

THE Upland GAZETTE

WILDLIFE CONSERVATION AND HABITAT MANAGEMENT

A Note from the Editor



REBECCA JONES

As I think about the wonderful hunting opportunities offered in our state, I cannot help but remember the key to providing those prospects—HABITAT.

Without quality habitat, hunter expectations will not be met, and game populations will suffer. Without quality habitat, the state's non-game wildlife populations will suffer as well. Fortunately, managing for game species can provide benefits for those species that we hunt just like those we love to observe.

As a wildlife biologist supervisor for the Wildlife Commission, I have the privilege of working with many field biologists on the front lines providing land management advice to landowners and hunters across North Carolina. The majority of quality wildlife habitats we help manage exist because the owners wish to improve hunting opportunities on their lands. Fortunately, we also witness these habitat improvements become critical for non-game wildlife as well. The impact of hunters on wildlife management funding, through license fees and taxes on guns and ammunition, has been well documented. What has received less attention is the impact hunters have on non-game wildlife species through their land management efforts. Just a few examples include benefits to high priority songbirds resulting from quail management, benefits to reptiles and amphibians resulting from waterfowl management, and benefits to a wide variety of species (mammals, birds, insects, etc.) resulting from the protection from development of large blocks of habitat for black bear and deer management.

Hunters truly have been America's original and most important conservationists. There is still a lot of work to do to conserve North Carolina's sensitive wildlife species, but hunters have and will continue to play an important role in achieving this goal as we move forward with wildlife management in the Tar Heel State.

Mark D. Jones

SUPERVISING WILDLIFE BIOLOGIST
PRIVATE LANDS WILDLIFE HABITAT GROUP



Grace (left) and Chief posing with an American woodcock after an eastern North Carolina hunt.

MARK JONES

Two Old Bird Dogs

By Mark D. Jones, Upland Gazette editor, NCWRC

Their names at birth were Grace and Chief—sister and brother born to separate litters of the same German-wirehaired pointer parents. Grace was one of only two surviving members of a litter of 10. Her brother Chief came along eight months later to another litter of 10 which fared much better with eight surviving.

Grace, like most female bird dogs, matured much faster than her younger brother Chief. Grace was a natural pointer, retriever, and all around good bird dog by the time she was 6 months old. She claimed her first wild bobwhite quail in Craven County before she was 8 months old. By the time she was 18 months old, Dad and I were killing desert quail (Mearn's, Gambel's, and scaled) over her and her mother Storm in southern Arizona.

Chief was another story entirely. At the time of his raising, I had three older female Wirehairs—Grace, Storm, and a much older female named Belle. Each of these dogs deserves a story, but this one is about Grace and Chief. Chief seemed to just hang around the older females and let them do the work. For his first two hunting seasons, he was the happiest and likely most worthless bird dog alive, but I don't think it was his fault. Having four dogs, it was hard for me to devote the time I should to Chief, so he was often put out on the ground with his mom Storm, sister Grace, or aunt Belle. He would simply tag along and let them find birds. Chief was just happy to be alive and did not need to find a bird to make his life special. After all, Chief had the ladies to do the work for him, and all he really wanted was a pat on the head once in a while.

I have been blessed with the opportunity to hunt many species of upland birds in many locations across this country. During Chief's first two seasons, we focused on quail and woodcock here in North Carolina, and we made two trips to Arizona for the three species of desert quail. Chief loved every minute of it, but he never really became a bird dog. My Dad, my hunting partner on our western adventures, and I often commented that Chief sure was "a loveable dog" but was not worth much for hunting birds. I am a dog guy, so I knew he always had a place at my home — even if he was worthless for hunting.

In Chief's third season, after his mom Storm had been killed in a freak accident, Dad and I found ourselves in southern Nebraska hunting ring-necked pheasants and bobwhite quail. With Belle and Grace to find the birds, we did not worry too much about Chief. He was part of the family and along for the ride. One day, while resting the ladies, I was hunting Chief in a coulee (the western version of a ravine) choked with bird cover. He proudly pointed in a plum thicket, and I was expecting either a rabbit or a songbird to appear. I nearly fell over with surprise when a large adult male ring-necked pheasant erupted from the cover only to fall to my gun a short distance away. I am not sure how I managed to shoot it given my surprise at Chief's successful point, but before I knew it, Chief was retrieving the bird to hand and acting like he was ready to find another. Pardon the pun, but you could have knocked me over with a feather! The only one as surprised as me was my father when I related the story after meeting back at the truck.

From that point forward, Chief became quite a bird dog. What Dad and I feared was a fluke turned out to be standard operating procedure for Chief from that day forward. For whatever reason, he decided to step out of the shadow of his older female relatives, and few dogs could beat Chief to a point or a retrieve. Few could pursue pheasants and sharptail grouse on the northern plains like Chief. He really excelled with ringnecks in North Dakota, and Dad and I remarked that once he got on the scent of a wild pheasant (which are prone to running like jackrabbits) only two things were going to happen: Either the bird would get smart and fly too far away for a shot, or Chief was going to track it until he locked in on a point within gun range. Closer to home, I recall both bobwhites and woodcock shot down over water (even a small lake) here in North Carolina where Chief swam like a Labrador retriever to get my birds. His transformation was amazing and welcome. While Chief transformed into a fine bird dog, Grace was quietly my steady and exceptional "go-to" dog all along. I had quite a pair of dogs.

For every good quality Chief possessed, Grace possessed it too. What made Chief so unusual was how he had changed from a worthless to a master hunter, but Grace had "it" from puppyhood. Those two siblings, turned loose on the northern prairies or in a Carolina woodcock covert, were quite a sight to behold. They competed a little but not in a way that undermined their purpose. There were other unique characteristics that existed between the two. Grace would often defer to Chief on a retrieve as if to say, "It's OK brother, you can have that bird. I'll get the next one when you are not close by."



Chief (left) and Grace developed a special bond and proved to be unique companions both in the field and around the home.

MARK JONES

All along Chief and Grace were developing a special bond unlike any I have ever witnessed in the animal world.

All along Chief and Grace were developing a special bond unlike any I have ever witnessed in the animal world. She was spayed early in life, so there were none of those complications to worry about. Chief and Grace became attached like best friends. They would honor each other's points like good dogs should, and Grace would groom Chief each evening after a hunt or even at home in my office where they spent most of their down time. He must have had the cleanest ears in the dog world!

Chief, in keeping with his happy-go-lucky personality, was comfortable around most any dog, but Grace became so attached to Chief that he was the only dog she would tolerate. If you tried to make her hunt with another dog, she seemed to turn up her nose in disgust. She was fine alone with me, but she did not want to share her hunting with any other canine but her brother Chief.

Dad and I often remarked that when something happened to one of the siblings, we did not know if the other would be able to make it. Chief started developing health problems when he was about 10 years old. First he developed an eye problem my vet attributed to allergies. That quickly developed into a diagnosed case of glaucoma and claimed one of Chief's eyes. Chief spent his last season hunting with one eye, and I have a photo of him retrieving a sharptail grouse across a snow-sprinkled North Dakota prairie in his final season. That year, Chief and his sister Grace performed in excellent fashion despite being 10 and 11 years old, respectively. Although he could see from only one eye, Chief seemed just as proficient as ever on that North Dakota trip. Pheasants, sharptails, and Huns all came easy in his final year. The birds from the Northern Plains were supplemented by woodcock and quail in North Carolina. Around that time, Chief developed a liver problem that was somewhat controlled by medication, and I sensed it might be Chief's last hunting season.

The fall of 2014 would be different from the prior 11 seasons. Chief had recently lost his second eye and was completely blind.

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Sister Stewards

By John Isenhour, technical assistance biologist, NCWRC & photographed by Melissa McGaw, NCWRC

If you spend a little time assisting private landowners, it will become apparent that conservation ethics and objectives vary greatly from one person to the next. Whether choosing to recycle in our homes, or placing an easement on the family farm, past experiences shape our view of the natural resources we steward. Some landowners have an “ah-ha” moment that changes their perspective while others may be influenced by seemingly mundane activities.

Sisters Amy and Ruth Ann Grissom spent many hours of their youth on a school bus in rural Montgomery County. Living at the end of their bus route, they had plenty of time to observe the natural features of the Uwharrie Mountains. The seemingly mundane bus rides allowed the Grissom sisters to see first-hand that this unique region their parents, Hyatt and Shirley, had introduced them to was constantly being changed by natural and human influences.

Fast forward a few years; the sisters are grown-up and have focused efforts to protect and enhance wildlife habitat across the Uwharrie region. The Grissom’s property is interspersed among the ancient Uwharrie Mountains. This relic geography supports stands of upland hardwood, mixed pine hardwood, loblolly pine, shortleaf pine, longleaf pine and bottomland hardwoods as well as fescue pastures, native warm-season grass fields and small ponds. Land management objectives for these tracts include plant diversity enhancement, wildlife habitat improvement and protection of the nationally significant Uwharrie River drainage. Benefits from their conservation efforts are magnified on the landscape due to the close proximity of the Uwharrie National Forest.

Several agencies, including the North Carolina Wildlife Resources Commission (NCWRC), have provided technical assistance to address the Grissom’s habitat objectives. Plans developed by conservation professionals have allowed for participation in financial assistance programs with the United States Department of Agriculture, U.S. Fish and Wildlife Service (USFWS), and the North Carolina Forest Service. Portions of the Grissom’s property are currently enrolled



in the Wildlife Conservation Lands Program as well as the agricultural and forestry Present Use Value programs to reduce property tax liability.

Various practices have been implemented to improve habitat on the property. Prescribed burning, controlling woody vegetation, herbicide applications, developing riparian buffers, establishing longleaf and shortleaf pine stands, and treating non-native invasive plants are just some of the tools utilized to improve habitat. One of the most impressive components of this management program has been the conversion of 225 acres of degraded fescue pasture to native grass and shrub/scrub habitat. Cattle have been removed from streams, conservation easements protect riparian buffers, and native vegetation has been established. The results of these efforts have proven

Sisters Amy (left) and Ruth Ann Grissom have worked hard to protect and enhance the natural resources of the Uwharrie region.

to benefit water quality and a host of wildlife species, especially grassland birds.

The Grissom’s property is utilized for recreation by family members, friends and others with an interest in conserving the Uwharrie region. Hunting opportunities on the property are managed through private leases with an emphasis on continuing the hunting heritage of the Uwharries. The farm hosted several falconers during the 2015 North Carolina Falconers Guild State Meet, and continued participation in this event is expected. Botanists commonly survey the property to identify and monitor populations

of rare plants. Researchers regularly survey the property to better document the natural significance of the Uwharrie region and evaluate management practices. Recently a bird banding project has begun to evaluate the impact of habitat management activities on the avian community. Biologists from the North Carolina Museum of Natural Sciences, USFWS and NCWRC have used mist nets to capture songbirds on the property. Student volunteers from the museum and Wake Audubon Society assist with data collection, apply leg bands and release the birds. Information gathered from this project will quantify how habitat management in the Uwharries benefits birds which may nest thousands of miles away.

The Grissom sisters have not been able to stop all the change they noticed on the bus rides of their youth. However, they have been able to manage unique pieces of property in the Uwharries to provide habitat for many species of native wildlife. Thanks to the work of the Grissom family, the Uwharrie region is a better place for wildlife and the citizens of North Carolina who visit this area to hunt, fish, recreate or just reflect. 🍂



A North Carolina Forest Service forester uses a drip torch to ignite a prescribed burn on the Grissom grassland. Prescribed burning is required to manage native grasslands for habitat quality and species diversity.

JOHN ISENHOUR

Benefits from their conservation efforts are magnified on the landscape due to the close proximity of the Uwharrie National Forest.



Degraded pastures and highly erodible croplands have been converted to this native grassland. Proper use of herbicides, establishment of native species, and an aggressive prescribed burning program have been vital tools in developing and managing this high quality early-successional habitat.

A Habitat Journey

By Chris Turner, district wildlife biologist, NCWRC & photographed by Melissa McGaw, NCWRC



Landowner Kerry West (left) and biologist Chris Turner discuss current and future habitat management goals and successes.

It's noontime on a late-May day when I park my truck at the end of the dead-end road along the edge of a dense Bertie County pine plantation. As the District 1 wildlife biologist for the North Carolina Wildlife Resources Commission (NCWRC) focusing on 13 northeastern counties, I'm always thinking about wildlife... all the time! Today is no different. I lean into the cab to prepare my clipboard and aerial photos for the field exam as Kerry West, the landowner I am here to meet, drives up. As I lock my truck and walk over to West, I have to smile at our great timing. Let another "habitat journey" begin.

It has been said that, "A journey of 1,000 miles begins with a single step." West's journey toward habitat management began much earlier than our first meeting. After many years of hunting deer on leased land, his dream to "get a piece of land of my own" was realized in 2008, when he was finally able to purchase a 40-acre pine plantation along a stream tributary in an area of Bertie County known for its deer herd, turkey flocks and an occasional black bear. In spite of a relatively limited acreage, West was drawn to the tract by the potential for special deer hunting and wildlife management opportunities.

"We don't have a tremendous piece of land where much deer management can take place, but we can maximize our land to the point where it's as good as you can get for a piece of land our size," West said. "There is a 1,200–1,500 acre tract of land behind us with limited hunting as well as a hunt club on two sides that manages deer. With a swamp run on the side that backs up to the large tract, this location was great."

West and I begin our field exam. Several habitat improvements are quickly evident. He and his two sons have begun hand-clearing road-edges. Widened paths create "day-lighted" roads. Wide-shoulders can provide linear openings on which native vegetation can be managed in sections using annual mowing, light disking or fire. I note that West has also started flagging out and freeing from competition all of the various oak trees he found that are thigh-sized or larger. These trees were left after the last timber harvest on the property years before and are now a source of acorns



As the West family has shown, managing your land for wildlife habitat can be much more than just an investment in our wildlife resources.

within the pine plantation. As he flags out yet another persimmon tree we have found, I note that it is certainly easier (and less expensive) to protect existing, key habitat features than it is to replace them.

On an aerial photograph, West shows me our location in the center of the property and says that he wants to create several upland food plots and wildlife openings near where we are standing. He says he has always been excited about the potential of providing quality forage for deer and brood habitat for turkeys in a place where both are lacking. A soils map shows that the soil types on the upland portions of his property are mostly productive and should be manageable. On this site, with proper design and construction, several openings might be possible within his young pine stand. It is clear through West's own experience and discussions with other land managers that the ultimate success of any food plot is always dependent on the context in which it lies. In other words, a food plot, similar to dessert after an evening meal, is only a complement to habitat conditions present in the surrounding forestland.

We duck into the dark pine thicket and trip our way downhill through honeysuckle vines and dead briar patches. Several worn deer trails crisscross through the dry pine straw, but something is missing. After canopy-closure shaded out the ground several years ago, all grasses, briars, and shrubs died-back resulting in a prolonged period of poor wildlife habitat within this dense loblolly pine stand. We discuss steps to reverse the loss of deer forage and small game cover within these pines.

In 1933, Aldo Leopold, considered to be the "father" of modern wildlife management, said in his book "Game Management" that wildlife is managed with the "creative use" of the "ax, plow, cow, fire and gun." The basic forest management tools of the ax (timber harvests), plow (disking/mowing), and fire (prescribed burning), when regularly wielded together in pine areas on a relatively short rotation, create and maintain beneficial conditions for many wildlife species. These planned, measured disturbances contribute to "re-setting" the vegetation from woody plants back to critical herbaceous species particularly legumes, grasses and forbs. West has benefited from the results of habitat management on other properties many times before making him well aware that his plans to improve deer forage on his own property must include periodic forest management activities.

Walking downhill through the pines, we suddenly pop out into a beautiful part of the tract: a bottomland hardwood area. The blackwater stream margin forming one boundary of the property contains large cypress, black

gum and tupelo gum trees. For long-term wildlife species diversity, it is difficult to place a value on the habitat provided by mature, hardwood bottoms such as this one. This wide streamside-buffer, left to protect sensitive wetland areas, contains mature beech trees as well as acorn-producing oak species. Protecting wide, mature stream buffers (the wider the better) usually results in hunters on even the smallest tracts seeing success. By mid-afternoon, West and I have covered most of his property—literally from top to bottom. Before parting ways, I tell him that I will be sending him additional recommendations along with technical information concerning some of the management techniques we have discussed.

Not surprisingly, within a few weeks, West contacted me with an update on his progress. He had discussed a forest management plan with the North Carolina Forest Service to assist him with seeking cost-share assistance for the recommended pre-commercial thinning activities in his pine stand thus opening the door for prescribed burning activities there. A year later, our next meeting on the tract included part of his "workforce"—one of his sons and a friend. We all walked a changing land this time. Together we viewed some of their habitat accomplishments and looked into a satisfying future born of commitment, planning, hard work and understanding.

Regardless of the species of interest, when it comes to improving, maintaining, or creating wildlife habitat, proper planning and patient progress moving ahead annually will show results.

This is the "habitat journey." Many people might agree that the best journey we can go on is the one that is shared with companions who care as much about the destination as we do. As providers of technical guidance and other assistance, NCWRC biologists and other natural resource professionals have the privilege of becoming companions in the journey through important habitat evaluation, planning and support. As we continue to work together, there is truly "joy in the journey" for all those wildlife managers like Kerry West and his family who are showing their heart for habitat. 🌿

"A journey of 1,000 miles begins with a single step."

A Day in the Life of a Wild North Carolina Bobwhite

By Andy Richardson, graduate research assistant, and Chris Moorman, professor, Fisheries, Wildlife, and Conservation Biology Program, North Carolina State University; Benjy Strobe, technical assistance biologist, NCWRC

For those fortunate enough to have heard the familiar whistle of an unseen bobwhite, you may have wondered about the lives of these secretive little birds. Maybe you've questioned where they spend the night, where they hide or feed, or what else happens during their daily lives. Well, our research team had the same questions and were in just the right position to find the answers.

For the past two years, our team of researchers and biologists from North Carolina State University and the North Carolina Wildlife Resources Commission (NCWRC) has been capturing and tracking Northern bobwhite quail in Bladen and Duplin counties in an effort to better understand the movement, survival, and nest success of these iconic game birds. Most of the tracking effort was centered on Smithfield Hog Production Division's Holmes Complex, which is the showcase farm for the NCWRC's Cooperative Upland habitat and Restoration and Enhancement (CURE) program. This farm has a significant amount of habitat for quail and other species found in early successional landscapes.

CURE management began on this farm in 2006 and now consists of 227 acres of field borders, fallow habitat areas and native grass and forb plots as well as 181 acres of restored longleaf pine. CURE management of these habitat areas affects 28 percent of the total farmland—a very high percentage compared to average areas on today's quail-unfriendly landscape. This farm maintains a high population of wild bobwhites without releasing pen-reared birds, supplemental feeding or predator removal.

We assigned a unique identification number to each of the 241 individuals we captured during 2014 and 2015 and attached very small radio-tracking collars designed specifically for quail. We gathered locations on individuals three times each week from February until August which gave us a long-term view on seasonal movements. However, these locations were only snapshots into a quail's daily life. We saw large movements of up to two and a half miles a few times each year. These movements



This CURE field border contains quality early-successional habitat that is lacking on most of the modern North Carolina landscape. Quail 188 spent much of his time using this border.

usually coincided with covey breakup. Covey breakup occurs at the first hint of green in the spring as groups of quail split up after staying together all winter to keep warm and find food. Although the movements we investigated were important to our research, our group became curious about what an entire day was like for one of these whistling males.

We chose to look further into the life of northern bobwhite number 188. Individual 188 was a male captured on Feb. 24 with seven other members of his covey in a 3-acre woodlot with heavy undergrowth surrounded by bare agricultural fields and pastureland. He was an adult when we captured him, making him one of the lucky few to see two summers as an adult. The average lifespan of a northern bobwhite surviving past its initial two weeks of life, when chicks grow flight feathers, is only eight months. Although this may initially seem shocking and lead to the conclusion there are too many predators on the landscape, one should keep in mind this is the observed average lifespan of individuals in healthy populations.

As long as there have been quail, many animals have preyed upon bobwhites. Coyotes, snakes, raccoons, hawks, and owls are known to prey upon adult bobwhites. Yet, bobwhites are able to overcome this assault by quickly maturing and having large numbers of young in order to replace themselves. Bobwhites are mature by their first summer after hatching, and females can have two or three nests during a summer with anywhere from eight to 16 eggs in each nest. Males and females will both incubate nests and care for hatchlings. Newly hatched chicks are also able to leave their nest immediately after hatching and can fly after as little as 10 days. Because a bobwhite's life strategy has accounted for dealing with a variety of predators, the loss of habitat that once provided places for these birds to safely hide, feed and nest is the main concern with modern bobwhite population declines.

We joined up with individual 188 early in the morning on July 16 at the margin of a soybean field roughly three-quarters of a mile from where he was captured five months earlier. As the sun rose, 188 emerged from a field



Above: A map showing Quail 188's movements on July 16, 2015. Top right: Quail 188 on the evening he was captured and radio-collared.



Male Northern bobwhites have a distinctive "bob-WHITE" whistle used to establish a territory and attract females.

border, a strip of native vegetation between a soybean field and a drainage ditch. This naturally vegetated border was made up of blackberry, pokeberry, mare's tail, dogfennel and broomsedge, and has been maintained by NCWRC for the purpose of providing wildlife habitat and improving water quality.

The first three hours of 188's day were spent competing against other males in an effort to attract females. Male Northern bobwhites have a distinctive "bob-WHITE" whistle used to establish a territory and attract females. One male's whistle typically sets off a chain of calls from all neighboring males. On this particular morning, that chain consisted of 188 and three surrounding males. When an adjacent male took the lead in calling, 188 quickly ran roughly 100 feet hidden amongst the soybean plants to the field border nearest the other male and began whistling as well. As another male in the opposite direction took the lead in whistling, 188 turned and ran in his direction.

These confrontations took place throughout the early morning and caused 188 to move up to 758 feet to protect his territory. After he stopped whistling, 188 took shelter from the near 100 degree temperature in a mature corn field. We heard sporadic whistling from neighboring quail until nearly noon, but 188 had retired for the morning.

Around 1:30 p.m., 188's radio signal weakened indicating to us he had taken cover further into a nearby drainage ditch, possibly to take advantage of the shaded water within the ditch. Around 3 p.m., 188 moved out of the cornfield, crossed a farm road, and traveled through a soybean field back into an adjacent field border from where he started his morning. Quail 188 spent the next few hours moving along the edge of a soybean field and field border likely feeding on the fruits, seeds and insects provided by the plants within the border in preparation to roost. He would whistle infrequently along with a few other males in the area but not with the voracity that occurred during the morning. Finally, at dusk, 188 moved into a blackberry patch alongside the farm road to rest for the night. In total, 188 traveled over 8,200 feet while staying within a 16-acre area during this day.

As a follow up to our story, 188 succumbed to a predator less than one week after we spent the day monitoring him for this article. His tracking collar was emitting a mortality signal in the same soybean field in which he spent part of July 16. Based on the condition of his collar, we believe he was killed by a medium-sized mammal, possibly a raccoon. The antenna from the collar was knotted multiple times into a soybean plant and had teeth

marks along it, suggesting that his predator was quite dexterous and possibly investigated this curious object after the predation event.

Although 188's time has come to an end, it is still heartening to see the Holmes Complex Northern bobwhite population doing so well due to the cooperative efforts of multiple groups uniting toward a common goal of upland habitat conservation and management.

This project is supported by a North Carolina Department of Justice Environmental Enhancement Grant, NCWRC Pittman-Roberson funding, North Carolina State University and Smithfield Hog Production Division. We thank technicians Nathan Klopmeier, Sarah Rosche and Kevin Cassel for their assistance in tracking 188 to bring this story to you. 🐾

Surveys and Research Program

By David Sawyer, Surveys and Research Program coordinator, NCWRC & photographed by Melissa McGaw, NCWRC

The Surveys and Research Program oversees the surveys, monitoring and research activities for North Carolina's resident and migratory wildlife resources that are taken or pursued through hunting or trapping. The mission of the Surveys and Research Program has two primary components:

- 1) To ensure the long-term viability and sustained harvest of game and furbearer populations by providing the best possible scientific information on the status and management of each species and its habitats so that regulations and management are based on objective data.
- 2) Participate in planning and coordination of management directives based on sound science.

Each biologist within the Surveys and Research Program has responsibilities for a specific group of species or set of specific research and survey responsibilities at the statewide scale. These employees are well-seasoned professionals who frequently serve as subject-matter experts in their field. In addition to serving as a source of knowledge and information for the Agency's administration, board of commissioners, and biological staff, they also serve as a resource for natural resource managers of other agencies or conservation organizations and frequently serve on various multi-state committees and working groups to address management issues on a scale much larger than North Carolina.

Each research project conducted or coordinated by this program has the primary objective of answering a question that can be directly applied to the management of wildlife or their habitats. Program biologists coordinate and conduct some research in-house, but most research is conducted cooperatively with universities or other conservation partners. Biologists in the program may conduct projects that determine the range and abundance of a species that has limited distribution within the state. Current examples include spotted skunks, Appalachian cottontails, fox squirrels and black ducks. The Surveys and Research Program also coordinates species restoration efforts for the Wildlife Management Division with the most recent efforts being devoted to wild turkeys and river otters.

Direct management of species is accomplished through the process of drafting statewide management plans, working within the agency's regulatory process and providing technical guidance to others.



Doug Howell, waterfowl biologist, prepares to band a wood duck. Wood duck banding provides the information needed by waterfowl managers to monitor harvest and establish annual bag limits.

Management plans may be directed at a specific species such as black bear or at issues such as agency response to a potential disease outbreak. Hunting and trapping regulations may originate from program biologists or others from within and outside the Agency. Regardless of origin, program biologists evaluate the potential biological impact of regulations using best available science.

Finally, in addition to providing direct guidance to others, information and materials are produced by program biologists for the purpose of technical guidance, species management and education.

Each Surveys and Research Program biologist works within at least one of six areas of wildlife management focus. These include: Migratory Game Birds and Waterfowl, Upland Game Birds and Wild Turkey, Black Bear and Furbearers, Small Game Mammals, White-tailed Deer and Human Dimensions. Let's take a snapshot look at some of the responsibilities and activities of the Surveys and Research Program biologists.

Migratory Game Birds and Waterfowl

(Joe Fuller, Doug Howell and Kimberly McCargo)

The biologists in this group work with migratory species such as ducks, geese, swans, rails, mourning doves and woodcock. Because these species migrate across state lines, all are under partial regulatory authority of the U.S. Fish and Wildlife Service (USFWS) and managed cooperatively with state and federal oversight. Therefore, much of the biologists' work is associated with multi-state groups like the Atlantic Flyway Council and the USFWS to maintain population estimates and develop annual hunting regulations. This includes coordinating and conducting aerial waterfowl surveys (counts of species from planes or helicopters), mourning dove surveys, or banding waterfowl and doves to estimate numbers using hunter band returns. Biologists also coordinate collection of public comments on proposed migratory game bird hunting season frameworks and bag limits. In addition to those activities, these biologists work cooperatively with professionals from other state and federal agencies to implement the North American Waterfowl Management Plan.

Upland Game Birds and Wild Turkey (Chris Kreh)

The focus of the Upland Game Bird biologist is on North Carolina's "gallinaceous birds," a term used to describe all "chicken-like" birds in the order Galliformes, such as quail, grouse, pheasants and turkeys. These birds are non-migratory giving the state full jurisdictional authority over them. Work activities include collecting and evaluating survey data to monitor trends in numbers and working with other agency biologists and partners to maximize available upland game bird habitat.

The state's wild turkey population is monitored using harvest numbers recorded in the big game harvest reporting system and the annually conducted hunter harvest survey. A summer turkey brood survey is conducted each year using agency employees and volunteers. Other long-term surveys are used to monitor quail and grouse, including avid quail and avid grouse hunter surveys, grouse drumming surveys and quail call-count surveys.



A Surveys and Research biologist and Private Lands Program biologist work cooperatively to tattoo a black bear as part of a research project in the North Carolina mountains.

Black Bear and Furbearers (Colleen Olfenbittel and Geriann Albers)

Furbearers include a long list of small to medium sized mammals that have been traditionally harvested for their fur, such as raccoon, beaver, gray and red foxes, muskrat, mink, weasel, coyote, bobcat and skunks. Black bears are included in this group due to their biological and management similarity to the other carnivores. Bear populations are intensively monitored through a combination of the big game harvest reporting system, the annual bear hunter survey, and sex and age data collected from hunter-harvested animals and other sources of mortality. Several other surveys provide supporting information. Furbearer harvest by trapping is annually monitored using a trapper harvest survey. Furbearer harvest by hunting is annually monitored using the hunter harvest survey. Specific field surveys are conducted for selected species to determine distribution or abundance.

Small Game Mammals (Brandon Sherrill)

One of the Wildlife Management Division's mammalogists has responsibilities for both small-sized non-game and game mammals. The small game mammal group includes all of the state's species of rabbits and squirrels (groundhogs are also in the squirrel family). Common small game mammal species (eastern cottontails and gray squirrels) are generally abundant across North Carolina, therefore most of this biologist's survey work is devoted to determining distribution and abundance of the species that often have limited range such as the Appalachian cottontail and fox squirrel. Harvest of more common species is monitored using the annual hunter harvest survey. Other surveys such as the deer hunter observation survey (which records small mammal observations made by deer hunters) and the avid rabbit hunter survey provide supporting information on abundance and distribution.

White-tailed deer (Jonathan Shaw)

The deer biologist monitors the state's deer populations using data obtained from a combination of sources. The big game harvest reporting system and annual hunter harvest survey provide harvest

information while data on sex and age collected by agency biologists and technicians provide details on specific herd parameters such as sex ratio and age structure. Indicators of hunter effort (time spent hunting) and success (harvesting deer) are obtained from the hunter harvest survey. The deer hunter observation survey provides additional information on hunter effort and an index to recruitment.

Wildlife Surveys Biologist (Ryan Myers)

The Wildlife Surveys biologist is dedicated to assisting other program biologists with obtaining, analyzing and summarizing survey data. This biologist has the primary responsibility for annually conducting recurring surveys that provide information used by many biologists in the agency. Of major importance are activities associated with the big game harvest reporting system and conducting and summarizing the annual statewide hunter harvest survey. A second primary function of this biologist is to maintain and archive Surveys and Research program data, data summaries and reports. Finally, and of greatest importance, is the responsibility to make information easily accessible by agency staff and the public through computer applications or the Internet.

Human Dimensions Biologist (Christopher Serenari)

Humans are a critical component of wildlife management because they ultimately decide how wildlife or their habitats will be managed. The Human Dimensions biologist conducts and interprets research that explores social attitudes, processes and behaviors related to wildlife management. Though residing in the Surveys and Research Program, human dimensions research may address issues concerning game, furbearers, or non-game species. Human dimensions research provides a science-based approach to gather input from the public that may directly affect or determine a wildlife management approach. Investigations may explore hunter attitudes towards wildlife management strategies, resident beliefs about wildlife, cultural drivers of human behavior and trade-offs that individuals are willing to make to support wildlife conservation. 🐾



ROLLING PLAINS QUAIL RESEARCH FOUNDATION

Eyeworms can have serious implications for quail survival. However, we have not yet found evidence that the parasite occurs in North Carolina quail.

When you spend time with an experienced quail hunter from the Southeastern United States, stories of easy limits, plenty of coveys and good dogs are sure to be told. But undoubtedly, the sharp decline of bobwhite quail populations across the Southeast and throughout its range since the late 1970s will arise.

Theories and thoughts for the cause of this decline include: change in overall habitat, change in farming practices, weather, fire ants, increased predators, increased herbicide and pesticide use, and many others. The overall decrease is likely linked to some combination of all of these factors with habitat loss being the most important issue. However, in areas where the habitat is good and the decline still persists, researchers and resource managers are investigating what else could be driving the quail decline.

Researchers in Texas and Oklahoma have a theory for why quail are experiencing low survival rates in their region. They point to a 1.5 cm long parasitic eye worm, *Oxyspirura petrowi*. This eye worm has been found in other gallinaceous birds (chickens, turkeys, etc.) in Europe and also in songbirds in the southeastern U.S., but until now, complications associated with its presence have not been documented in Northern bobwhite quail.

Researchers from Texas Tech University and Texas A&M suspect the presence of these worms could be causing loss of vision and make the birds more vulnerable to predators—particularly avian predators. In addition to increased predation rates, infested birds may expend more time and energy finding

Keeping an Eye on Quail

By John Henry Harrelson, technical assistance biologist,
Maria Palamar, wildlife veterinarian and
Chris Kreh, upland game bird biologist, NCWRC

food and may be at increased risk of becoming infected with other parasites and respiratory ailments. Of the 29 adults tested in the initial Texas study, 28 were found to have the parasite present, and some individuals had as many as 40 worms.

Knowledge about *Oxyspirura petrowi* parasite is limited. What is known is that quail can become infested with the parasite by ingesting infested crickets that serve as an intermediate host. Insects are the main food source for bobwhites during the spring and summer which is when parasitic eye worm infestations are most common. Texas researchers hypothesize that bountiful summer rains, which often foreshadow healthy quail populations, lead to increased cricket abundance. This in turn leads to increased ingestion of the crickets by quail and facilitates the infestation of quail by the eye worm. Once ingested, the parasite finds its way to the eye of the bird, and it free floats on the surface of the eye, the conjunctiva, nictitating membrane, nasolacrimal ducts and Harderian gland. These parasites leave marks on the cornea of the quail, so even when you do not find the parasite, you can find the lesions associated with its previous presence. It is not clear if the presence of parasites is a cause of pain for the bird.

In an effort to learn more about the possible effects of eye worms on quail populations here in North Carolina and to record baseline data, biologists with the North Carolina Wildlife Resources Commission began collecting hunter-harvested quail samples in the fall of 2013 and continued through the 2014–2015 hunting season. Hunters were asked to keep the entire head as well as a wing. This allowed us to determine the sex and age of these birds as well as have them examined for evidence of *Oxyspirura petrowi*.

A total of 95 samples were obtained from both wild and pen-released quail from five properties across Bladen and Columbus counties in southeastern North Carolina. In addition to recording sex and age of the birds, we collected a small amount of muscle and skin

for inclusion in our genetic tissue database. After initial processing, the heads were shipped to Texas Tech University where researchers examined each quail head and looked for the parasite.

No evidence of *Oxyspirura petrowi* was found in any of the 95 samples. Dr. Whitney Kistler from Dr. Kendall's Wildlife Toxicology Laboratory at Texas Tech University indicated in her report: "The results we found during this study are unsurprising. The few studies that have examined Northern bobwhites in the southeastern United States for *Oxyspirura spp.* reported similar results."

It's possible that North Carolina may not have suitable habitat for the cricket species that serves as an intermediate host. Time of the year when the samples are collected may also factor in when looking for the parasite. Only animals that have had the chance of getting infested during the summer will develop the parasite during hunting season.

Other southern states, including Georgia and Florida, have conducted similar studies, and neither has found the parasite. This indicates that location, climate and topography may play an important role in the ecology of the parasite or the intermediate host species.

So what does this mean for quail in North Carolina? We now know that the parasite is not widely distributed in our state, although we could still find this parasite in the future. We can safely say that right now it does not seem to be impacting quail here. Habitat loss and degradation are the overwhelming forces driving quail declines.

Habitat management is still our most powerful tool and one that you can use on your own property. If you are interested in learning more about the habitat management programs available through NCWRC, please visit our website at ncwildlife.org/CURE/CUREDecliningHabitatDecliningWildlife.aspx.

In the meantime, the NCWRC is still actively trying to learn more about our quail populations and how to make sure they are present in our state for future generations. 🐦

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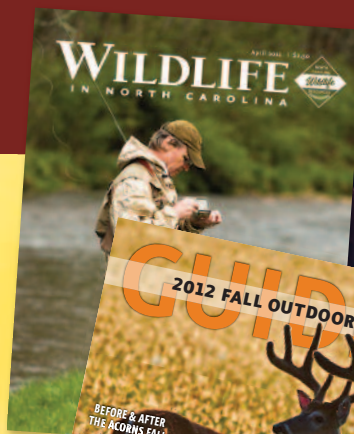
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Chief retrieving a wild North Dakota pheasant along a field edge where the prairie meets a wheat field.

He used memory to get around my fenced yard, and he seemed happy to be around Grace and my wife's toy poodle Oz. However, we all knew Chief would not hunt that season.

Dad and I headed to Montana and North Dakota that season with Grace and three younger wirehairs (Maggie, Pearl and Faith). Chief stayed behind with my wife, son and Oz. Grace had grown feeble by this point as she was pushing 13 and showing her age. We were not sure she would be able to hunt much in that dry, hard and unforgiving landscape.

On our way west across the Missouri River, Dad and I remarked that we really would like to get at least ONE pheasant with Grace sometime on our trip. We just weren't sure she could hold up for a hunt. When we first turned her loose in Montana, an old spark seemed to ignite in Grace's hunter's heart, and she began finding birds like prior years. From an early Montana pheasant we feared might be her last ever, Grace proceeded to find pheasants each place we turned her loose, and she performed exceptionally well in North Dakota. She hunted a little slower, and she seemed a little tired at night, but when I really wanted to get a pheasant, Grace was the dog I chose from the pack. Like Chief the prior year, I sensed this might be her final season.

Chief went to doggie heaven the day before Thanksgiving in 2014—just a few weeks after Grace returned from the Northern Plains. They spent their last three weeks together with her grooming his sightless eyes and watching him muddle around in our yard as his body succumbed to the liver disease. After Chief was gone, Grace began to mourn like an elderly person who has lost a spouse of 50 years. She just wasn't herself. She began to lay outside in the yard for hours on end rather than wanting to come into my office

where she had always preferred to be in the past. It seemed she was waiting for Chief to return from some unexpected trip.

Grace never recovered from Chief's death. It was almost as if she lost her will to live. The only time I saw any hint of the old Grace was when I picked up a shotgun. The old love of the hunt was still there, but she did not seem content at any other time. Grace passed away just before we left for North Dakota in October 2015. As I walked those Dakota coulees and plains with Maggie, Pearl and Faith, I could not help but remember the times I hunted those areas with their great-aunt Grace and great-uncle Chief.

One area had produced my first-ever limit of North Dakota roosters behind Chief on my first full hunting day in the state. Another area had produced an opening day limit of pheasants for both Dad and me behind Grace alone. Area after area had memories of those dogs.

I keep rough hunting maps and journals—primarily to help in future hunts. I often name special areas based on something that stands out about the spot or based on special exploits of a dog. More than one area had Grace's or Chief's name attached in some form. Over the course of their lives, Chief and Grace successfully hunted 11 species of upland game birds across eight states. They pointed and retrieved and provided countless hours of enjoyment and probably traveled more than most humans. At home, they proved to be gentle and loving pets. They lived life to the fullest, and their memories keep me warm on cold winter days after bird season is over.

This story is a tribute to Grace and Chief—two dogs who provided a wealth of pleasure and love to this hunter and fulfilled a dog's promise to be man's best friend. 🐾



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