

# BRINGING BACK LONGLEAF



**One tree,**



**One acre,**

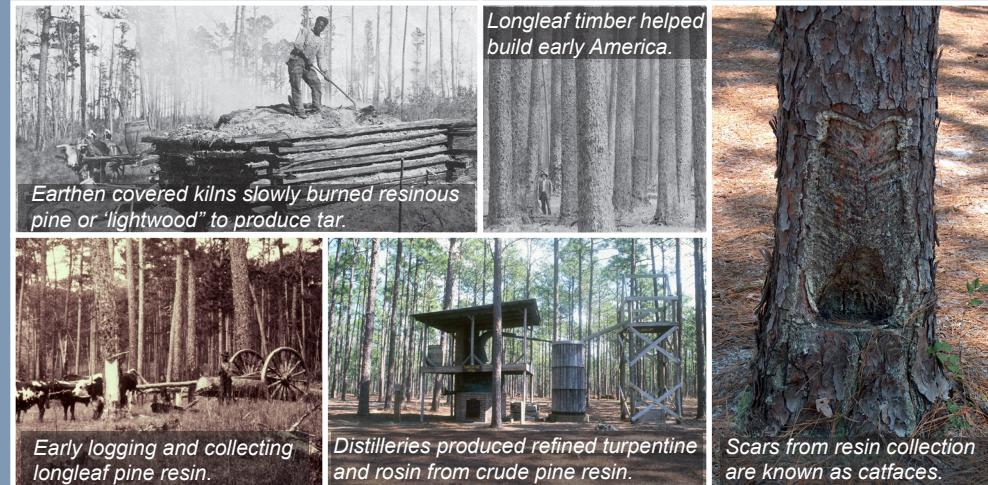


**One forest at a time.**

# Why Longleaf?

## CULTURAL

North Carolina's early economy was shaped by longleaf through its many uses in naval stores.



## ECONOMIC

Longleaf forests continue to provide valuable wood products including timber and pine straw.



## The decline of longleaf...

Once covering over 90 million acres, today longleaf pine is one of the most threatened ecosystems in North America. Reduced to fewer than 3 million acres of its original extent by the late 20<sup>th</sup> century, longleaf forests declined due to:

- Conversion of longleaf pine forests to non-forest uses.
- Exclusion of frequent, low-intensity fires from the forest landscape.
- Replacement of longleaf pine with other tree species.



Longleaf pine forests are highly diverse, fire-adapted ecosystems that historically dominated the Southeastern U.S.

## NATURAL

Longleaf pine habitats are recognized as one of the most diverse ecosystems in the world.



## LEGACY of the LAND

Longleaf values are deeply rooted in North Carolina.



In North Carolina, and across the South, efforts are underway to restore longleaf and the plant communities associated with it.

**Longleaf pine forests provide cultural, natural, and economic values – all on the same acres.**

# Restoring Longleaf

Across the Southeast, efforts to restore longleaf pine have increased longleaf acreage since its peak decline in the 1990s; however, continued management and establishment of longleaf forests is needed to conserve this imperiled landscape and its associated plants and wildlife.

With so few acres of longleaf remaining, planting to establish new stands is key to restore and conserve additional longleaf pine forests.



Young planted longleaf stand.



Natural regeneration of longleaf seedlings.

Forests with existing longleaf can be restored and managed with prescribed fire and thinning to mimic the natural disturbances that helped maintain longleaf forests for thousands of years.

To assist with establishment efforts, longleaf pine seedlings are available from the N.C. Forest Service Claridge Nursery. The Nursery offers genetically improved and natural occurring longleaf pine selections. Improved longleaf pine is grown from seed produced in orchards made up of tested selections that offer superior growth characteristics, including earlier height growth initiation, greater disease resistance, and increased volume growth.



**buyntrees.com**

For a list of NC nurseries offering longleaf seedlings, visit [nclongleaf.org](http://nclongleaf.org)

With most longleaf acres in private ownership, landowners are essential to bringing longleaf back to NC!

## How to establish longleaf pine...

### Pick the right site.



Longleaf pine is native to a variety of sites ranging from wet, poorly drained flatwoods to dry, rocky mountain ridges; however, it is well-suited for dry, infertile soils and does not tolerate saturated soils for long periods. Assess site soil characteristics and consider the feasibility of prescribed fire management for your longleaf stand.

### Prepare the site before planting.



Longleaf pine does not tolerate shade or vegetative competition. Herbicides, mechanical treatments, and burning are all effective methods, often used in combination, to prepare the site for planting. Pastures, agriculture fields, and high quality sites require the most intensive site preparation to control competing vegetation.

### Plant longleaf seedlings.



Plant early using seedlings grown from local seed sources. Hire an experienced longleaf tree planter and keep an eye on planting depth. Plant longleaf container seedlings so the bud is slightly above or at ground level, but never buried.

### Control competition after planting.



Evaluate the need for competition control in March or early April. Seek advice from a Registered Forester or licensed herbicide applicator to determine the correct herbicide and application rate for the targeted vegetation.

### Prescribed burn after establishment.



Burning young longleaf pine helps control unwanted competition and brown-spot needle blight. Despite being the most fire-tolerant of all the southern yellow pines, longleaf pine is susceptible to fire damage during certain stages, see *The Forest Built by Fire* pages.

### Establishment Timeline

#### FEB – APRIL:

- Prepare your restoration plan.
- Pre-order seedlings, if possible; NCFS accepts orders starting July.

#### Pre-Planting

#### OCT – JAN:

- Plant container seedlings as soon as the site has adequate moisture.

#### APRIL – MAY:

- Post-planting seedling checks.
- Use herbicides for competition control as needed.

#### Plant Seedlings

#### JUNE – SEPT:

- Apply chemical site preparation as needed.
- Site prep burn cutover sites.
- Scalp or rip soil in agricultural sites with hardpans, allowing sufficient time for the soil to settle.

#### DEC – MARCH:

- Conduct a prescribed burn.
- After one full growing season, vigorous, longleaf seedlings are resistant to fire.

#### Post Planting

# Beyond Longleaf...

Longleaf pine forests are more than one species of tree. A fully functioning forest supports a variety of plants and wildlife.

## WHY NATIVE UNDERSTORY SPECIES?

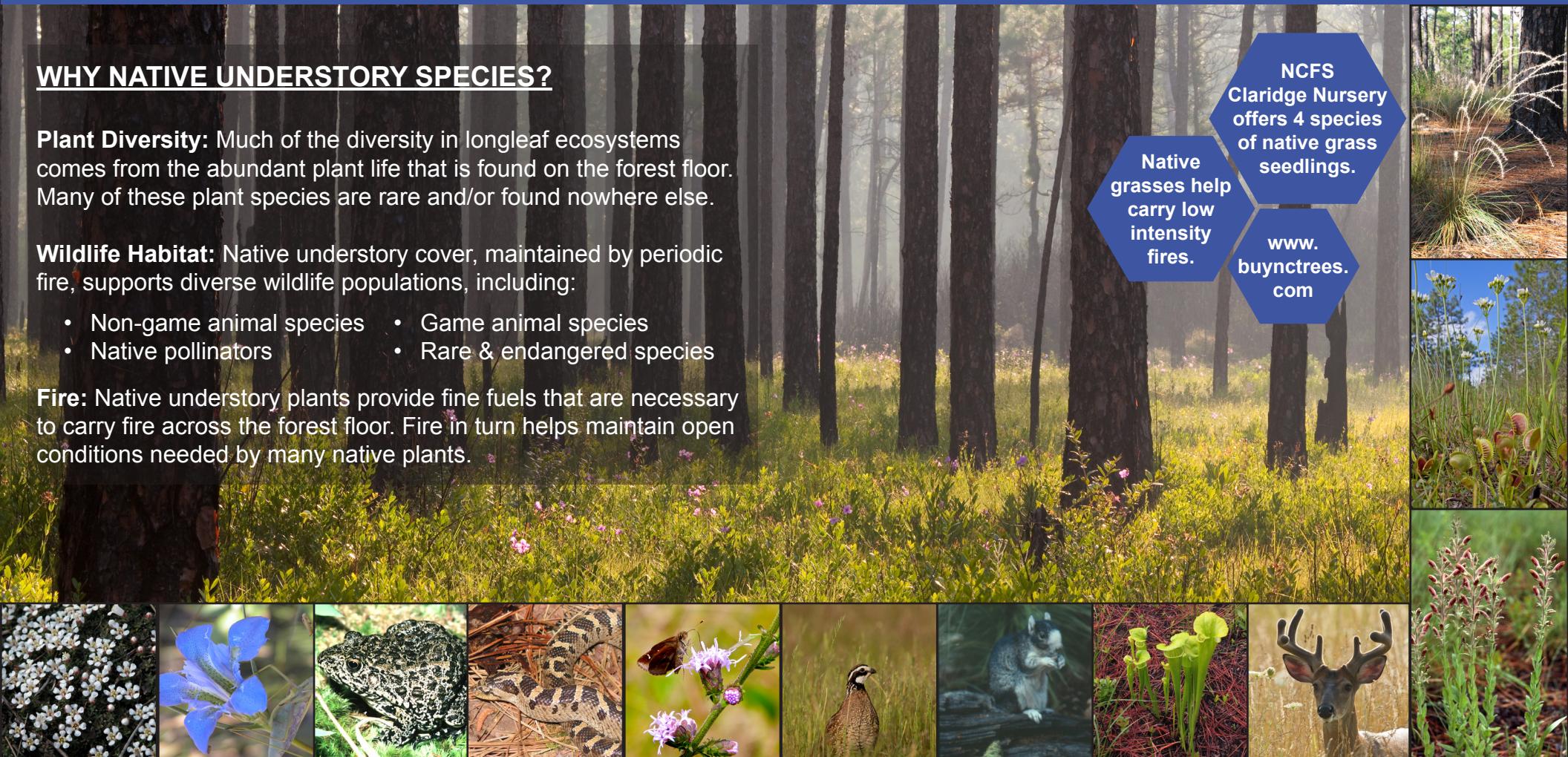
**Plant Diversity:** Much of the diversity in longleaf ecosystems comes from the abundant plant life that is found on the forest floor. Many of these plant species are rare and/or found nowhere else.

**Wildlife Habitat:** Native understory cover, maintained by periodic fire, supports diverse wildlife populations, including:

- Non-game animal species
- Game animal species
- Native pollinators
- Rare & endangered species

**Fire:** Native understory plants provide fine fuels that are necessary to carry fire across the forest floor. Fire in turn helps maintain open conditions needed by many native plants.

NCFS  
Claridge Nursery  
offers 4 species  
of native grass  
seedlings.  
  
Native  
grasses help  
carry low  
intensity  
fires.  
  
[www.buyntrees.com](http://www.buyntrees.com)



## Restoring Understory

Re-introducing prescribed fire to longleaf forests promotes and benefits existing native plants.

On sites where native species are absent, such as former agricultural fields, planting is necessary to restore the understory.

Select plant species based on specific site conditions and management goals. Species should naturally occur in the area and grow in similar habitats.

Control Competition: Use a combination of prescribed fire, herbicides, and mechanical treatments to reduce woody vegetation and remove weedy species prior to planting.

Directly sow seeds or outplant nursery grown seedlings, preferably using local seed sources. Time the planting to take advantage of seasonal rains.

### Develop a Plan

### Prepare the Site

### Plant Understory

### Prescribed Fire

Prepare Seed Bed (if seeding): For optimal germination, expose the soil in forests or cutovers using prescribed fire. If disked former ag fields, compact loose soil prior to seeding.

Regular fire is essential for long-term understory restoration, but newly established plants need 1-2 growing seasons before burning.

# The Forest Built by Fire



Historically, low intensity fires frequently moved through the landscape.

Today these fires are mimicked using prescribed fire.



Immediately after prescribed fire.



Fire reduces competition from hardwoods and other pines, maintaining open conditions necessary for longleaf pines and native plants, while providing food and habitat for wildlife.



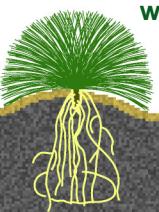
Regrowth two weeks after fire.



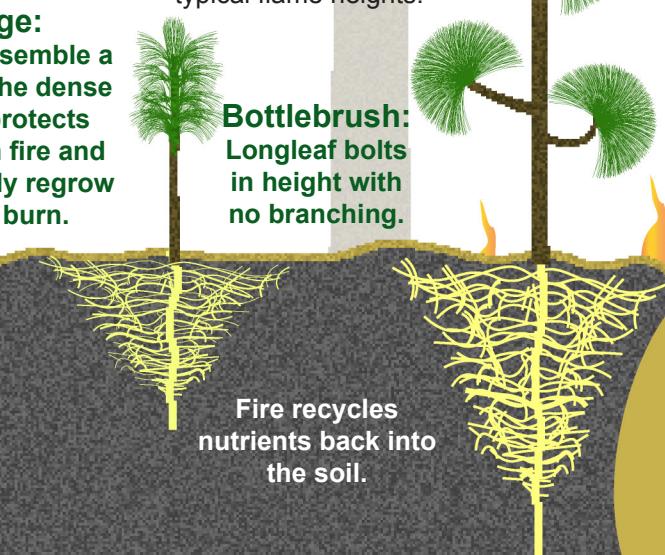
**Seeds:**  
Fire consumes litter on the forest floor, creating optimal conditions for germination.



**Grass Stage:**  
Young longleaf resemble a clump of grass. The dense needle cluster protects the bud from fire and will quickly regrow post burn.



Most grass-stage growth occurs underground as seedlings develop extensive root systems.



Fire recycles nutrients back into the soil.

**Fire resistant, not fire-proof**  
Longleaf is resilient to frequent fires but is vulnerable to fire at certain stages:

- Prior to the grass-stage as new germinants.
- During height growth before bark thickens
- While “candling” in early spring before needles emerge on new growth.



**Sapling:**  
Lateral branches emerge at 6-10 ft in height.

**Mature:**  
Lower pine limbs are pruned by fire, keeping the canopy above most flame heights.

Thick plates of bark protect the inner trunk from fire.

Native understory plants and longleaf needle litter provide fine fuels to carry fire across the forest floor.

# Tips for managing your longleaf

Tips based on “Management Checklist” articles from The Longleaf Alliance’s quarterly magazine *The Longleaf Leader*.

Planting Longleaf

Competition Control

Prescribed Fire

Groundcover

Planting Longleaf

Competition Control

Prescribed Fire

Groundcover

FALL	WINTER
<b>Plant Longleaf</b>	
<b>It's never too early to plant longleaf if:</b> <ul style="list-style-type: none"> <li>The site is prepared</li> <li>There is adequate soil moisture</li> <li>Seedlings are available</li> <li>Planting crew is available</li> </ul>	<b>Keep an eye on planting depth!</b> For containerized longleaf, expose <ul style="list-style-type: none"> <li>Top of the plug on cutover sites.</li> <li>1 inch of the plug above the soil surface on scalped sites.</li> </ul>
<b>Chemical Site Prep</b>	<b>Inspect Longleaf Plantings</b>
<ul style="list-style-type: none"> <li>After harvest, ensure adequate resprouting before applying fall herbicide. If in doubt, wait a year.</li> <li>Apply foliar active herbicides to pasture grasses before first frost (e.g., glyphosate/Roundup®/Accord®).</li> </ul>	<b>Evaluate one year survival in young stands:</b> <ul style="list-style-type: none"> <li>Determine adequate stocking.</li> <li>Wait until after the first frost, so the grass stage longleaf is easily seen.</li> </ul>
<ul style="list-style-type: none"> <li>Soil active herbicides need at least 60-days to breakdown before planting. (e.g., imazapyr/Arsenal®/Chopper®)</li> <li>Late application of triclopyr/Garlon® targets waxy leaf competitors while reducing impacts to groundcover.</li> </ul>	<b>Chemical Hardwood Control</b>  <b>Basal bark and stem injection herbicide treatments</b> to control unwanted trees/shrubs are typically most effective during the dormant season.
<b>Mechanical Site Prep</b>	<b>Walk the Line</b>
<ul style="list-style-type: none"> <li>Scalp agricultural sites, staying on the contour.</li> <li>Leave waterbars in the furrow and pick the scalper up regularly to reduce erosion.</li> <li>Do NOT plant seedlings directly into the subsoiled/ripped furrow.</li> </ul>	<b>Property boundaries should be well-marked with signs or paint.</b> Winter is an excellent time to do your annual inspection and re-mark boundaries as needed.
<b>Site Prep Burns</b>	<b>Fuel Reduction Burns</b>
<b>Conduct a site prep burn prior to planting to:</b> <ul style="list-style-type: none"> <li>Remove logging slash</li> <li>Stimulate early growth by increasing available nutrients</li> <li>Decrease potential hot spots in subsequent burns.</li> </ul>	Conduct winter fuel reduction burns in mature or sapling stands.  <b>Burning Young Longleaf</b>  Introduce fire in young longleaf stands to help control other pines & woody competition.
Clean up or establish fire lanes for prescribed fires.	
<b>Order Native Seed</b>	<b>Plant Native Groundcover</b>
<ul style="list-style-type: none"> <li>Purchase seed from companies that sell Southeastern sources.</li> <li>Some seed may also be collected from nearby donor sites.</li> </ul>	Plant in late winter to take advantage of seasonal rains. If sowing seed, <ul style="list-style-type: none"> <li>Increase seeding rates by 25%.</li> <li>Some species require cold stratification for germination.</li> </ul>

SPRING	SUMMER
<b>Order Seedlings</b>	
<b>Order seedlings early!</b> Sometimes nurseries sell out of preferred seed sources or entire inventories. Pre-order if possible.	N.C. Forest Service Claridge Nursery accepts longleaf seedling orders starting in July.  <b>buynctrees.com</b>
<b>Inspect Longleaf Plantings</b>	<b>Stay-in-Touch</b>
<b>Assess recent winter tree plantings to:</b> <ul style="list-style-type: none"> <li>Check for early mortality from freeze damage or other factors.</li> <li>Uncover and/or lift viable containerized longleaf seedlings that were planted too deep.</li> </ul>	<b>Keep in contact with your forester!</b> <ul style="list-style-type: none"> <li>He or she is KEY for successful forest management.</li> <li>Plan early if interested in cost-share opportunities.</li> </ul>
<b>Chemical Hardwood Control</b>	<b>Control Invasive Species</b>
Apply hexazinone around bud-break as site prep or to control oaks. Hexazinone is tough on oaks but easy on many understory species.	<ul style="list-style-type: none"> <li>Spray invasive species such as: kudzu, bermudagrass, bahiagrass, and fescue.</li> <li>Some problematic grasses and weeds require repeated treatments (spray, mow, and/or disking).</li> <li>Look out for invasive COONGRASS!</li> </ul>
<b>Release Seedlings</b>	<b>Mechanical Site Prep</b>
<b>Assess stands for herbaceous competition to determine the need to spray or mow.</b> <ul style="list-style-type: none"> <li>For chemical release, know your soil pH before applying Oust® or Oustar®.</li> <li>Banded spraying is often just as effective as broadcast spraying.</li> </ul>	Subsoil or rip sites with hardpans to give plenty of time for the soil to settle prior to planting.
<b>Growing Season Burns</b>	
<ul style="list-style-type: none"> <li><b>Control unwanted pines and/or hardwood stems</b> that are too large to effectively target with winter burns.</li> <li><b>Promote native plants with growing season fire.</b> For example, wiregrass produces more viable seed when burned in the spring or summer.</li> <li><b>Conduct a seed bed preparation burn</b> in longleaf stands with good developing cone crops in spring or summer. This provides a clean seed bed for germination in the fall.</li> </ul>	
Clean up or establish fire lanes for prescribed fires.	
<b>Plant Native Groundcover</b>	<b>Order Native Seedlings/Plugs</b>
<ul style="list-style-type: none"> <li>Time planting to take advantage of seasonal rains.</li> <li>Control emerging weedy competition as needed.</li> </ul>	N.C. Forest Service Claridge Nursery accepts native grass seedling orders starting in July.  <b>buynctrees.com</b>



# North Carolina Longleaf Coalition

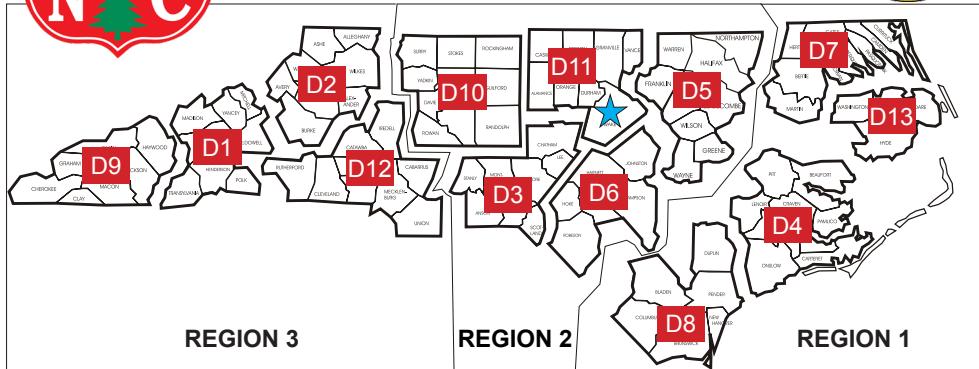


To learn more about Longleaf Pine in North Carolina and for additional resources, visit

[nclongleaf.org](http://nclongleaf.org)

## North Carolina Forest Service

North Carolina Department of Agriculture  
and Consumer Services  
Steve Troxler, Commissioner



### Central Office

1616 Mail Service Center  
Raleigh, NC 27699-1616  
919-857-4801

### Regional Offices

R-1	Kinston	252-520-2402
R-2	Jordan Lake	919-542-1515
R-3	Mount Holly	828-665-8688

### Claridge Nursery

762 Claridge Nursery Road  
Goldsboro, NC 27530  
1-888-NCTREES  
[buynctrees.com](http://buynctrees.com)

**[ncforestservice.gov](http://ncforestservice.gov)**

### District Offices

D-1	Asheville	828-667-5211
D-2	Lenoir	828-757-5611
D-3	Rockingham	910-997-9220
D-4	New Bern	252-514-4764
D-5	Rocky Mount	252-442-1626
D-6	Fayetteville	910-437-2620
D-7	Elizabeth City	252-331-4781
D-8	Whiteville	910-642-5093
D-9	Sylva	828-586-4007
D-10	Lexington	336-956-2111
D-11	Hillsborough	919-732-8105
D-12	Mount Holly	704-827-7576
D-13	Fairfield	252-926-3041

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