



North Carolina Wildlife Resources Commission



Wildlife Diversity Program Quarterly Update

October - December 2012





In this Issue:

Page 2 - [Sea Turtles](#)

Page 3 - [Waterbirds](#)

Page 4 - [Chowanoke Crayfish](#)

Page 5 - [Red-Cockaded Woodpeckers](#)

Page 6 - [Green Growth Toolbox](#)

Page 7 - [Native Seed Collecting](#)

Pages 8, 9 - [NCPARC](#)

Page 10 - [Cooperative Wetland Study](#)
[Ironcolor Shiners](#)

Page 11 - [Robust Redhorse](#)
[Conservation Committee](#)

Pages 12, 13 - [Amphibian Conservation](#)

Page 14 - [Northern Flying Squirrels](#)
& [Golden-Winged Warblers](#)

Page 15 - [Mussel Restoration](#)

Page 16 - [Pond Levelers](#)

Page 17 - [Spotfin Chub Monitoring](#)

Page 18 - [Red Spruce Seedlings](#)
[for Habitat Restoration](#)



October - December 2012

N.C. Wildlife Resources Commission

2012 Sea Turtle Nest Total Was Second Highest

During summer 2012, volunteers and cooperators with the North Carolina Sea Turtle Nest Protection Project reported 1,070 nests laid by loggerhead sea turtles. This was the second highest annual total for loggerhead nests in North Carolina. Volunteers also found and protected 22 green turtle nests, five leatherback nests, and two Kemp's ridley nests on North Carolina beaches in 2012. Although eggs in a few nests

had yet to finish incubation as of the end of November, beaches in North Carolina produced 85,611 sea turtle hatchlings that scrambled down the sand into the ocean. The relative lack of tropical storms and hurricanes along the North Carolina coast during the summer and fall months of 2012 helped ensure greater than 70 percent average hatching success of sea turtle nests this year.



Loggerhead hatchlings crawl toward the surf from their nest on Shackleford Banks in Carteret County. Local volunteers in Pine Knoll Shores check the contents of a loggerhead sea turtle nest, three days after the majority of hatchlings emerged and scrambled to the ocean. (Photos by Matthew Godfrey)





Dredged-Material Islands for Waterbird Nesting

In early September, nesting by waterbirds on dredged-material islands was complete and chicks had fledged. Many adults and fledglings were staging (resting and feeding voraciously) within intertidal zones — areas that are above water at low tide and under water at high tide. There they replenished fat reserves prior to migration. Many shorebirds that nested farther north were also in these areas, stopping over during long migratory flights to winter habitats.

Well above the high tide line, however, the N.C. Wildlife Resources Commission, the U.S. Army Corps of Engineers, and contractors were reviewing plans for placement of dredged sand onto selected islands. Federal funds enable interstate channels to be dredged periodically to maintain navigability. Waterbirds nest on dredged-material islands created by sands dredged out of channels.

Placing dredged sand onto islands strategically is a management tool Commission staff uses to keep islands from eroding, and to maintain early and mid-successional vegetation stages available for nesting habitat.

Terns, black skimmers, American oystercatchers and plovers select early successional, sand-shell sites for nesting. Brown pelicans, herons, egrets and white ibis select mid-successional habitats with bunch grasses and small shrubs.

The Commission’s cooperation with the U.S. Army Corps of Engineers to use dredged sand material for bird islands began in the early 1980s, and continues to be a win-win partnership for navigation and our state’s waterbirds. Up to seven dredged-material islands in the Ocracoke, Hatteras and Oregon Inlet areas may receive newly dredged sand material during winter 2012-2013.



White ibis (Photo by Mark Buckler)



Plover (Photo by Mark Buckler)



Commission staff, in cooperation with the U.S. Army Corps of Engineers, placed dredged sand on to islands (left and bottom photos) to keep islands from eroding and to maintain early and mid-successional vegetation for waterbirds, such as white ibis and plovers.

Chowanoke Crayfish Surveys in the Chowan River Basin

In December, Wildlife Diversity Program staff finished a distributional survey for Chowanoke crayfish (*Orconectes virginiensis*) and other crayfishes within the Chowan River basin.

Prior to 2011, biologists had relatively limited knowledge about distribution of crayfishes of the North Carolina portion of the Chowan River basin. Because of their limited knowledge, biologists initiated an intensive study in 2011 to assess the distribution of Chowanoke crayfish, a state and federal species of concern.

Chowanoke crayfish are restricted to the Chowan and Roanoke River basins within North Carolina and Virginia. They typically inhabit coastal

plain waterways that have continuous flow and stable substrates.

Biologists completed 130 surveys during 2011-2012 using minnow traps, backpack electrofishing gear, seine nets and hand excavations.

They collected six crayfish species. Five were native species and one was a non-native species. They found Chowanoke crayfish in eight of 57 streams and 19 of 117 survey sites, some of which represent new collection records.

Two species, an undescribed crayfish species (*Cambarus sp. C*) and non-native red swamp crawfish (*Procambarus clarki*), possibly represent new species records for the basin. In

addition, they also made noteworthy collections for five species of fish, including bridle shiner (*Notropis bifrenatus*), ironcolor shiner (*Notropis chalybaeus*), blackbanded sunfish (*Enneacanthus chaetodon*), banded sunfish (*Enneacanthus obesus*), and Roanoke darter (*Percina roanoka*).

Future work includes analysis of data collected during the last two years and launching additional surveys for crayfishes in the Roanoke River basin. These surveys will provide baseline information to determine the status of Chowanoke crayfish and guide management decisions for our native aquatic communities.



Wildlife Diversity Program biologists used a seine net to collect crayfish, such as the Chowanoke crayfish, a state listed species of concern.

Red-Cockaded Woodpecker Distribution and Status in Northeastern North Carolina

Wildlife diversity biologists attended a meeting hosted by J.H. Carter III & Associates, Inc., in Columbia, N.C., in November to discuss the distribution and status of the red-cockaded woodpecker in northeastern North Carolina.

Typically, red-cockaded woodpecker populations of the Piedmont and Southern Coastal Plain occur in open longleaf pine forests with little to no hardwood understory and managed regularly with fire. The northeastern coastal populations, on the other hand, have been documented using a variety of habitats

including pond pine woodlands, high pocosin and nonriverine swamp forests, which contain a significant amount of hardwood encroachment and almost no periodic burning.

These red-cockaded populations are believed to be far more extensive than previously thought. However, more surveys are needed to estimate their numbers better, identify habitat requirements, and understand the impact they may have on red-cockaded woodpecker conservation not only in North Carolina but throughout their range.



Red-cockaded woodpecker cavity tree in Palmetto-Peartree Preserve, in Columbia, N.C. Vegetation within approximately 5 to 10 feet of the tree was removed manually by J.H. Carter, Inc., research staff because red-cockaded woodpeckers prefer open longleaf pine forests with little to no hardwood understory.





Green Growth Toolbox Project Provides Assistance in Planning for Growth around Camp Lejeune

The N.C. Wildlife Resources Commission Green Growth Toolbox Project provided mapping assistance to the Plan It East, Envision East 2050 regional planning exercise held Oct. 24, 2012.

Hundreds of local elected officials, land use planners and business owners attended this “reality check” exercise, which was supported by the U.S. Department of Defense and local governments. Leaders gathered to map desired future growth scenarios for the region surrounding Camp Lejeune, which is expected to grow by up to 1 million more people by 2050.

Background materials and a review of existing condi-

tions included maps of biodiversity and wildlife habitat contributed by the Wildlife Diversity Program in collaboration with the N.C. Conservation Planning Tool.

The assistance from the Commission helped participants target high-priority natural areas for conservation, habitat connectivity and low-intensity development in the growth maps they created.

The growth maps are being analyzed by the Plan It East team and the results will be shared with local governments to use in their land use planning. Most growth maps depicted centered growth patterns that encourage high urban development density and limited exurban sprawl.



Green Growth Toolbox Training in Durham

In October 2012 the Wildlife Diversity Program partnered with the Natural Heritage Program to give an introductory Green Growth Toolbox and Conservation Planning Tool workshop to planning staff working in and around the city of Durham and Durham County.

The workshop was well-attended, with more than 20 participants. Participants came away with a better understanding of the benefits of green growth and how to use conservation data to shape their decisions on land-use issues.



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 to conserve 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 pay by credit card.  

Name _____

Address _____

City/State/Zip _____ E-mail address _____

Credit Card # _____

Amount _____

Signature _____
(if paying by credit card)

Donate online by visiting: www.ncwildlife.org/give



Native Seed Collecting and Habitat Restoration

In November 2012, 10 volunteers helped collect native grass and wildflower seeds on the Sandhills Game Land that will be used in habitat restoration projects.

The N.C. Wildlife Resources Commission is restoring habitat on portions of the Sandhills Game Land formerly managed for pine straw production or agricultural uses. These sites often have a poor native seed bank. Grasses and wildflowers native to the longleaf pine forest are

an essential component of the habitat for many game and nongame wildlife species. These plants also play a critical role in helping to carry a prescribed fire, an important management tool used by the Commission to maintain and improve forest conditions for wildlife.

Commission staff utilizes a “flail vac” mounted on a 4-wheeler to collect larger volumes of wiregrass, but hand-collecting is required to obtain seeds of many other species such as

butterfly pea, blazing star and goldenrod. Volunteers help collect seed and, in the process, learn more about longleaf habitat and management.

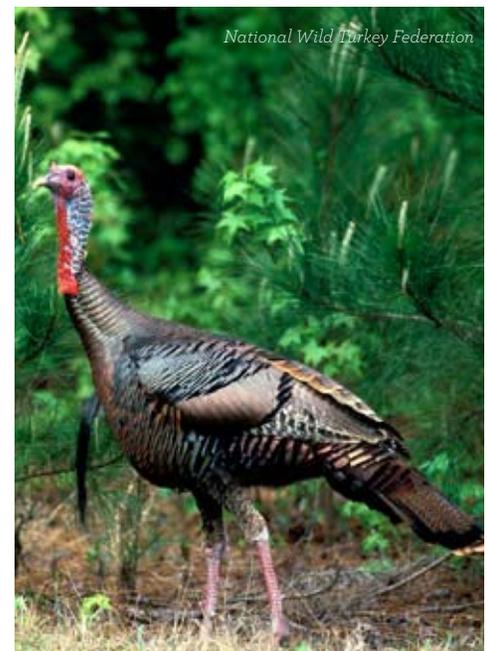
In the fall of 2012, more than 250 pounds of seed were collected, which will plant about 50 acres. This restoration will benefit many species including Bachman’s sparrows, bobwhite quail, pine snakes, wild turkeys, red-cockaded woodpeckers and gopher frogs.



(Photo by Robert Smith)



(Photo by Brady Beck)



The “flail vac” seed collector (top, middle) efficiently collected wiregrass seed, while volunteers, such as Zach Lamb (top, far left) and David McCloy (bottom, far left), hand-picked a greater diversity of plant seeds.



(Photo by Robert Smith)



(Photo by Jeff Hall)

Collected seeds were used to restore habitat on the Sandhills Game Land, benefiting many wildlife species, such as pine snakes (bottom middle) and Eastern wild turkeys.

North Carolina Partners in Amphibian and Reptile Conservation (NCPARC) Workshops, training and meetings

Wildlife Diversity Program staff presented a Calling Amphibian Survey Program (CASP) workshop in fall 2012 at the Cape Fear Botanical Garden in Fayetteville, attended by 26 people.

An additional workshop on general reptile and amphibian identification, survey methods, ecology and management was given at Cool Springs Environmental Education Center near New Bern for an N.C. State University biodiversity class, attended by 21 people.

At the N.C. Association of Parks and Recreation, staff gave a presentation entitled, "Wetland Restoration & Creation for Rare Amphibians," attended by 18 people.



Pine woods snake (Photo by Jeff Hall)



Wildlife Educator Mike Campbell checks a minnow trap during the NCSU workshop. (Photo by Jeff Hall)



North Carolina Partners in Amphibian and Reptile Conservation (NCPARC) Priority Amphibian and Reptile Conservation Areas (PARCAs)

Wildlife Diversity Program staff met recently to finalize plans for Priority Amphibian and Reptile Conservation Areas (PARCAs) in North Carolina.

This is an ongoing effort for the entire southeast, and North Carolina has been working toward establish-

ing about a dozen or so PARCAs. These will function similarly to the Audubon Important Bird Area designation.

Eighteen people are in the process of reviewing the final draft of the North Carolina PARCAs.



The first PARCA meeting was held at the Commission's headquarters in Raleigh in March 2012. (Photo by Jeff Hall)

North Carolina Partners in Amphibian and Reptile Conservation (NCPARC) Surveys, research and game lands

An incidental coral snake record from Robeson County was submitted to the N.C. Museum of Natural Sciences, and Wildlife Diversity Program staff accompanied museum personnel to survey the immediate area. They discovered no additional coral snakes.

Wildlife Diversity Program staff also joined museum staff to survey for upland snakes in the Sandhills. They obtained numerous records for coachwhips, southern hog-nose snakes and northern pine snakes, as well as many other species.



Coachwhip (Photo by Jeff Hall)



Eastern hognose (Photo by Jeff Hall)



Coachwhips (Photo by Jeff Hall)

The Swain Tract

A new parcel of land was added to the game lands system in Brunswick County.

The Swain Tract consists of roughly 83 acres harboring numerous ponds that support a variety of amphibians, including the potential for gopher frogs, as well as ornate chorus frogs, southern chorus frogs, barking treefrogs, oak toads and other priority species.

This tract was purchased with State Wildlife Grant monies dedicated toward land acquisition for priority species conservation.



Oak toad (Photo by Jeff Hall)



N.C. Wildlife Resources Commission and N.C. Division of Water Quality Study Wetlands

The N.C. Wildlife Resources Commission and the N.C. Division of Water Quality (DWQ) have been awarded a grant from the U.S. Environmental Protection Agency (EPA) for a study entitled “Evaluation of Success Criteria and Restoration Techniques to Promote Aquatic Biota in NC Mitigation Wetlands.”

This study will evaluate amphibian diversity, macroinvertebrate diversity and water quality parameters in several types of isolated wetlands in the Sandhills and upper Coastal Plain regions of eastern North Carolina.

The Commission will be evaluating specifically how amphibian diversity varies among



Tiger salamanders benefit from wetland restoration activities. (Photo by Jeff Marcus)

natural open-canopy wetlands and closed-canopy wetlands, compared to recently restored isolated wetlands on Commission-owned game lands and mitigation wetlands associated with North Carolina’s Ecosystem Enhancement Program (EEP). This study will help guide the way

isolated wetlands are restored and managed in North Carolina, taking priority amphibian species diversity into consideration.

This cooperative study between the DWQ and the Commission will continue for three years and should provide sound science and on-the-ground isolated wetland management recommendations throughout eastern North Carolina.

Biologists Survey for Dwindling Ironcolor Shiners in the Southeastern Coastal Plain

Central Wildlife Diversity Program staff wrapped up the year’s sampling efforts searching for the ironcolor shiner.

Statewide surveys completed by the Commission in the 1960s indicated the species, which closely resembles the more common dusky shiner, was widespread across North Carolina’s entire coastal plain ecoregion. However, even then, the animals were captured in small numbers and the species has been considered “vulnerable” since 1972.

Fifty years later, a targeted search has revealed that the shiner is absent from many previously recorded locations. Individuals were found at two sites — one in the Lumber River and one in the White Oak River in 2010 — but no ironcolor shiners were captured in 2012 at 35 sites scattered across the entire southeastern coastal plain in the lower Cape Fear and Lumber drainages. However, individ-

uals have been captured at scattered sites in the Chowan River drainage in the northeastern coastal plain, so they have not yet been extirpated from the state.

Surveys will continue in 2013, with searches planned for new sites in hopes of locating a remaining population.



Wildlife Diversity Program Biologist Brena Jones holds a dusky shiner, which closely resembles the elusive ironcolor shiner.



Robust Redhorse Conservation Committee Meeting Held in North Carolina

The 17th annual meeting of the Robust Redhorse Conservation Committee (RRCC) was held Oct. 9 - 10, 2012 at Morrow Mountain State Park near Albemarle.

The RRCC is a voluntary stakeholder partnership charged with directing the recovery of the robust redhorse. This rare fish is found in only three Atlantic slope drainages in the southeastern United States and can reach 30 inches in length and weigh up to 20 pounds.

The RRCC was established in 1995 under a Memorandum of Understanding (MOU) between state and federal resource agencies, private industry, and the conservation community in lieu of listing under the U.S. Endangered Species Act.

Approximately 30 representatives of the signatory agencies to the MOU and university research affiliates attended the meeting. They discussed the conservation efforts across the range of this species – North Caro-

lina, South Carolina, and Georgia, as well as plans for the upcoming year.

In North Carolina, the N.C. Wildlife Resources Commission is pursuing a long-term hatchery program at the McKinney Lake Fish Hatchery. Staff has scheduled a pilot project to begin in the spring of 2013. The plans include supplementing the small population in the Pee Dee River downstream of Blewett Falls Dam and possibly reintroduction downstream from the Tillery Dam.



Members of the Robust Redhorse Conservation Committee met at Morrow Mountain State Park in October to discuss ongoing conservation needs of the rare fish, which is found in only three Atlantic slope drainages in the southeastern United States.



Help Keep North Carolina *WILD!*

Buy a plate



Your purchase helps conserve wildlife in North Carolina.

Green Salamander Conservation in Western North Carolina

From July through November, Wildlife Diversity Program staff, along with citizen scientists, monitored 42 nests for green salamanders in Henderson and Transylvania counties. Nine nests failed during this period, which was a hatch success rate of 79 percent.

Within the first weeks of hatching, young were usually found in the nest crevice along with the attending female. As the season progressed, hatchlings started moving away from the nest. Observers often noted them exploring

outside of rock crevices during the daytime, clinging to the rock surface, embedded within moss or lichen patches on rocks or within bark furrows on nearby trees, or on top of rocks under cover objects such as flakes of bark.

Continued monitoring of hatchling survivorship and habitat use helps staff better understand potential dispersal strategies for these salamanders, particularly within isolated populations at individual rock outcrops.



A hatchling green salamander explores the surface of a rock outcrop in Henderson County. Tree bark placed on green salamander nest rocks provide cover habitat for dispersing hatchlings.



Wildlife Diversity Biologists Plan Bog Turtle Management Activities

The Wildlife Diversity Program staff met in Elkin for a coordination meeting and to improve habitat at two bog turtle-inhabited bogs in Wilkes County.

The meeting was informative, well attended, and overall very successful in providing updates on Wildlife Diversity projects and issues statewide.

Staff representing Private Lands programs also attended. They reported that efforts were successful, resulting in approximately two acres of enhanced habitat for the federally threatened bog turtle.





Western North Carolina Amphibian Conservation - Hellbenders and Mudpuppies

From May to November 2012, Wildlife Diversity Program staff and partners collected more than 100 water samples from mountain rivers for analysis to detect the presence of two N.C. Wildlife Action Plan priority and state-listed species, Eastern Hellbender (*Cryptobranchus a. alleghaniensis*) and mudpuppy (*Necturus maculosus*).

This new detection technique is called “environmental DNA,” or “eDNA,” and includes using a vacuum pump to force one liter of river water over a filter membrane that traps any DNA present in the water.

Lab partners with The Oriante Society and the University of Idaho created species-specific DNA primers for use in the analysis.

Staff collected river water samples from all sites surveyed for these species. They also collected from new, potential streams that they did not survey. One out of every five samples was tested as a control, using well water, treated city water, or purchased spring water, to ensure no field contamination between samples.

Other objectives included testing three streams in multiple locations and repeatedly over the seasons

to examine whether eDNA can be correlated with salamander relative abundance, spatial distribution and temporal variation.

A few samples also addressed other questions such as whether wetsuit material and other sampling equipment might transfer salamander DNA from one site to another and whether the target species might be detected in any streams that drain to the Atlantic Ocean. Currently, these species are only known from Gulf-draining river basins in the state. Lab analysis of all samples is currently under way.



Project partner Dr. Stephen Spear collects a river water sample for eDNA testing. (Photo by John Groves)



Staff and a project partner filter a river water sample for eDNA testing. (Photo by John Groves)



A biologist removes eDNA filter after water collection (Photo by John Groves)



Mudpuppy



Hellbender (TR Russ)



Carolina Northern Flying Squirrel Survey

In July and August, Wildlife Diversity Program staff discovered a population of Carolina northern flying squirrels on Sugar Mountain in Avery County.

With the help of a local landowner, they employed multiple survey techniques to document this notoriously elusive species.

They documented both northern and southern flying squirrels with trail cameras and acoustic detectors. Acous-

tic detectors have been evaluated by Wildlife Diversity staff and academic partners for approximately three years regarding their usefulness in surveys and long term monitoring of flying squirrels.

The Sugar Mountain result is just one example of the increased efficiency of documenting squirrels with acoustic detectors and cameras versus nest boxes and live trapping.



Three survey techniques Commission biologists use at an active den tree for Carolina northern flying squirrels: acoustics, trail camera and trap. (Photo by Chris Kelly)



A pair of Carolina northern flying squirrels. (Photo by Jonathan Mays)

Golden-Winged Warbler Working Group Meeting

The Southeast Golden-winged Warbler Working Group met in Asheville to discuss the Roan Mountain blitz and upcoming conservation needs. N.C. Wildlife Resources Commission staff provided an overview of the newly released Golden-Winged Warbler Status Review and Conservation Plan.



Male golden-winged warbler (Photo by West Virginia University)



Female golden-winged warbler (Photo by West Virginia University)



The Southeast Golden-Winged Warbler Working Group met in Asheville to discuss conservation needs of this songbird. (Photo by Chris Coxen)



Mussel Community Restoration in the Upper South Fork Catawba River System

Wildlife Diversity Program staff and cooperators from the U.S. Fish and Wildlife Service's Asheville field office began pilot work to reintroduce native mussel species to the Jacob and Henry Forks, tributaries of the South Fork Catawba River in Burke County.

Past pollution from mining, poor land management practices and textile manufacturing wastes killed native mussels throughout the South Fork Catawba River in the past, and dam building created barriers to natural recolonization from other populations in the Catawba River system.

Water quality and habitat quality in these streams have improved greatly, supporting diverse fish communities, and are believed to be sufficient to support native mussel communities.

Biologists observed that the Johns River, also in Burke County, still supports a relatively healthy native mussel population in the upper Catawba River system. They designated it to be a source for animals to restore communities in the South Fork system.

Staff collected several hundred individuals of common species in the genus *Elliptio* from two sites on the Johns River, marked their shells with an abrasive tool for future identification, and transported and released them at sites on both the Jacob and Henry Forks.

These mussels will be monitored for survival and reproduction. If results are positive, less common species, such as Eastern creekshell, brook floater and notched rainbow, will be propagated and cultured in captivity at the Conservation Aquaculture Center (CAC) and Marion State Fish Hatchery to provide sufficient numbers for release, as well.



N.C. Wildlife Resources Commission and U.S. Fish and Wildlife Service personnel release translocated mussels in Henry Fork.



An Eastern elliptio was marked with an "X" and released into Jacob Fork, a tributary of the South Fork/Catawba River in Burke County.

Prior and concurrent experimental efforts to propagate and culture these species conducted at the CAC and at the College of Veterinary Medicine, N.C. State University have been successful, which confirms the approach as a viable technique to restore these species.

Remember Wildlife At Tax Time

This tax season, donate on [line 31 of your N.C. state income tax form](#) to the Nongame and Endangered Wildlife Fund and help conserve nongame animals and their habitats for future generations of wildlife watchers to enjoy.



Managing Southern Appalachian Bog Water Levels with Pond Levelers

In early December 2012, Wildlife Diversity Program Biologist Gabrielle Graeter coordinated the installation of two Clemson beaver pond levelers at a Southern Appalachian bog in Henderson County.

A pond leveler is a long PVC pipe placed through the middle of a beaver dam that drains water from the pond side of the dam down to a specified level. The leveler is designed to lower the water level of the pond while keeping the dam intact so that the beavers do not see a need to rebuild the dam or build additional dams. This type of system needs continual monitoring to ensure success. For more information on pond levelers visit Clemson University's website (www.clemson.edu/psapublishing/pages/afw/afw1.pdf).

This Henderson County bog has several rare species, including the bog turtle (*Glyptemys muhlenbergii*) and the mountain sweet pitcher plant (*Sarracenia rubra jonesii*). Bog turtles are federally and state listed as threatened and a priority in the N.C. Wildlife Action Plan. Mountain sweet pitcher plants are federally listed as endangered.

The beavers in this bog are industrious in building dams, having succeeded in flooding much of the critical habitat for both of these priority species. Biologists addressed this problem because the plants can't move and bog turtles had limited habitat in the surrounding areas.

Many partners were involved in the successful installation of pond levelers. The expertise of the N.C. Natural Heritage Program, Commission, U.S. Fish and Wildlife Service, and the U.S.D.A.-Animal and Plant Health Inspection Service was critical in laying the groundwork for the project.

The Carolina Mountain Land Conservancy played an important role in providing the tools and supplies needed to build the pond levelers, made possible through a grant it received from the Service for habitat management in area bogs. Professors at Haywood Community College brought their Soils & Hydrology class to the bog for a hands-on learning experience, which included installation of pond levelers.



(Photo by University of Connecticut)

A pond leveler (top photo) installed in a bog in Henderson County drains water from the pond side of the dam down to a specified level. It will help restore critical habitat for bog turtles and the federally endangered mountain sweet pitcher plant (left). Haywood Community College students place the pond leveler intake device on the pond side of the beaver dam. The intake device consists of a wide diameter PVC pipe with 2-inch holes that is wrapped in galvanized wire weld. (Photos by Gabrielle Graeter)



Long-term Monitoring of the Spotfin Chub, a Threatened Species

The Little Tennessee River in Macon and Swain counties supports perhaps the healthiest and most abundant population of the federal and state threatened spotfin chub.

Restoration efforts in Tennessee, Alabama, and the Cheoah River in North Carolina, have been successful in re-establishing populations of this species, and may be successful enough in the near future to remove the species from the federal list of threatened species.

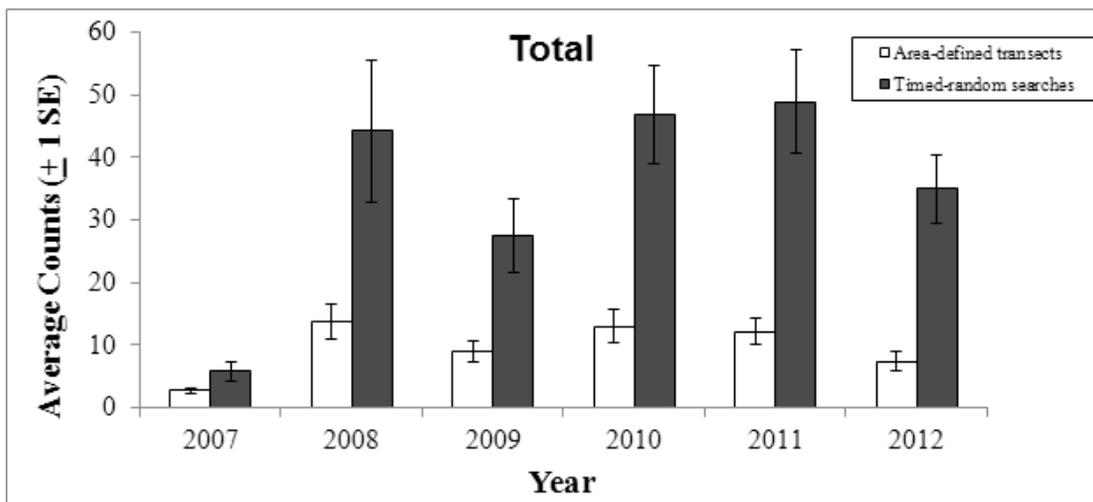
A necessary requirement of the species' recovery plan is long-term stability of populations be documented before delisting. In 2007, Wildlife Diversity staff initiated a long-term monitoring effort to document the status of spotfin chub in the Little Tennessee River over a 10-year period.

With assistance from cooperators from the U.S. Fish and



Wildlife Service, Conservation Fisheries, Inc., and others, personnel, wearing masks and snorkels, conducted visual surveys using both area and time defined searches. After completing year six of this effort in August, staff has analyzed data in detail and is preparing an interim report on results to date.

So far, fluctuations in the population have been observed over time and at each of the 10 monitoring sites, with an overall trend of relative stability and abundance.



Results from spotfin chub surveys in the Little Tennessee River 2007-2012 show average number of chubs observed in each survey method at all sites surveyed in each year, with standard error depicted by whisker bars.

Commission Restores Red Spruce Habitat for Rare Flying Squirrels

In October, Wildlife Diversity Program Biologist Chris Kelly worked with Southern Highlands Reserve (SHR) to re-pot approximately 1,300 red spruce seedlings in preparation for planting in fall 2013.

They also collected new cones from Roan Mountain and the Black Mountains for future propagation. Kelly manages projects that inventory, monitor, research and manage habitat for federally endangered Carolina northern flying squirrel, which only occur in high-elevation northern hardwood and spruce-fir forests in the

Southern Appalachians. Although much of the high-elevation habitat in North Carolina is protected by public agencies or private conservation organizations, the habitat is degraded by past logging, fires and invasive pests.

Kelly has pursued efforts to restore this habitat for five years, developing a relationship with the non-profit, high-elevation nursery SHR to produce seedlings for restoration efforts.

Other agencies and conservation organizations are taking notice. Kelly and Mountain Region Wildlife Diversity Supervisor Kendrick Weeks

attended the kickoff meeting of the Southern Appalachian Spruce Restoration Initiative (SASRI) in December. This initiative is modeled after the Central Appalachian Spruce Restoration Initiative (CASRI), which works to restore the spruce ecosystem in that region.

The SASRI meeting was so well attended that it had to be relocated to a larger meeting space in Asheville. SASRI meeting attendees will continue monitoring the whole red spruce-Fraser fir ecosystem and its many rare and endemic species.



Chris Kelly, a Wildlife Diversity Program biologist, re-pots red spruce at Southern Highlands Reserve (left). The red spruce seedlings will be used for future propagation efforts to restore and improve high-elevation habitat in North Carolina.



Mark Ford talks about the Carolina northern flying squirrel's use of red spruce and Fraser fir in western North Carolina at the kickoff Southern Appalachian Spruce Restoration Initiative meeting in December. (Photo by Chris Kelly)

THE WILDLIFE DIVERSITY PROGRAM



The Wildlife Diversity Program was established in North Carolina in 1983 to prevent nongame species from becoming endangered by maintaining viable, self-sustaining populations of all native wildlife, with an emphasis on species in decline.

More than 1,000 nongame animals call North Carolina home. Many nongame species, including mammals, reptiles, birds, amphibians, snails, mussels, and fish, are common and can be seen or heard in your own backyard. Other nongame animals, such as bald eagles and peregrine falcons, were, at one time, considered endangered, but now soar high in the sky, thanks to the work conducted by Wildlife Diversity biologists.

The men and women who work for the Wildlife Diversity Program are dedicated to conserving and promoting nongame wildlife and their habitats through a variety of survey and monitoring programs, species management, and habitat conservation or restoration projects. While these programs and projects target nongame animals and their habitats, game species — such as deer, turkey, mountain trout, and black bass — also benefit because they share many of these same habitats.

You can learn more about the many projects and programs conducted by Wildlife Diversity personnel on behalf of nongame and endangered wildlife by visiting www.ncwildlife.org/conserving.

BUY A T-SHIRT AND KEEP NORTH CAROLINA WILD

Through the purchase of this commemorative wildlife buttons T-shirt, you can help keep North Carolina wild for future generations to enjoy and appreciate. T-shirt sale proceeds benefit the N.C. Wildlife Resources Commission's Wildlife Diversity Program, thanks to a generous donation by Neuse Sport Shop, located in Kinston. T-shirts are \$15 for adult sizes and \$12 for youth sizes. They can be purchased online at the Wildlife Commission's N.C. Wild Store, www.ncwildstore.com. Or online at Neuse Sport Shop, www.nssnc.com.





Stay Informed on wildlife activities in North Carolina

Subscribe to [NC Wildlife Update](#) - news including season dates, bag limits, legislative updates and more -- delivered to your inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/wildlifeemailupdate.

“Like” the Wildlife Resources Commission on [Facebook](#) and follow us on [Twitter](#) to see the latest news releases, view photos, get updates on fishing and boating, learn of new regulations or just find out about wildlife and the outdoors in North Carolina.



Wildlife Diversity Program
N.C. Wildlife Resources Commission
1751 Varsity Drive
Raleigh, N.C. 27606
919-707-0050