

A Note from the Editor



REBECCA JONES

As Wildlife Commission staff prepare this issue of the *Upland Gazette*, we are also busy reviewing nominations for one of the Agency's most prestigious awards.

The Lawrence Diedrick Small Game

Award is typically given to a North Carolinian whose actions significantly and positively impact any of North Carolina's small game populations, including Northern bobwhite quail, ruffed grouse, squirrels or rabbits. The award recognizes efforts in habitat management, education, research, the Hunting Heritage Program or other meaningful contributions. In some cases, small game populations may benefit significantly from efforts focused on non-game or other species with similar habitat requirements.

The award is named in honor of Lawrence G. Diedrick of Rocky Mount, who served as a wildlife commissioner from 1993 to 2001. Diedrick was a strong and passionate promoter of efforts to address declining populations of bobwhites and other species dependent on early successional habitat.

After his death in September 2002, a group of his friends made memorial contributions to the Commission's Wildlife Endowment Fund to support an annual Small Game Award in his honor, and the Wildlife Resources Commission created the Diedrick Award in 2003. Nominations can be made in two categories: individual and organization.

Previous winners of the award include private landowners who go the extra mile to manage their properties, dedicated wildlife professionals, sister agencies with special small game initiatives and corporations that provide habitat for small game on lands they own and manage. It is exciting to review the nominations and learn about North Carolinians making a difference for wildlife species.

In the Spring 2017 issue, we highlighted the efforts of the Palmer Family for winning the 2016 Diedrick Award. The Diedrick Award gives us an opportunity to recognize one person or entity at a time, but it is heartening to know that many North Carolinians are working hard to create habitat for small game and associated wildlife species. They all deserve praise, and a heartfelt thank you goes out to them all.

Mark D. Jones

SUPERVISING WILDLIFE BIOLOGIST

PRIVATE LANDS WILDLIFE HABITAT GROUP

THE Upland GAZETTE

WILDLIFE CONSERVATION AND HABITAT MANAGEMENT



SARAH ROSCHE

A captured male Northern bobwhite quail has an attached necklace-style radio collar.

The Risk of Being Burned Investigating Spring and Summer Prescribed Fire Impacts on Northern Bobwhite Nesting Ecology

By Sarah Rosche, Chris Moorman and Chris DePerno; Fisheries, Wildlife and Conservation Biology Program, North Carolina State University

Lightning-ignited fires and fires lit by Native Americans and European settlers once burned vast acreages of land across the South. These fires played a huge role in developing the fire-dependent plant and animal communities present in the region. Today, land managers use prescribed fires (also known as controlled burns) to manage and maintain habitat for a variety of wildlife species.

Frequent, low-intensity fires in open-canopied forests of the Sandhills and Coastal Plain regions of North Carolina promote an understory characterized by extensive herbaceous forbs and grasses with patches of shrubs and low-statured hardwoods. These vegetative conditions provide food and cover for wild turkey, white-tailed deer, Bachman's sparrow and even Northern bobwhite quail if the understory cover is suitable.

Through the late 20th century, prescribed fires were primarily applied during the winter months (January to March) when cool temperatures and steady winds were present. Also, burning during the winter months was based on the belief that dormant-season burns would be less likely to have an impact on nesting birds or harm growing trees. However, more

recently, land managers have shifted to conducting prescribed fires during the spring and summer (also called the growing season) to match the peak in historic lightning occurrences and to more effectively kill encroaching hardwoods. Burning during the growing season broadens the window for applying prescribed fire and achieves ecological effects that differ from dormant-season burns. These growing-season burns are effective in restoring native grass and forb cover where hardwood shrubs and trees have encroached.

Concerns about the effects of growing-season fire on ground-nesting birds remain prevalent among hunters and landowners. Logically, it seems that prescribed fire conducted during the nesting season would destroy all ground nests, which are built from highly flammable dried plant material. However, the risk of nests being destroyed depends on the timing of the fire relative to the peak of nesting activity and the spatial overlap between fire occurrence and nest locations. In other words, a fire conducted a day before the start of nest construction will not destroy that nest, and small or incomplete burns will leave lots of unburned vegetation in the landscape for safe nesting to occur.

A recent study by North Carolina State University (NCSU) showed that relatively large-scale spring burning on Fort Bragg Military Installation only destroyed 1 of 40 wild turkey nests. Most turkeys nested in wetter lowland areas that were less likely to burn, and nests in the uplands were often in areas not scheduled to be burned that nesting season. However, Northern bobwhite quail are less likely than turkeys to nest in the lowlands where they are farther removed from prescribed burning impacts. Therefore, NCSU faculty and graduate students are collaborating with the Wildlife Branch at Fort Bragg to study how spring and summer prescribed burns may affect Northern bobwhite quail nesting ecology.

Tracking Nests for Data

Fort Bragg covers approximately 160,000 acres and contains one of the largest contiguous remnants of the longleaf pine-wiregrass ecosystem. Land management at Fort Bragg is driven by efforts to restore and maintain habitat for the federally endangered red-cockaded woodpecker. Prescribed burns in forest stands primarily are conducted on a three-year return interval, and priority is given to burning during the spring and summer (April to June) to limit hardwood occurrence in the uplands and to maintain an open midstory required by the woodpecker.

Over two years, we captured 130 wild bobwhites and placed specially-designed radio transmitters on each one, allowing us to track incubating birds and pinpoint each nest location. We located and monitored 30 nests and recorded whether nests hatched chicks, the cause of failed nests and selection of nest sites relative to how long it had been since the last prescribed burn. If birds selected recently



SARAH ROSCHE



SARAH ROSCHE

Top: Remnants of a Northern bobwhite quail nest that was burned by a prescribed fire. Bottom: Northern bobwhite quail nest in habitat that has not been burned in two years.

burned areas, the nests would be at lower risk of destruction from fire because the next burn in the three-year rotation would not occur for a few years. Conversely, if birds selected areas that hadn't been burned in several years, those nests may be more susceptible to prescribed fires.

Two out of the 30 bobwhite nests (6.7 percent) were destroyed by prescribed fire. Interestingly, 75 percent of all nests were in areas that were at least two years post fire, making a large portion of nests at risk for being destroyed by prescribed fire that is implemented on a three-year rotation. Nests in areas not burned in two years had high nest success (more than 60 percent of the nests hatched chicks), indicating these areas provided high-quality nesting cover. Bobwhite nesting activity peaked in June during our study, so restricting all growing-season burning to April or May would greatly reduce the chance that prescribed fires would destroy bobwhite nests. However, these early growing-season burns would still degrade some of the highest quality nesting cover on Fort Bragg for nesting during the subsequent months.

Prescribed burning is critical to Northern bobwhite conservation because it helps maintain the dense understory which provides food and cover for bobwhite. Additionally, growing-season prescribed fire often is best at preventing hardwoods from growing tall and shading out understory vegetation, especially on soils more productive than in the Sandhills region where

Fort Bragg is located. In fact, research indicates, in areas where soils are better and the vegetation recovers more rapidly post fire, bobwhite will nest in more recently burned patches.

We suggest that land managers should vary fire frequency and seasonality across their properties to provide a patchwork of habitat conditions for Northern bobwhite and other wildlife species. More frequently burned patches—including those burned in the spring, summer and early fall—will benefit some species (like the Bachman's sparrow). Less recently burned areas and those burned during the winter will benefit other species (like fruit-eating birds and white-tailed deer). Further, some wildlife species will use different burn patches during different seasons of the year (like white-tailed deer, Northern bobwhite and wild turkey).

To achieve management objectives for bobwhite or other wildlife species requires the perfect mix of fire frequency, timing and variability, and will vary depending on soil conditions and vegetation conditions. Thus, landowners should work with a professional to develop a plan that meets specific management objectives that match the environmental conditions on their property.

North Carolina Wildlife Resources Commission Private Lands Staff can provide advice regarding managing your lands with prescribed fire. Please see the Private Lands staff directory on page 64. 🐾



Putting the Sting in Quail Management

By Marc Puckett, Small Game Project Leader, Virginia Department of Game and Inland Fisheries (VDGIF)
(Modified from Shell's Covert – VDGIF BLOG)

LORIEN KOONTZ

I am sure you've all heard the old saying "Taking the sting out of it." Something said like this "Man the post-game picnic sure took the sting out of losing by eight runs." I guess only a rare few people out there cherish being stung, literally or figuratively. So why would I write "Putting the sting in quail management?"

I was honored to speak back in June at the annual meeting of the Virginia State Beekeepers Association. Over 200 people generally attend this meeting. And whether you are in Virginia, North Carolina, or elsewhere, bees have become "all the buzz." Take a look at this link to see how many bee keeping chapters there are in Virginia: viriniabeekeepers.org/local-groups/local-groups-map.

My talk, "The Bobwhites and the Bees" that I have been giving in various forms for over eight years now was well received and I had many questions. I also made contacts

with local chapters to which I have since given several talks.

The world of honey bees is fascinating. I know enough to get "stung" trying to talk about them, but while sharing programs with several superb beekeepers, I picked up a few things. Did you know that one out of every three bites of food can be attributed to being visited by pollinators like bees, butterflies, birds and other animals?

Back in April, I watched a gray squirrel go through a tulip poplar, limb by limb, poking his nose into every flower—never thought of squirrels as pollinators, huh?

The truth is animals pollinate about 85 percent of plant species worldwide. And pollinating insects are in decline (recent studies in Europe show a decline in insects of all kinds). European honeybees help offset the decline in native pollinators, and many growers of produce and fruit rely on

You may think bumblebees and quail chicks don't have much in common, but the same flowers that produce pollen for bees also provide habitat and foraging areas for quail chicks.

them to meet the demand of consumers. But there are over 4,000 native bee species in North America and more than 500 species of butterflies. So why do we rely on honey bees so much?

The habitat for all these species, like the habitat for bobwhite quail, has declined markedly. And I am sure you have all heard of honey bee "colony collapse disorder." Declining habitat may not be the only cause of the declines in these species, but it is a major factor.

During the summer of 2016, I was lucky to share speaking duties with Dr. Nancy Ruppert, North Carolina State apiarist bee inspector, at a program we put on for the Southside Beekeepers in southern Virginia. She gave a talk on bee nutrition. I was surprised to learn that honeybee keepers

often must feed their bees. There was a lot of talk about what types of feeds were best and when feeding was necessary. I wondered to myself, “Was there not a day when bees could feed themselves year around?”

To enhance quail conservation efforts in some areas, quail, too, are sometimes being supplementally fed. This suggests that modern ecosystems cannot naturally meet the food demands of many organisms. As a kid in the 1960s, I remember bumble bees being everywhere, and wild hives of honey bees were common. Just as common was the whistle of the bobwhite. It simply seemed like the land bore more “fruit” then, than it does now.

Though not all good quail plants are good for pollinators (ragweed for example is great for quail but not a good honey bee plant), Dr. Ruppert pointed out, and I agreed, that the overlap between quail habitat and that for pollinators is striking.

I now judge the quality of quail habitat during summer based on the number of bees I hear buzzing or butterflies I see nectaring as I walk through it. Many fantastic quail plants are equally great for bees. For example, the black and gold bumblebee (*Bombus auricomus*) visits bee balms and night shades, which provide insects and good brood-rearing habitat structure for

“I now judge the quality of quail habitat during summer based on the number of bees I hear buzzing or butterflies I see nectaring as I walk through it.”

quail chicks. Partridge pea (*Chamaecrista fasciculata*), a common native legume cherished by bees, is a key larval host for several butterfly species (like the cloudless sulphur, the sleepy orange and the little yellow), and makes great brood-rearing cover for bobwhites. And all you need to do in the month of May is walk by blooming blackberry thickets to know that this escape cover for quail is frequently visited by bees and insects of many varieties (not to mention quail relish eating the ripe berries).

Perhaps the most notable bee in decline is the rusty-patched bumblebee (*Bombus affinis*) which was recently listed as endangered by the U.S. Fish and Wildlife Service. Its populations have declined by over 80 percent, and it is only found in small portions of its native range. It nests in the ground and has an affinity for native sunflowers and goldenrods (*Solidago sp.*), two plant types that provide good habitat structure for quail, are rich with insects, and covered up with butterflies during fall.

And did I say, “Nest in the ground?” I sure did. Though quail nest on, not in, the ground they do need bare dirt under their feet to prosper. This does not mean open exposed bare ground. It means some openness and bare dirt under a canopy of herbaceous vegetation. Ah ha!

The same is true for many of our native bees. In addition to bumblebees that nest in the ground, there are many species of digger bees that need access to bare ground for nesting. Those of you who garden know the ones I am talking about. They can be very numerous around your garden in spring and at first may alarm you, but they almost never sting. They love to nest in the bare ground of a garden, and while there they help pollinate your vegetables.

Here are some plants that really benefit bees and other pollinators: giant yellow-hyssop, swamp milkweed, butterfly weed, spotted Joe Pye weed, flat-topped goldenrod, St. John’s wort, blue lobe.

lia, stiff goldenrod, hairy beardtongue, narrow-leaf mountain mint, black-eyed Susan, green-headed coneflower, rough-leaf goldenrod, white heath aster, blue vervain, New York ironweed, Culver’s root, partridge pea, sumac, desmodiums (beggar-weeds or tick trefoils), sunflowers, and many more.

If everyone interested in bees, butterflies, and bobwhites would learn to love and manage for weeds, wildflowers and thickets, collectively we could all put the sting back into

our environment, and in so doing put the life back into it. Whether in Virginia or North Carolina, or anywhere at all, take the time to learn more about our native plants and pollinators. Sources of information for this article and for general information about pollinators can be found at the links below. 🐝

- North Carolina Botanical Gardens – Saving Our Pollinators ncbg.unc.edu/pollinators/
- Virginia Working Landscapes (a branch of the Smithsonian Conservation Biology Institute) VAWorkingLandscapes.org
- The Xerces Society – xerces.org
- North Carolina Department of Agriculture and Consumer Services ncagr.gov/pollinators/index.htm
- The Virginia Native Plant Society – vnps.org



MARC PUCKETT

White-checked skippers use early-successional habitats like nearly 60 percent of the butterfly species in Virginia.



AIMEE TOMCHO

Top: Birdwatchers gather at Grandfather Mountain State Park. **Right:** Once called the golden swamp warbler due to its affinity for bottomlands, the prothonotary warbler is the only cavity-nesting warbler in the Eastern United States and is a priority species in North Carolina.



WILL STUART

A Place for Birds

By Aimee Tomcho, conservation biologist, Audubon North Carolina

A layer of snow still hid in the shadows of rock outcrops and old trees standing tall along the ridges above Big Horse Creek in Ashe County the morning I first visited George and Carole Ford. Landowners with a unique vision to develop a working farm and scenic vacation destination they call On the Windfall, both love birds and want to do all they can to benefit the wildlife on their little space of land. These landowners are not alone in their desire to learn more about bird conservation.

North Carolina is an important place for birds. Our diverse ecoregions have yielded sightings of 475 species to date. One of the wonderful things about birds is that they can be found everywhere—visible from armchair to tree stand, and mountains to sea. Because birds are one of our most watchable types of wildlife, birdwatching has become one of American’s favorite pastimes. The preliminarily-released 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation by the U.S. Fish and Wildlife Service indicates wildlife-watching activities increased by 20 percent since 2011 with 86 million participants. Birdwatching—including observing, feeding, and photography—is understood to account for the majority of wildlife-watching activities.

Walking among the tall trees with the Fords on that cold, winter day revealed something we already know: These birds are found in more than just our public places. In North Carolina, over 80 percent of the land is privately owned. Even urban

residents are utilizing Audubon’s “Bird-Friendly Communities” resources to learn more about landscaping with native plants and erecting nest boxes for nuthatches. Plus, we have a rich resource full of native plants and nature’s nest boxes already existing in our private forests. With 60 percent of North Carolina’s forests located on private parcels, landowners who wish to manage their forests and employ techniques that benefit birds need a tool that supports their goals with technical and financial assistance. The Forest Landbird Legacy Program seeks to fill that niche.

Begun in 2003 by the U.S. Fish and Wildlife Service (USFWS), Audubon North Carolina assumed the project lead in 2015. This project remains possible by the continuing support from valuable statewide partnerships with USFWS, North Carolina Wildlife Resources Commission (NCWRC), North Carolina Forest Service and the Natural Resources Conservation Service. Regional NCWRC technical assistance biologists serve as points of contact for program inquiry.

Birds Matter ...

“Why do birds matter?” is one of those questions like “What is love?” or “Why are we here?” Unanswerable, I think, by logic. One could cite facts like birds eat lots of harmful insects, charm us at our feeders, or challenge us to learn their field marks, molts, and names both com-

mon and scientific. But perhaps the answer lies deeper. Since the beginning, birds have lifted our eyes to the skies. They’ve shown us we’re not gravity’s slave and that flight is possible and limitless. It can hover and soar, dive and display, and take us from one end of the planet to the other in a single, impossible burst of energy and purpose. Inspiration is the gift birds have given us from the start.” —Wes Craven, late Hollywood director and avid birder

Beyond enjoyment and ecological function, birds serve as universal indicators of forest health. Across the globe, there is a bird for every niche. I like to tell those who may be new to birdwatching that they can go into a forest with their eyes closed, and if they are able to recognize a handful of bird songs, the birds will sing a medley that can tell you stand age, stand structure, tree species composition and in what part of North Carolina you are standing. All we need to do is listen. Perhaps you are already familiar with a handful of bird songs without even realizing it.

Landowners Finding Commonality

Often the practices that farmers or foresters are planning for their land benefit birds. Whether actively farming, growing trees or enjoying the recreational values, those who seek to preserve the legacy of their land into the future find commonality in the desire to

limit land conversion. Biologists, foresters, and private landowners working together, uniting goals and sharing conversation knit together a landscape legacy across North Carolina. The key is to find habitat balance on a landscape scale.

The trend of forested acreage increasing in the South is no longer true. Further, contiguous blocks of 50 acres or more of mature hardwood forests are decreasing in favor of small pockets of trees. While beneficial, these pockets cannot meet the needs of many of our native wildlife. While we often think of large mammals requiring the bulk of connected forest corridors, research is revealing similar requirements for certain species of birds, such as the wood thrush, which breeds statewide and is recognized as one of the most intricate songsters in the forest.

Besides our spring and summer breeding birds, North Carolina has hosted more than 300 overwintering species, and approximately 400 species have passed through during the fall migratory months between August and November. While some of these numbers reflect unique occurrences, we cannot underestimate the importance of a state that boasts these numbers. When we analyze these data, we also find that certain species, such as the prothonotary warbler, rely on North Carolina's southeastern-most bottomland hardwood forests to support 24 percent of this species' entire population.

Small Changes for Big Impacts

Some recommendations, like pursuing a longer timber rotation, may require proactive planning. Additionally, a forest management

plan will prove beneficial and may qualify you for a tax deferment. However, many techniques that benefit birds require only small changes and directly align with targeted goals for land management. Here are some examples:

- **Snags:** Most forests have not matured enough to generate the numbers of standing dead trees once found in our forested ecosystems. Yet there are more than 80 species of birds in North Carolina that require snags for nesting and foraging. With a limited number of primary tree cavity excavators (woodpeckers), keeping your old, "holey" tree standing may mean that birds like the brown-headed nuthatch can successfully hatch a brood of young this year.

- **Tree Canopy Gaps:** As forests age, natural disturbances like wind, flooding and fire create small, beneficial canopy gaps that allow light to penetrate to the forest floor and results in pockets of incredible vegetation and structural diversity.

- **Restorative Prescribed Fire:** Hardwood forests in the South have evolved with fire. In certain cases, fire can be reintroduced to restore native plants that benefit birds. Examples include the river cane brakes found in North Carolina's floodplain forests.

- **Encouraging Native Fruiting Vegetation:** Did you know that the waxy berries that remain on hollies, dogwoods and spicebushes could make the difference between a successful and unsuccessful fall migration for songbirds? Choosing where to add light in the forest can be used to encourage beneficial tree and shrub species.

- **Individual Trees:** Oh, the intricate lives of birds! One individual tree can prove critical

for bird health and overall area diversity. There are numerous examples of nature's single-tree selection. One would be the sap wells of a foraging yellow-bellied sapsucker. Have you ever noticed a tree that has a perfect pattern of holes around the trunk? These trees generate productive reservoirs for well ... eating sap. But did you know that sapsuckers often maintain these sap wells daily to ensure production? Or that they play an ecological role for other species as well? Hummingbirds will often place their nests near these pock-marked trees. How about that single cedar tree on your property? You've likely heard of the birds called cedar waxwings that are named for their fondness of this tree. But there are multiple species that benefit from the berries and year-round cover that cedar trees produce.

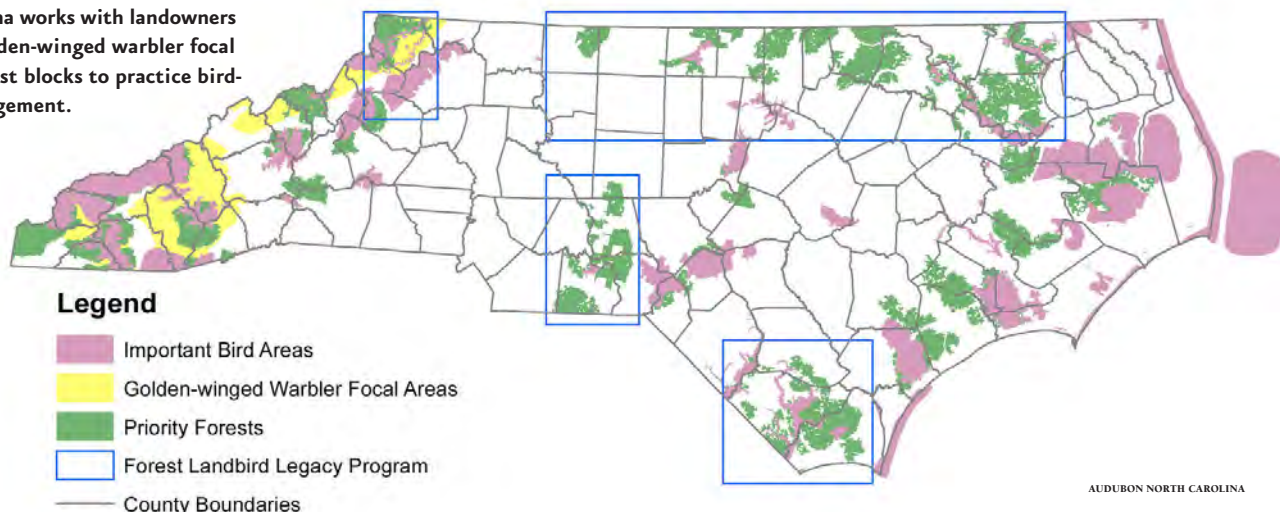
The Practice of Bird-Friendly Forestry

To maximize habitat potential and efficiency of effort, Audubon North Carolina mapped priority hardwood forests along the entire Atlantic Flyway (see map for North Carolina section, in green). These are areas targeted for the highest level of attention due to forest coverage and bird species diversity. If you fall within one of the four areas representing North Carolina's Priority Forested Blocks (see map, outlined in blue), financial assistance through the Forest Landbird Legacy Program may be available.

Projects are actively developing from the mountains of Ashe County to the bottomlands of Bladen County. The projects are as diverse as the landowners. In Caswell County, at the Cherokee Scout Reservation,

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From early successional habitats to mature forests, Audubon North Carolina works with landowners across the state in golden-winged warbler focal areas and priority forest blocks to practice bird-friendly habitat management.



AUDUBON NORTH CAROLINA

Sandy Mush Game Land

An Early Successional Habitat Success Story in the Mountains

By Chris Henline, Burnsville crew team leader, North Carolina Wildlife Resources Commission

Early one morning, I am standing in a thin stand of pines, overlooking a diverse sea of native warm-season grasses and wildflowers, listening to a bobwhite quail calling out his name. One would expect to be enjoying such a morning in the Piedmont or Coastal regions of North Carolina. However, I am in the Mountains, about 15 miles north of Asheville, on Sandy Mush Game Land.

Sandy Mush Game Land covers approximately 2,800 acres in Buncombe and Madison counties where Sandy Mush Creek empties into the French Broad River. The game land ranges from 1,730 feet to 2,375 feet in elevation with a wide diversity of habitats. Typical mountain species, such as hemlock and Northern red oak, are joined with species more typical of the foothills, like Southern red oak, post oak and red cedar to create a unique landscape. Open, flat ridge tops lined with pines and oaks descend into cove hardwood stands and around steep rocky bluffs that lead into cool creek bottoms.

Of the 2,800 acres in Sandy Mush, about 700 are comprised of some type of early successional habitat. These habitats range from planted fields to young forests and everything in between. The wooded areas are diverse with Southern Appalachian oak forest (850 acres), dry Southern pine forest (500 acres) and cove forest (400 acres) being the dominant forest types.

Looking Back

Historically, the land practices of this area were very typical of the French Broad River Valley. Numerous small farms dotted the landscape. These farms were primarily beef and dairy cattle operations. The larger, open areas were used as pastures, hayfields or row crops such as corn to provide feed for the cattle. The cattle could roam through the upland wood lots, keeping the vegetation low to the ground. However, vegetation was more abundant in agricultural areas or on steep slopes where cattle were restricted. Field borders and fence rows provided an abundance of native forbs and grasses that supported a wide array of wildlife species. The steep coves were also allowed to grow



CHRIS HENLINE

A hillside at Sandy Mush Game Land reveals a natural regeneration of shortleaf pine, native warm-season grasses and forbs during the second growing season following thinning and prescribed burning.

and flourish, creating habitat that not only benefited wildlife but water quality as well.

Sandy Mush Creek cuts a deep gorge just above its confluence with the French Broad River. This natural feature restricted land use and development in the adjoining areas due to its inaccessibility. However, the remote and rugged features did develop some interest from the local power company, Carolina Power and Light (CP&L).

CP&L, since acquired by Duke Energy, developed plans to construct a dam across Sandy Mush Creek to build a power generating plant and reservoir. In the early 1970s, CP&L started acquiring lands that would fall within this reservoir. A total of 71 tracts were purchased. However, CP&L created a rental program allowing local farmers to lease the pastures and fields until they were ready to construct the power plant. After several years, CP&L decided not to construct the reservoir. This allowed the current farming practices to continue without interruption.

In 2004, CP&L agreed to sell the property to the State of North Carolina. The primary funding source for the purchase came from the Environmental Enhancement Program (EEP) along with help from local land trusts and private donors. The EEP developed its funding through mitigation moneys set aside by the North Carolina Department of Transportation for water quality protection. The

EEP is not equipped to manage large tracts, so the North Carolina Wildlife Resources Commission (NCWRC) became the primary custodian and manager of the property, and Sandy Mush Game Land was established.

Let's Start Managing

Now that NCWRC had this new piece of land, we had to decide how to manage the property. This is an important consideration for any new property because the path chosen impacts the property for years to come. When walking around the property, it was obvious there was a great deal of open land to work with, and since quality early successional habitat is in short supply and critical to so many wildlife species, the Commission decided to focus on this habitat type.

Since flat ground is a limiting factor in the Mountains, the plan was to manage the gentler slopes with agricultural equipment and establish annual food plots and dove fields in these locations. Steeper areas that were open would be transformed into native warm-season grass/forb habitats maintained primarily with mowers, chainsaws and fire. The open pastures consisted of cool-season grasses, primarily fescue. Other pastures were starting to be colonized by thick stands of pioneering tree species, such as yellow poplar and Virginia pine. The first

objective was to remove some of the less-desirable vegetation so that higher-quality habitat could be established.

To start with, we decided to concentrate on a couple of areas dominated by fescue and pioneering tree species. We would spray fescue with herbicide in the fall, hand cut the woody vegetation in early winter and then conduct a prescribed burn in late winter and early spring. This prescription created a clean canvas to establish a quality native warm-season grass/forb habitat.

The herbicide application went well. However, while hand cutting the woody stems, an interesting discovery was made. Intermixed with the thick Virginia pines, shortleaf pines were found, as were soft mast trees such as apple, hawthorn, persimmons and plums. These soft mast clumps as well as the scattered shortleaf pine were left to add food, structure and cover. The surrounding Virginia pines and poplars were then dropped away from our “leave” trees to help protect them from fire. Our efforts paid off with most of the shortleaf and soft mast trees surviving the fire.

After green up, we found that fescue was not coming back to life. Instead, a variety of native grasses and forbs was starting to emerge. We decided not to apply more herbicide and just see what plants developed. By the end of summer, a diverse sea of native grasses and forbs had established itself that was more desirable and easier to maintain than anything that could have been planted. Over the next several years, the same prescription was applied to different areas across the game land, with similar results.

These initial management decisions have shaped the current management goals for Sandy Mush Game Land. By being selective with the chainsaw and waiting to see what the seed bank had to offer, we now have several natural savanna units consisting of a native shortleaf pine overstory with a bluestem/indian grass/forb understory. By avoiding a set burning rotation, we have achieved a variety of stages of early successional habitat that is just as important as the grass/forb stages. These shrub/scrub components provide excellent structure for an array of wildlife.

The proof of our success is easy to see. Just talk to the neighbors, hunters and other users of the game land. You can hear quail whistling throughout the summer, or you

might flush a covey in the fall. I even found a quail nest this summer in an area that was burned just four months earlier. The neighbors are seeing more deer and turkeys than ever while hunters are having successful trips in the field. I even had a rabbit hunter tell me that hunting rabbits has become harder just because rabbits have so many places to hide. Commission staff and local birders have compiled a bird checklist with over 150 different bird species that have been found on the game land, and most of these depend on early successional habitat. All these indicators seem to point to the fact that we are doing something right.

Spread the Word

The location of Sandy Mush Game Land is convenient to the public. With a lot of people passing by and looking at the game land, we are constantly getting questions about why we are allowing the area to grow up and become “ugly” instead of promoting the pretty green pastures they are used to seeing. The natural habitats on Sandy Mush Game Land are in the minority across the landscape, and there is a misunderstanding of how this habitat can be beneficial to wildlife.

Sandy Mush is a demonstration area to local farmers as well as people just interested in wildlife, showing what quality early successional habitat looks like and how beneficial it can be. We have shown that these management techniques can be simple, inexpensive and very effective. However, there are also some complications from being close to the public that can affect our management options. Being in a “suburban” landscape creates smoke-sensitive areas that we must consider and avoid when conducting prescribed burns. Some areas have very specific requirements regarding wind direction for smoke management purposes while other areas are just not suitable to burn. However, these areas can be maintained mechanically with beneficial results.

We have had universities, sportsman groups, and land conservancies come out for classes and tours to see how we are able to create this unique habitat. We even had a multi-state workshop for the Shortleaf Pine Initiative come and tour Sandy Mush Game Land to see our shortleaf program and how we are tying that into our wildlife objectives. These educational opportunities are, in a way, as valuable as the habitat itself.

The Issues

There are still challenges to overcome. When the EEP transferred the property to NCWRC, stream buffers were established to protect water quality. Every stream has a buffer that is either 30 or 300 feet wide, depending on the stream's classification. The only management activities allowed inside the buffer areas are prescribed burning and treating invasive species. Around 1,000 acres of the game land falls within these buffer areas. We have several open habitats that are within the buffers, but instead of just allowing them to grow into a random forest, we are planting wildlife-friendly tree species. We have planted shortleaf in areas that we burn and soft and hard mast trees in other areas.

Exotic invasive species have turned into a real challenge. Oriental bittersweet, multiflora rose, and sericia lespedeza are the biggest challenges. We are having some success slowing them down in the early successional habitats. However, the invasives seem to have the upper hand within the wooded areas for now. One bright spot with the invasives, especially inside the woods, is that they have created a thick understory habitat in which deer and ruffed grouse seem to be thriving.

The biggest threat is one that we do not have much control over—surrounding land practices. Most of the surrounding farms are being cleared to become as productive as possible, or they are quickly turning into subdivisions. Even though the habitat on the game land is excellent, it is just a small island in a sea of poor habitat. If declining early successional-dependent wildlife species are to thrive, they need places to expand. Unfortunately, their opportunities are very limited.

Early successional habitat is a very important habitat component across the landscape. However, technology and the desire to have more productive and efficient farms has shown how quickly we can lose early successional habitat and the wildlife that depends on it. As land managers, we now have the tools to make technology work for us to reclaim what was lost. Sometimes, a simple, basic approach can be very effective.

Personally, I have found over the years that it is easier to maintain something that is already growing than to try and start from scratch. This concept has turned Sandy Mush Game Land into a shining example of quality early successional habitat. 🌱



Passing the torch through three generations.

CONSERVATION CHRONICLES

Sandhills Area Land Trust Connects Owners with Conservation Opportunities

Written and photographed by Stephanie Wagner, Sandhills Area Land Trust

In today's fast-paced world, it seems that most communities are not as tight knit as they have been in the past. Once common gatherings such as corn shuckings and barn raisings have been lost in most of North Carolina and the Southeast. However, there is a new type of gathering going on in the Sandhills. Neighbors here are not coming together to raise a barn destroyed by fire but are using fire to rebuild an ecosystem.

Over the last couple of years, local landowners have been coming together to help conduct prescribed burns in each other's longleaf pine forests. This is not a new concept: In years past, Sandhills neighbors used to cooperate to make sure the woods were regularly burned. These controlled burns would prevent wildfires, protect homesteads and regenerate the ecosystem. However, this fire culture has been muted by the well-intentioned but misguided efforts of Smokey Bear, urban development and the fragmentation of longleaf on the landscape.

In 2015, the Sandhills Area Land Trust, along with partners, created North Carolina's first Prescribed Burn Association (PBA) to bring this fire culture back to our longleaf pine communities. The unique longleaf pine forest ecosystem is important for the economic, cultural and environmental future of the Sandhills region. The historic longleaf pine ecosystem once spanned over a range of 90 million acres, from Virginia to Texas. Today, less than 5 percent remains, and many of these acres are suffering from poor management.

A Southeastern-wide conservation effort is underway to restore this once-great forest back to its historic range, and the Sandhills is a critical part of this effort. There have been major successes in restoring the longleaf ecosystem on public lands as evidenced by some of our game lands and state parks. However, over half of the longleaf acreage in the United States is on private lands.

Privately-held lands represent both the greatest challenge and greatest opportunity in restoring this valued ecosystem.



Focusing On Private Property

Private landowners have the potential to bring back the longleaf forest, and we need to equip them with the right tool: prescribed fire. Longleaf pine trees have evolved to not only tolerate fire, but depend on it. Throughout history, the longleaf forest was maintained by lightning-initiated fires as well as Native Americans and settlers who relied on fire to keep forests open for hunting, turpentine production and cattle grazing. Forest ecologists and public land managers promote and utilize prescribed burning for forest health, but private landowners have been less inclined.

Most private landowners have excluded the use of prescribed fires on their land because of many valid concerns, including potential liability, lack of experience and assistance, and limited equipment availability. Additionally, landowners must adhere to smoke management guidelines to limit negative impacts to their neighbors and community.



The N.C. Sandhills Prescribed Burn Association (PBA) was created to address these barriers and encourage private landowners to strengthen their longleaf pine woodlands for a higher return on conservation, wildlife, and production value. The PBA is a precedent-setting effort that educates landowners to strengthen relationships and increase comfort, capacity and confidence to safely conduct prescribed burns on private lands. Over the last two years of this initiative, the PBA has served as the catalyst for hundreds of private landowners to attend field days, take part in workshops and participate in prescribed burns.

The PBA has also strengthened collaboration among conservation partners. Staff from the N.C. Wildlife Resources Commission, who provide technical advice to landowners across the state, often develop prescribed burning into habitat management plans for private landowners in the Sandhills. The National Wild Turkey Federation donated a burn trailer filled with equipment for landowners to use. The North Carolina Forest Service has scheduled additional Certified Burner Courses to meet increased demand from private landowners. The PBA has provided opportunities for course attendees to conduct the required certification burns. To date, the PBA has assisted 12 private landowners with prescribed burns, and 10 of these landowners have become certified burners.

North Carolina's population is one of the fastest growing in the nation according to the most recent Census Bureau estimates, and the PBA is one initiative that can address threats to private woodlands. Whether a landowner wishes to enhance economic production from their forests or develop a traditional longleaf ecosystem, the PBA is available to help landowners pursue longleaf land stewardship for future wealth generation, family heritage and unique plant communities/wildlife habitat.

Landowner Spotlight: The Dean Family

Most of the private landowners in North Carolina meet a similar profile: they are in their 50s, juggling jobs and family, own less than 100 acres of land, and do not pursue forestry for full-time employment. The N.C. Sandhills PBA is designed to connect these landowners with the resources they can use to achieve their longleaf management goals. This strategy includes short, evening workshops,

a retired forester mentorship program and providing ample opportunities for landowners to participate in prescribed burns. The Dean family is a three-generation family that has been involved with the PBA since its inception. Leslie Thiel, daughter of Thomas Dean, volunteered to be on the steering committee. Here she provides an overview of how this initiative has helped her family:

My dad grew up here in Moore County and bought the portions of land being passed on to other heirs. My dad was lucky to retire at 55 and come back to the home place which had been in agricultural use for many years. He got started in longleaf based on recommendations from timber consultants. However, he also wanted to get the land back to its original state of longleaf habitat. He raked pine straw annually and did the occasional burn, but that is not what restores an ecosystem.

As my parents aged and my husband was due to retire, I wanted to come and help with the land they owned. I have always been a gardener, and an aptitude test I took many years ago said I should be a farmer. So, tree farmer fit the bill. After moving here, my concern was the annual raking which damaged native groundcover, removed critical nutrients and stressed the longleaf themselves. After taking a couple of tree farm/longleaf seminars and hearing about the rotational recommendation for raking every third year and burning during the resting period, I tried burning on my own a couple of times, unsuccessfully.

I then took the NC Prescribed Burner class and learned quite a bit, but hands-on is the real lesson. This is where the PBA comes into play: getting that hands-on experience and certification. The PBA has been an essential program for local Sandhills landowners to access experts and peers when needed. Recently, we were introduced to a new pine straw raking technique over wiregrass. We continue to strengthen our longleaf stewardship and learn new ways to balance production and conservation.

If you are interested in becoming involved in the Sandhills PBA, or are interested in starting a PBA in your community, please contact program coordinator Jesse Wimberly at jesse@sandhillslandtrust.org or (910) 603-1052. For more information on managing your property to enhance wildlife habitat, please contact the appropriate NCWRC Private Lands staff directory on page 64. 🌲

One Year with a Wildlife Biologist

By Jason Smith, technical assistance biologist,
North Carolina Wildlife Resources Commission

As a technical assistance biologist, my job is to help farmers and landowners establish native warm season grasses (NWSG) for forage and wildlife habitat in the western Piedmont and Mountains. I also assist landowners with other wildlife management techniques focusing on fallow field management, timber stand improvements for wildlife and tax deferral plans to conserve qualifying land under the Wildlife Conservation Land Program (WCLP).

After earning my degree in Fisheries and Wildlife Sciences, I started my career with the North Carolina Wildlife Resources Commission (NCWRC) as a wildlife technician in the Mountains and Piedmont. As a wildlife technician, I worked with others in a crew that managed Commission game lands to provide optimum habitat for wildlife and offer quality hunting for sportsmen. Game land management practices included prescribed burning, timber stand improvements for wildlife, fallow and NWSG field management and dove field and food plot planting. We also help conduct wildlife surveys to monitor populations.

After several years of working as a wildlife technician, I had the opportunity to begin working as a technical assistance biologist in the western Piedmont and Mountains. Working as a biologist has allowed me to apply knowledge gained from college and managing game lands to help landowners implement similar practices on their own property.

Most of my time is spent working with the Commission's Cooperative Upland habitat Restoration and Enhancement program (CURE) to help cattle farmers and other landowners convert fields and pastures to native warm-season grasses. In 2001, CURE began in the western Piedmont, and habitat enhancement projects took place on private lands. Practices include thinning and burning, establishing field borders around crop fields, and converting fescue pastures and hayfields to NWSG. After biologists evaluated all habitat enhancement projects in the western North Carolina focal area, they con-

cluded that NWSG used for the dual purpose of cattle forage and wildlife habitat was a critical wildlife habitat management opportunity in the area. Currently, the CURE program provides technical assistance and equipment to farmers and landowners. Equipment includes herbicide sprayers, no-till drills, and prescribed fire equipment used to establish and manage NWSG fields.

These grasses historically grew in North Carolina prior to European settlement with peak production occurring during the summer months. Common NWSG include big bluestem, little bluestem, indiangrass, switchgrass, and Eastern gama grass. These are perennial bunch grasses that provide cover for wildlife due to their growth structure which creates open space on the ground and canopy cover above. This structure provides safety for ground nesting birds such as bobwhite quail and wild turkeys, and allows safe movement for small mammals like rabbits.

NWSG structure also provides bare ground for beneficial forbs to establish. When properly managed, NWSG can provide multi-season habitat for many wildlife species. NWSG are equally important for livestock because they are so well adapted to our soils and climate and have excellent drought tolerance. These grasses also have high yields that require minimal fertilizer and lime inputs. When managed appropriately, these grasses provide excellent forage for cattle during the summer months and may also be cut for hay to provide excellent feed for cattle during the winter. This fills the summer forage gap and is a great compliment to cool season forage systems.

Busy Seasons

My daily activities throughout the year revolve around the growing season for NWSG. During January and February, I generally spend most of my time preparing work plans for farmers and landowners to use as a guide for upcoming field preparation and planting. This often involves going onto

the property and mapping all fields that will be planted. Aside from working individually with landowners, I also promote NWSG by setting up booths at local trade shows and guest speaking for groups such as local cattleman's associations. Once March begins, it is time to provide landowners with prescribed fire equipment such as drip torches and water tanks. I also provide important information concerning when to burn, how to burn and who to contact before you burn. Prescribed fire is an important tool to help manage NWSG and other habitats for wildlife.

Generally, burning season is wrapped up by the beginning of April. Early April is time to switch gears and get the herbicide sprayers up and running. Before planting NWSG, it is important for landowners to implement an early herbicide (glyphosate) application to kill off any existing cool season vegetation that was prepped the previous year. Three weeks after the herbicide application the entire field should be dead. Late April through early May is the optimum time for planting, but first I must get the sprayers back around to the landowners and apply the pre-emergence herbicide (imazipic). This herbicide application is important because it will limit the amount of competition from weeds that may stress NWSG. Once the herbicide is applied, I will have the drill set up and calibrated so that the landowner can immediately start planting. Most farmers should be finished planting by the first of June.

During the months of June through September, I will meet with farmers who are grazing and haying NWSG to provide guidance regarding when to graze or cut hay and what height to graze or cut hay while ensuring stand productivity and longevity. Also, during this time, I provide landowners with equipment for spraying fields that are going to be planted the following spring. This spraying will reduce competition from nuisance summer grasses. Once October begins, days start getting shorter and the temperature begins dropping, which allows cool season grasses to grow. I must haul the



NWSG growth structure provides security for many species of wildlife ranging from Northern bobwhite quail to white-tailed deer.

JOHN ISENHOUR/NCWRC

spraying equipment back around to the farms so the landowner can kill off any cool season grasses and further reduce competition that will stress NWSG seedlings planted the following spring.

After November, I am finished with all equipment and must prepare for winter storage. December is the time to start back NWSG outreach at trade shows and events to gain landowner interest. Generally, with adequate rainfall, the result will be a successful field of NWSG that will provide benefit to cattle and wildlife.

The CURE program in western North Carolina has worked with over 65 land-

owners and converted nearly 1,000 acres to NWSG. This program continues to expand, and currently there are more than 12 farmers and nearly 160 acres planned for the upcoming planting year.

While my job is focused on the western Piedmont and foothills region of the state, our Agency has other technical assistance biologists around the state who work on different habitat types. No matter your location in North Carolina, if you want wildlife habitat management advice for your property, contact your local district biologist or technical assistance biologist listed in our Private Lands staff directory on page 64. 🐾



BENJY STROPE/NCWRC

Wildlife Commission staff disking a fallow area to improve wildlife habitat.

DISKING 101

By Benjy Strobe, Southeastern focal area management biologist, North Carolina Wildlife Resources Commission

Many people are familiar with the use of disking as a conventional farming method. In farming circles, too much disking can have negative impacts on soil quality, soil health, erosion and on leftover cover and food for wildlife species. For these reasons, wildlife often benefits from no-till practices. However, fewer people know that a disk, when used carefully, can improve and manage wildlife habitats. Disking can be used to maintain natural vegetation and keep it from converting into trees. These areas often include firebreaks, fallow field areas and field borders.

Disking wildlife areas maintains an open area beneficial to ground-dwelling wildlife. Waiting to disk until late winter just prior to spring green-up will maximize winter cover, and maintain cover and habitat throughout most of the year. Disking in November can promote the growth of high quality brood cover for birds the following spring by encouraging annual plants, such as ragweed and partridge pea. Light disking (one or two passes) is used to promote herbaceous cover for brood habitat. Light disking should expose soil on about half of the ground, while heavy disking is used to control tree saplings or to remove all the vegetation.

Disking should be done on a rotation, so that some early successional habitat is in place year-round. This is accomplished by disking half to a third of each block depending on whether you are using a two or three-year rotation. Having a good management plan will assist you in keeping track of what needs disked and when.

220 acres are being managed with the help of the Forest Landbird Legacy Program funding. Their forests are being managed for oak regeneration in a way that considers bird conservation and includes prescribed fire and high canopy retention. To the credit of their forester who experimented with canopy retention levels, the oak regeneration is higher here than other sites with higher ground-level light exposure.

Back at On the Windfall, the introduction of 20 new snags was the prescription. Awaiting the end of summer's nesting season, it was a crisp, clear autumn morning when five of us loaded the gear we needed to enhance the bird conservation components of their forest. As we worked, the Carolina chickadees, white-breasted nuthatches and downy woodpeckers seemed to sing songs of approval. By spring, there will be new places for birds to nest and find food on Carole and George's mountain farm.

Cost-share provided directly through Audubon North Carolina eliminates the headaches frequently involved in federal and state funding options. Assistance may cover prescribed fire (by certified burner),

herbicide application and chainsaw or heavy equipment operation. Landowners stand to gain better birdwatching on their land, recognition by management professionals and neighbors (a sign is gifted to display to agreement holders), as well the priceless investment to family land legacy for generations to come.

Foresters and land managers looking for an opportunity to be trained in bird-friendly forestry are in luck. Audubon offers regular training sessions. Nearly 200 foresters to date have been trained in forest bird conservation. If you are hiring a consulting forester, ask if they have been trained as a "Forester for the Birds."

The Forest Landbird Legacy Program and associated funding assistance require a 10-year commitment to an agreement enlisting at least 50 acres of mature hardwoods (50 years old or older). Join with your neighbors to elevate your impact. Check out nc.audubon.org for ideas or contact Aimee Tomcho at 828-419-0890 or atomcho@audubon.org. Your participation in this program can help ensure that there will always be "A Place for Birds." 🌿

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**[ncwildlife.org/
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Issues from 1996 through fall 2017 have been posted on the site, and we plan to continue posting issues in the future.

While visiting the website, be sure to sign up for e-mail notices to be sent to you each time a new issue is available.



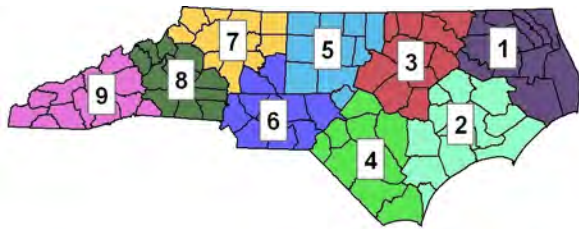
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