are located in the state. While the birds are found predominately in the southern Piedmont and Coastal Plain where staff has conducted similar surveys for the last couple of years, biologists believe that expanding the survey to other parts of the state is an imperative precursor to a well-informed trapping/banding project.

Biologists created one to two routes per county (21 counties from Polk east to Robeson, north to Wake/Durham counties). Each route is 10 miles long and biologists will survey each route at 20 mph. The counties were selected based on a map generated from the "Birds of North Carolina: Their Distribution and Abundance," which can be accessed online.

Loggerhead shrikes hunt small prey, such as mice, in grasslands and other open habitat, often impaling their kills on barbed wire or thorns. Because of the birds' hunting techniques in nature, biologists used live mice as bait and distinct cage traps to trap the birds. The mice are in wire boxes within the larger trap and remain unharmed during the course of trapping. After a loggerhead shrike is trapped, biologists take many measurements and feather samples before banding the bird with color bands. The survey will run through March.

*Loggerhead shrike (Photo by John Carpenter)*

*West Virginia Department of Natural Resources biologist Rich Bailey holding a freshly banded loggerhead shrike (Photo by Allison Medford)*

*Virginia Department of Fish and Game biologist Sergio Harding measuring the tarsal length on a trapped loggerhead shrike (Photo by Allison Medford)*

## Golden-winged Warbler Habitat Management Underway on NCWRC's Pisgah Game Land

In December 2016, Wildlife Commission staff created and improved golden-winged warbler nesting habitat on a parcel of the Pisgah Game Land-WRC located in Roaring Creek Valley in Avery County. Over the course of two days, staff from the Wildlife Diversity Program and the Land and Water Access Division's Burnsville and Marion Wildlife depots created 15 acres of the shrub/sapling habitat preferred by the golden-winged warbler.

*Golden-winged warbler (Photo by USFWS)*

Like many neotropical migrants, golden-winged warblers face threats on the wintering grounds and during migration. But the breeding grounds in North America are critical to growing more of these birds, and biologists and managers are working together to get that habitat in top shape.

Roaring Creek Valley is home to approximately a dozen breeding pairs of golden-winged warblers. More pairs reside in the greater Roan Highlands. The species tends to cluster on the breeding grounds; thus, this area has been designated by the Golden-winged Warbler Working Group as a focal area for golden-winged warbler conservation. The Commission's Beck tract is just one parcel in this broader landscape where work is being done to improve nesting habitat for golden-winged warblers. Southern Appalachian Highlands Conservancy and Audubon North Carolina have been improving their adjacent Elk Hollow tract and nearby Grassy Ridge tract. The Nature Conservancy and U.S. Forest Service are doing likewise on neighboring tracts: setting back field edges, thinning woods, and protecting good nest cover.

The golden-winged warbler is considered a habitat specialist, requiring a patchwork of varying cover types. Fortunately, biologists now have data-based best management practices at their disposal. Treatments applied to the Beck tract expanded the existing openings, retained 5 to 15 trees per acre and 30-70 percent shrub cover, and feathered the hard forest edge. Creating habitat for golden-wings also creates habitat for other species in need of conservation such as chestnut-sided warbler, American woodcock, ruffed grouse, and Appalachian cottontail. Staff will measure the golden-winged warbler's response this May.

*The Beck tract before Wildlife Commission staff began work. (Photo by C. Avery)*

*The Beck tract, after staff expanded the existing openings, retained 5 to 15 trees per acre and 30-70 percent shrub cover, and feathered the hard forest edge. (Photo by Chris Kelly)*

## Bog Turtle Conservation Planning

Several significant efforts are currently underway to improve conservation of bog turtles in North Carolina and throughout their southern range. Bog turtles are federally listed (S/A; by similarity of appearance), state listed as Threatened and designated a Species of Greatest Conservation Need in the N.C. Wildlife Action Plan.

Wildlife Commission biologist, Gabrielle Graeter, has been taking a lead role in doing a region-wide status assessment of bog turtles, assisting with pulling together data from all the states in the southern population's range, to refine and update the species' status. This project will provide information to help guide future actions and aid in prioritizing our activities. The data gathering phase of the project is based on methods used by biologists working on the northern range of the species, so that comparisons can be made across the two regions.

*Juvenile bog turtle (Photo by Gabrielle Graeter)*

At the Project Bog Turtle (http://projectbogturtle.org/) meeting in December 2016, staff held several strategy sessions aimed at prioritizing research, management, and funding activities. Some of the important avenues for research topics include using LIDAR to locate additional wetlands that have potential for bog turtles and assessing the utility of headstarting. Other topics included assessing prey abundance at bogs, fertility, nesting success, and juvenile survivorship. Staff also discussed first and subsequent steps that should be taken when habitat appears suitable but the bog turtle population is in decline. The information from this session will be made available to bog managers as a resource. In discussing funding, staff explored the financial needs of Project Bog Turtle as well as potential funding sources for research and management.

Another effort in the beginning phases is the drafting of a North Carolina Species Conservation Plan for bog turtles. This plan will include sections on the ecology of the species, threats, conservation goals, conservation actions, an implementation plan, and economic impacts. Partnerships will be key to the success of the plan, during both the writing phase and the implementation phase. There will be many opportunities for key partners to get involved with plan development. The Bog Turtle Species Conservation Plan is expected to be completed by the fall of 2017.

## Protecting and Providing Bat Habitat in Western North Carolina

Wildlife Commission personnel are protecting bat habitat in western North Carolina by repairing a steel gate and chain-link fence that were recently vandalized at a mine in Avery County. These barriers prevent human entry into the mine, which is crucial for protecting hibernating bats and their winter habitat, as well as human safety.

Before the arrival of white-nose syndrome (WNS), over 1,000 bats routinely hibernated in this mine each winter; however, current counts are down 99 percent, with only 11 bats counted during the 2016 survey. Bats infected with WNS tend to arouse from hibernation too often, which depletes vital fat reserves and results in starvation. The heat generated from human presence in hibernation sites also causes bats to arouse and burn fat unnecessarily, so it is imperative to prevent disturbance at this and other hibernation sites.

Wildlife Diversity Program technicians provided bat habitat by recently installing bat houses on Green River, Needmore, and John's River game lands. Bat houses provide additional habitat for bat colonies and enable biologists to monitor population trends over time. These bat houses could be used by a variety of species, such as big brown, little brown, Mexican free-tailed, and Northern long-eared bats, and are large enough to offer safe roosts for maternity colonies. Staff will inspect the houses each summer to determine which bat species have occupied the structure, if any, and to provide any necessary maintenance.


*Western Wildlife Diversity Supervisor Kendrick Weeks repairs a chain-link fence outside a cave in Avery County. (Photo by Joey Weber)*

*Bat house installed on Green River Game Land (Photo by Joey Weber)*