VOLUME 7, ISSUE 2 SPRING ISSUE — APRIL 2022

N.C. Forest Stewardship News

N.C. Forest Stewardship Program Newsletter
N.C. Forest Service — NCDA & CS

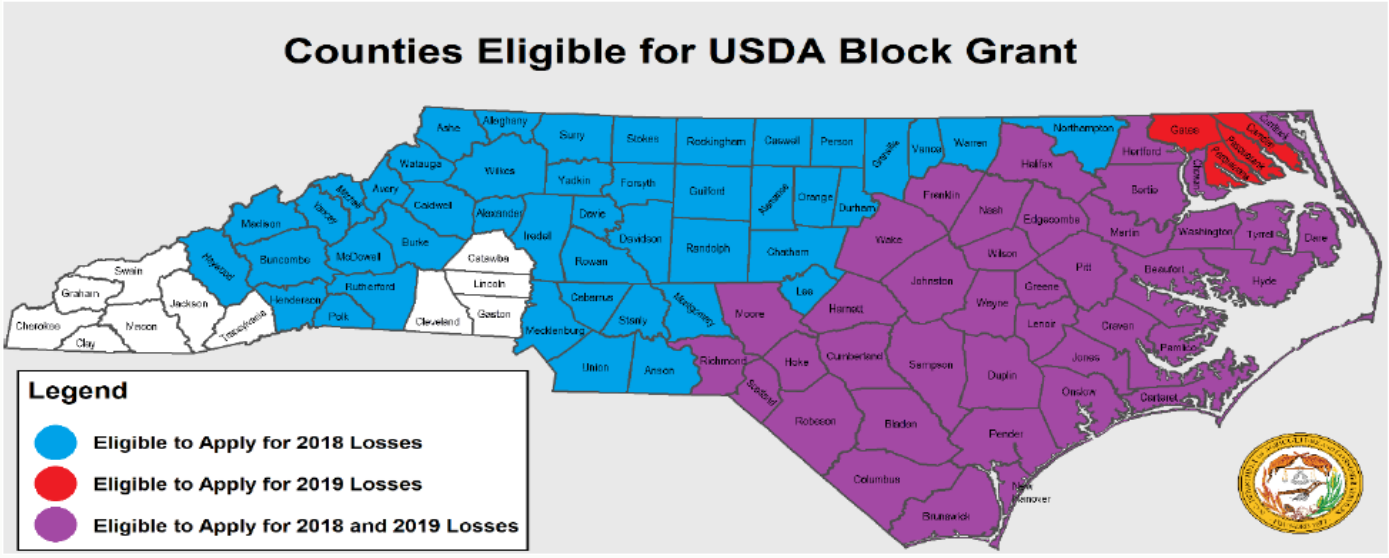
Cost-Share Now Available for Comprehensive Management Plans

By Jonathan Murray, Forest Stewardship Coordinator, NCFS

The N.C. Forest Service (NCFS) obtained a USDA Block Grant as part of the 2021 North Carolina Agricultural Disaster Recovery Program. A portion of this grant is designated for woodland recovery assistance offering time-limited cost share funding. Forest landowners interested in having a comprehensive management plan (Forest Stewardship, N.C. Tree Farm, and Forest Management Plans) developed or updated, may be eligible for cost share assistance.

The Agricultural Disaster Recovery Program—Woodland Recovery Assistance (ADRP-WRA) offers two options for landowners to enroll for cost share assistance. Landowners may choose to have their management plan prepared by the N.C. Forest Service, or work with a Natural Resource Professional (ex. Consulting Forester).

Approximately $2 million was allocated for the ADRP-WRA program. Funding will expire on December 31, 2023.



The ADRP-WRA program is administered by the N.C. Forest Service and provides funding to eligible landowners in 89 counties impacted by Hurricanes Florence, Michael, and Dorian. The 11 counties that are **not** eligible include: Catawba, Cherokee, Clay, Cleveland, Gaston, Graham, Jackson, Lincoln, Macon, Swain, and Transylvania.

For more information about ADRP-WRA please contact your local NCFS County Office (https://www.ncforestservice.gov/contacts/contacts_main.htm). Additional information about ADRP-WRA can also be found here https://www.ncforestservice.gov/managing_your_forest/woodlandrecovery.html.

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All Creatures Great and Small—Threatened and Endangered Species

By Tom Gerow, Water Resource Staff Forester, NCFS

Forest stewardship includes all of the natural resources, including wildlife habitat conservation. While most people think of deer, turkey, quail or trout, there are hundreds of hidden animals living in the streams that flow through forests. Those aquatic animals need:

- Clean water, free of sediment or silt.
- Unobstructed stream flow.
- Stable, consistent water temperatures, without spikes in heat.
- Stable streambanks and stream bottoms.

North Carolina has many plant and animal species that are listed as either Threatened or Endangered (generally called 'T&E species'), under the federal Endangered Species Act (ESA). Many of these animals live in streams and the expectation is that more aquatic animals in N.C. will be added to the list of protected species. The list of T&E species in N.C. is available on the U.S. Fish and Wildlife Service (USF&WS) website: www.fws.gov/raleigh/es_tes.html.

Since 2018, the aquatic animals listed below have been added to the list of federally protected species:

Year Listed	Species Name	Type of Animal	Federal Status	Critical Habitat Designated?	4(d) Rule in Effect?
2018	Yellow Lance	mussel	Threatened	Yes	Pending
2021	Atlantic Pigtoe	mussel	Threatened	Yes	Yes
2021	Carolina Madtom	catfish	Endangered	Yes	n/a
2021	Neuse River Waterdog	salamander	Threatened	Yes	Yes

Many of these aquatic animals are known to exist in streams across much of the Neuse River basin and Tar-Pamlico River basin.

Preharvest Planning Cost Share Assistance

In an effort to support habitat needs for rare aquatic species within the Neuse River and the Tar– Pamlico River basins, preharvest planning cost share assistance is available to help landowners. The USF&WS partnered with the N.C. Forest Service to establish a time-limited pilot project to provide cost share assistance to forest landowners in these seven eligible counties: Edgecombe, Franklin, Granville, Halifax, Nash, Vance, and Warren (see map).

Landowners may receive reimbursement for obtaining a qualifying preharvest plan from a trained professional. To learn more about this opportunity visit the NCFS website: https://www.ncforestservice.gov/healthy_waters/costshare.htm

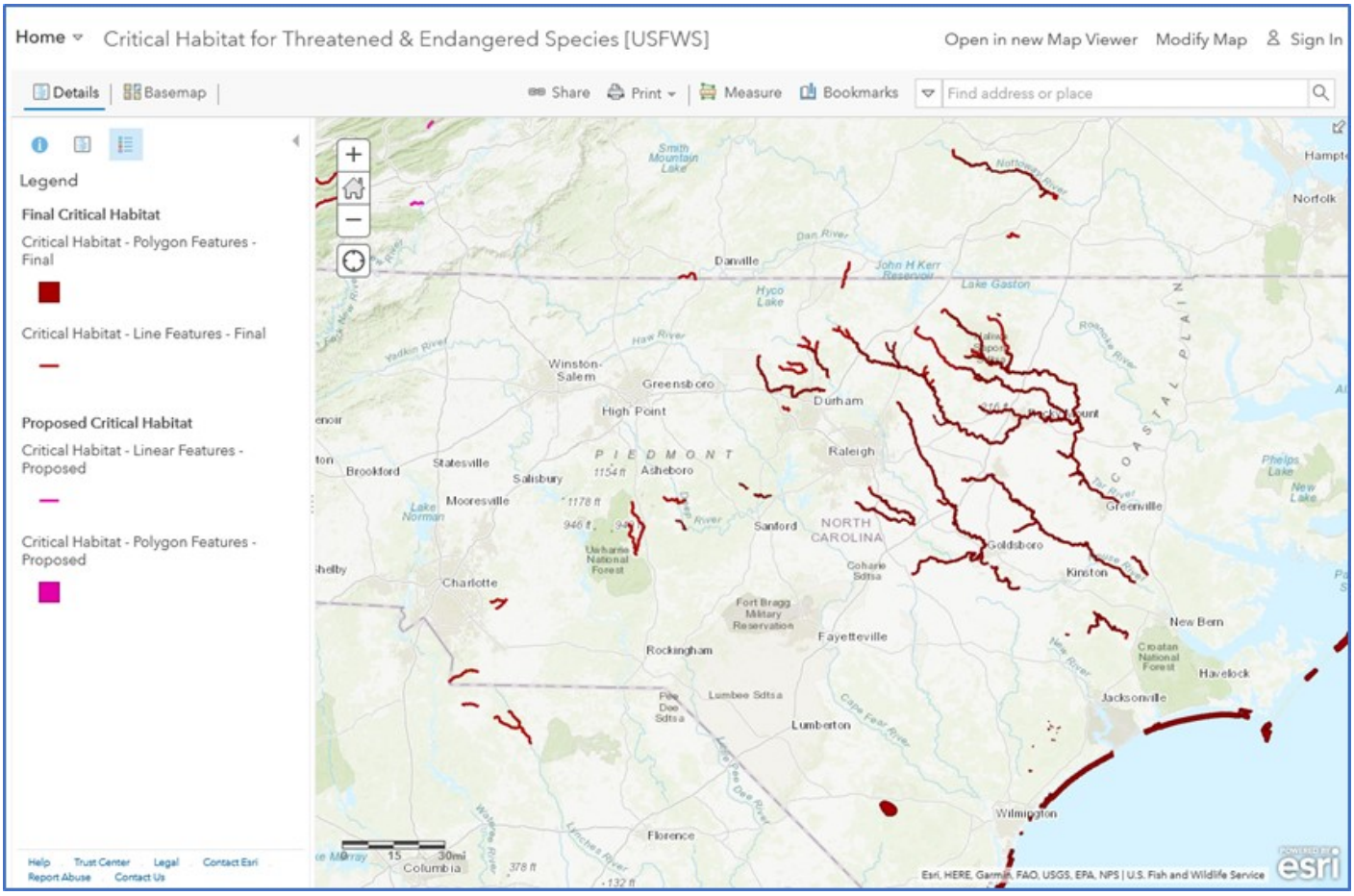
Critical Habitat

In addition to being federally protected, some land areas, or a stream have been designated as "critical habitat" by federal rule. This habitat is vital for the survival of that species.

For aquatic species, this usually includes segments of streams and rivers. It's a good idea to identify whether your forestry activity is next to, or nearby, a critical habitat. Exercise caution to comply with N.C. forest practice guidelines (FPG), riparian buffer rules (where applicable), and fully implement appropriate forestry best management practices (BMP).

The USF&WS maintains an online map displaying areas where critical habitat has been established is currently being proposed. To view the online mapping tool, follow these steps:

1. Go to *ecos.fws.gov.*
2. Click the bullet point "Critical Habitat Report". This takes you to a new website.
3. On this new website, click the bullet point "**online mapper**". This takes you to a new website. (Note: ArcGIS shape files are also available to download).
4. On this map viewer tool, you can zoom-in to the map or search by address.



This screenshot is from the USF&WS map viewer, showing streams and areas that are either proposed or have "final" designation as Critical Habitat.

Who Will Watch the Home Place?

By John Isenhour, Wildlife Conservation Biologist, District 6, NCWRC

Music is meant to invoke emotion in the listener. Some songs raise our sprits with a catchy tune, some entertain us with lyrics that make us smile, while others are meant to reach into our hearts or teach a lesson. Most of us have a handful of songs that stir our interbeing or seem to describe who we are. For me, one of these songs is "Who Will Watch the Home Place" written by Ms. Kate Long. I first heard Ms. Laurie Lewis sing this song in the early or mid-1990's, likely on the "Pine Cone Bluegrass Show", while attending NC State University. The words of this song have haunted me from that very moment and resonate in my heart each time I visit my family's "Home Place". Undoubtedly, many folks related to this song as it was awarded the International Bluegrass Music Association song of the Year in 1994.

If you've ever been emotionally tied to a piece of land and never heard this song, it is worth an internet search and possibly a download. The chorus will likely tug at your heart, give you chills or leave a tear in your eye. I can think of no better way to describe the feelings involved with loving a piece of land which has an uncertain future. During my career as a private land

"Who will watch the home place

Who will tend my hearts dear space

Who will fill my empty place

When I am gone from here"

biologist with the NC Wildlife Resources Commission, I've had many opportunities to assist landowners who successfully managed their property to enhance wildlife habitat and address other natural resource objectives. Many of these folks have had a deep tie to their land and the family members who worked the land before them. Most of these landowners have well developed plans for what will happen to the land, "when they are gone from here" and who will watch their home place. Over the last several years, situations have arisen with my family which have brought questions concerning the family's property to the front burner. The realization that caring for a piece of land is "not always enough" is the basis for this article.

So, I will not mention native grasses, prescribed burning or forest management in this article, but rather focus on land legacy. In the rapidly changing landscape of North Carolina, planning for land transfer is vital for those families who want to maintain ownership of rural properties. These tracts in turn are critical for natural resource conservation goals ranging from wildlife habitat enhancement to sustainable forest production.

My family's property is an example of how challenging maintaining family ownership of rural property can be, and how critical planning is to keep rural land rural. While our story is unique, it is not uncommon to many families and places in North Carolina. My family has been on "the home place" since 1919. Though I don't have the formal documents to prove so, the description my great uncle provided leads me to believe we were sharecroppers or tenant farmers for many years. My great-grandfather raised a family on the property he "worked" with his sons. My grandfather married a young lady from a neighboring farm, and they raised a family on the property as well. My grandparents borrowed the money to buy the 60 acres at a timber company auction in 1960. In the early 2000's with the passing of my grandmother, the property transferred to my father, aunt and uncle as tenants in common. At my dad's death, his portion of the ownership transferred to my mom.

So here we are - a retired school cafeteria worker, a retired schoolteacher and a retired freight worker- tenants in common ownership of a piece of property valued at no less than half a million dollars. The truest definition of "Land Rich and Cash Poor". Time has marched on, and the years have impacted both the health and the wealth of the aging landowners. The land is one of their primary assets, a non-liquid asset that impacts estate planning and health care assistance qualification.

A prime example that times have changed, and no longer can you count on land simply passing to the next generation. It is imperative that proper steps be taken to protect land assets, ensuring financial health and the ability to pass the land on to the next generation if so desired.

The following information is shared by Dr. Mark Megalos, Emeritus Professor with NC Cooperative Extension. He has over 30 years of experience working with landowners in North Carolina and addressing questions concerning land legacy. Seeking guidance from professionals such as Dr. Megalos, can reduce the stress of land ownership and transition, making the question, "Who will watch the home place" easier to answer.

There are 3 major stumbling blocks to the transition of family property often encountered by Extension Faculty: Getting to agreement, handing over or keeping control and the "numbers" (Figuring out the cost of ownership and an enterprise to sustain the property). It is vital to explore each of these topics individually to evaluate if one, or more, may be the impediment that hinders your forward planning. Once these heady topics are addressed, defining a mechanism for land transfer becomes much simpler, as decisions are narrowed to the ones that fit your unique needs, circumstances, resource profile and wherewithal.

For better understanding, let's look at these "stumbling blocks" more closely:

1) Getting together to discuss financial matters is not a typical occurrence for most families. There is a right way to do it which requires planning, a neutral location and a set of agreed upon rules for the discussion. Proper planning and initial homework by some or most of the parties can ensure that everyone is heard, personal preferences are shared in a welcome environment and that the discussion stays on topic.

2) The passing of ownership and control of land are key discussion points that impact current owners and have definite estate tax, and future valuation implications. It becomes a matter of balancing the current owner's needs and setting up the enterprise for future owner's success. Ownership transition can be either partial, beginning long before the passing of principles and may possibly take the form of shares in an LLC, or complete transition. Many factors may play on this decision including the need of the current owner to "cash in" on the property value. The choices are simpler when there are periodic or annual income streams that can be shared among owners until the full land transfer is complete.

3) Analyzing the Numbers—agreeing on the distribution of the ownership pie is easiest when there are abundant pieces to share. Simply said, passing along property is easiest when the needs of current owners can be satisfied from the land. Annual rents or other income generated by the property can help to defray the legal or advisory costs of planning an estate transition. When land is a cost rather than revenue source, outside funds must be found to keep it. Success in ownership transition may require a life insurance policy, partial sale of property or an endowed maintenance account to ensure ownership through subsequent generations.

As one might imagine there are several potential solutions. The ones included here are oversimplification for the purposes of this article but are based on years of Cooperative Extension experience educating landowners and others to the subtleties of estate planning when farm and forests are involved. No option is perfect or mandated and each option is unique to the property, family, location and situation. The key is to begin talking and imagine what a future ownership might look like while not forcing the decision making to a future time where options become limited and liquidation is potentially the only viable solution.

A final piece of advice: anticipate obstacles that may disrupt a perfect estate plan. While technically referred to as "unforeseen occurrences", more simply they are the things that might "force your hand". Beware of the 3 Big D's: Divorce, Death, Disability. An estate plan that accounts for these potential disturbances is likely to stand the test of time.

Mark's advice highlights the clash between emotions and the realities of land legacy. Many factors will come in to play in most land transition situations, however as stated above it must start with a conversation. As with any emotionally charged topic, some of these conversations will be difficult. Tough decisions and sacrifices will likely be required and in most instances a compromise between involved parties will be necessary. Whether you own 5 acres or 5,000 acres, if you bought your property or inherited it, a quote attributed to Benjamin Franklin sums up a hard truth concerning land transition, "If you fail to plan, you are planning to fail!" Address this head on, as none of us know when we'll "be gone from here". Discuss how to "tend your heart's dear space" to ensure it meets your present and future needs and wishes. And understand that how we plan today will have a huge impact on "Who will watch the home place" in the future.

These online resources can provide additional information to assist with land legacy and transition planning.
North Carolina Cooperative Extension:
https://content.ces.ncsu.edu/conserving-working-lands-a-land-legacy-workbook-with-tools-and-resources-to-guide-your-conservation

John Isenhour is currently a Wildlife Conservation Biologist with the NC Wildlife Resources Commission. He can be reached at john.isenhour@ncwildlife.org or 704-213-4825.

Dr. Mark Megalos is currently the Executive Director of the National Woodland Owners Association. He can be reached at execdirector@nationalwoodlands.org or 703-255-2700.

Above: The author's grandparents, Hubert and Ruth Isnehour, pose for a family photo with the author's father, Robert (far left).

Fungal Friends & Bacterial Buddies: Soil Microbes Promote Healthy Forests

By Lawrence Long, Forest Health Monitoring Coordinator, NCFS

Forestry professionals are well-aware of the negative impacts of fungi and bacteria. Many species are pathogenic, meaning they cause diseases that can blight individual trees or entire stands. Those diseases may cause slowed growth, poor growth form, or even mortality. However, some fungi and bacteria are integral for healthy forest ecosystems. In fact, they are important for nearly all plants and not just trees!

Nutrients such as phosphorus and nitrogen are critical to every aspect of a plant's biology, including photosynthesis, growth, and reproduction. But plants are not particularly adept at extracting these nutrients from soil on their own. Instead, nearly all hardwood and softwood trees rely on microbes such as fungi and bacteria to obtain their nutrients from soil. Soil microbes supply trees with critical nutrients that they would not otherwise be able to obtain in quantities sufficient for normal growth and development.

But it is not just a one-way street. In return for phosphorus and nitrogen, trees supply their microbes with another essential nutrient, carbon. The end product of photosynthesis is carbohydrate, so plants have a renewable source of carbon to share with soil microbes that are not good at synthesizing it on their own. By sharing their carbon, trees support the growth of fungi and bacteria, near and even inside of their roots. Effectively, trees trade carbon for phosphorus and nitrogen. The relationship between trees and their microbes is a specific form of symbioses called a mutualism as both organisms benefit.

Phosphorus can be a limiting nutrient because most of it is locked up in soil and sediments where it exists in a form that is not accessible by plants. Fungi are particularly good at mobilizing soil-bound phosphorus and decomposing organic matter which releases nitrogen into the soil. Moreover, some types of soil dwelling bacteria can convert atmospheric nitrogen into a form that is available for use by plants.

Plants increase their access to soil-bound nutrients by forming linkages, called mycorrhizae, between their roots and fungal filaments. There are two types of mycorrhizal linkages. Ectomycorrhiza are fungal filaments that form a sheath which surrounds the tip of the root. Some of the fungal filaments even surround the individual cells in the root tip. Fungi and root cells can then exchange their nutrients across that shared interface. Endomycorrhiza are the other type of linkage. The fungal filaments in this association do not form a sheath that envelops the root but instead penetrate directly into individual root cells and form a highly branched structure called an arbuscule inside it, across which nutrients are exchanged. Either way, these mycorrhizal associations increase the surface area across which nutrient exchange and even water uptake can take place. So not only do fungi convert nitrogen and phosphorus into forms that are useable by trees, but they also enhance its uptake. There is even evidence that trees with robust mycorrhizal associations are less susceptible to infections by bad bacteria and fungi!.

Ectomycorrhizal sheath surrounding root tips.

Image credit: Nilsson et al. 2005, https://creativecommons.org/licenses/by/2.5/

Nitrogen is considered the primary limiting nutrient in forest ecosystems, meaning that its abundance influences tree growth regardless of how much of the other nutrients may still be available after it has run out. It may seem counterintuitive that nitrogen could be so limiting given that it makes up nearly 80% of earth's atmosphere. However, plants and most animals cannot utilize nitrogen gas. Only certain bacteria can convert atmospheric nitrogen into a form that can be used by plants through a process known as nitrogen fixation. These nitrogen-fixing bacteria transform nitrogen gas from the atmosphere into ammonium or nitrate and then release some of it into the soil where it is available for uptake by plants. Most nitrogen-fixing bacteria are free-living in the soil, but when available soil nitrogen is in short supply, some plants form root nodules and entice the bacteria inside using carbohydrate. The only other natural source of nitrogen available to plants comes from the breakdown of dead organic matter by, you guessed it, bacteria and fungi.

Fungal Friends Cont.

There are a few tree species in North Carolina that form nitrogen-fixing associations with bacteria. They include black locust, honey locust, alder, eastern redbud, mimosa tree, and princess tree. You might have noticed that this list is made up of mostly weedy or even invasive tree species. You are correct. Invasive and weedy species tend to thrive in disturbed areas. Soil disturbance can disrupt the extensive belowground fungal network that other, more desirable tree species depend on and can pave the way for these opportunistic invaders. These species are successful, at least in part, due to their stable supply of nitrogen.

Both mycorrhizal and bacterial associations are costly. They consume somewhere between 5% and 25% of total carbohydrate production. But plants do have some control over how much of their carbon they share. Trees can influence how many fungal filaments are allowed to penetrate between, or inside of their root cells. They can moderate how permeable their roots are for releasing carbon into the soil where nitrogen-fixing bacteria can access it.

Nodule of the nitrogen-fixing bacteria attached to the roots of an alder. Image credit: Whitney Cranshaw, Colorado State University, Bugwood.org

When nitrogen and phosphorus are readily available, such as in agricultural or garden settings, these relationships are less common. In natural settings like forest ecosystems, competition for soil nutrients is high and symbiotic mutualisms are necessities.

Outstanding Woodland Stewards

August 2021 – March 2022

Sean Maloy	**Caswell County**	**Piedmont Region**
Semora Limited Partnership	**Caswell County**	**Piedmont Region**
Michele & Patrick Riggsbee	**Vance County**	**Piedmont Region**
Charles Powell	**Vance County**	**Piedmont Region**
Kirk Travber	**Currituck County**	**Coastal Region**
The Windigo	**Caldwell County**	**Mountain Region**

From all of us at the N.C. Forest Service, we wish you and your families a safe and enjoyable Spring!