Living with Fire in North Carolina

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Wildland Urban Interface

Wildland Urban Interface (WUI) is the area where structures and other human development meet or intermingle with undeveloped wildland, forest or vegetative fuels.

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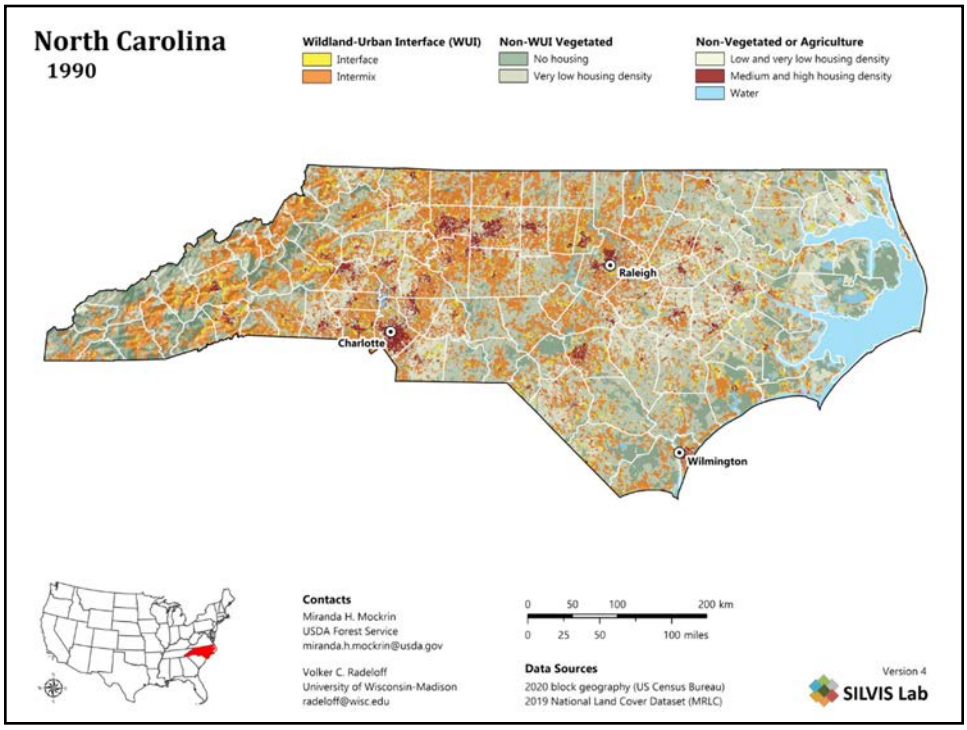
North Carolina
1990
Wildland-Urban Interface (WUI)
Interface
Intermix
Non-WUI Vegetated
No housing
Very low housing density
Non-Vegetated or Agriculture
Low and very low housing density
Medium and high housing density
Water
Raleigh
Charlotte
Wilmington
Contacts
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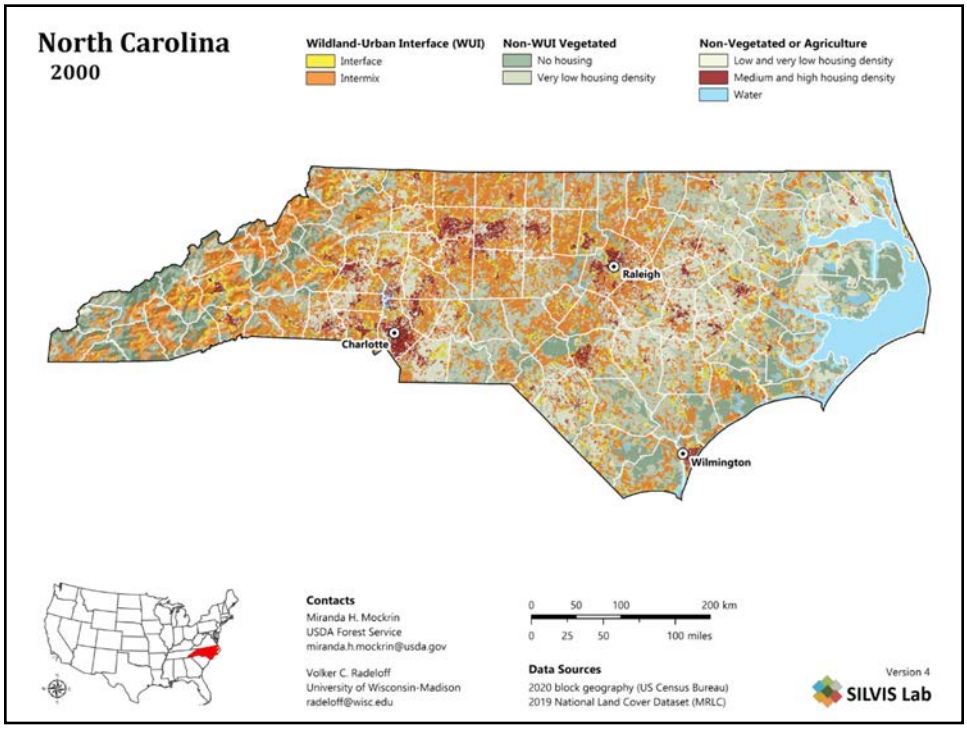
Volker C. Radeloff
University of Wisconsin-Madison
radeloff@wisc.edu
0 50 100 200 km
0 25 50 100 miles
Data Sources
2020 block geography (US Census Bureau)
2019 National Land Cover Dataset (MRLC)
Version 4
SILVIS Lab

4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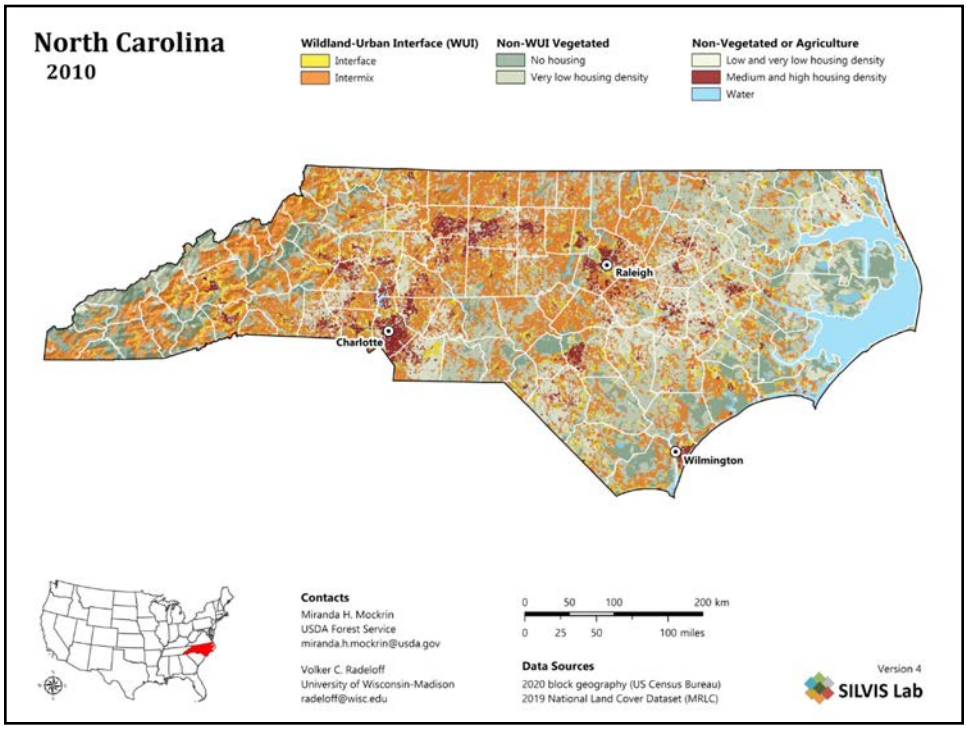
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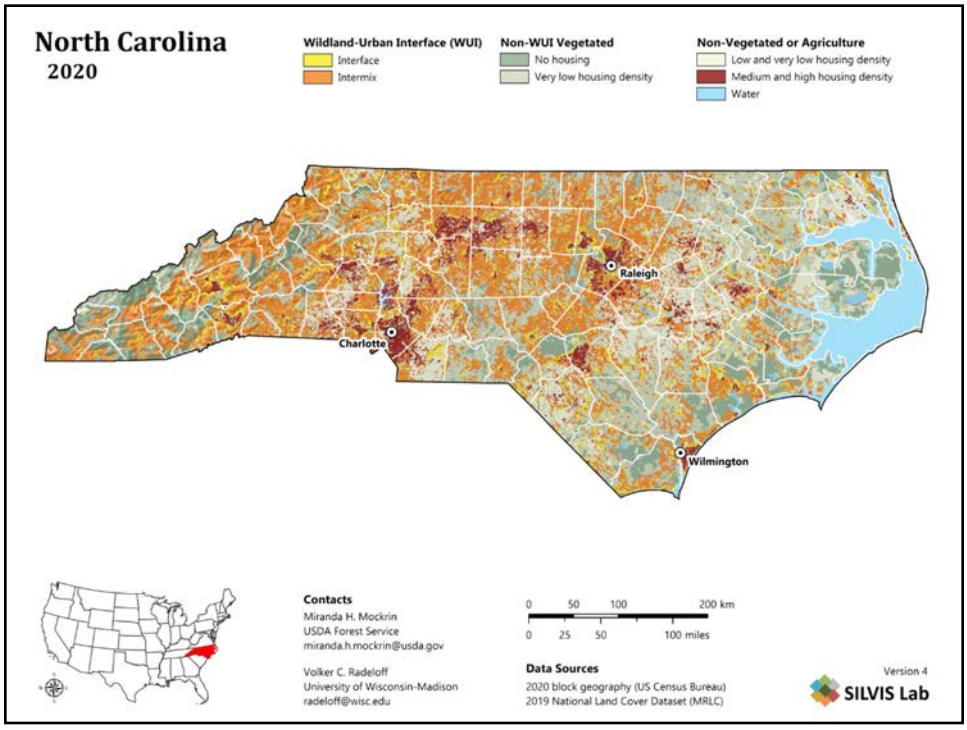
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Poll Question:

Where does North Carolina rank nationally in relation to area (number of acres) in the wildland urban interface?

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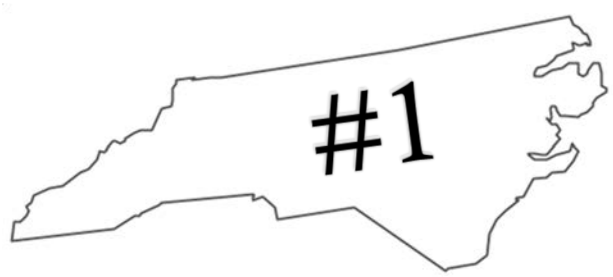
Did you know?



- North Carolina ranks #1 in the nation for area (number of acres) in the Wildland Urban Interface.
- We also rank 4th for the number of housing units in the WUI.

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Ecological Disturbance

Tropical Storms / Hurricanes: Tropical System Helene
Observations from a High Severity event

- Damage was not consistent overall
- Windward (southerly slopes) received a larger share of the damage.
- Apparent microburst or downburst areas were evident throughout the area.
- Areas of heavy damage were interspersed throughout areas with much lighter damage.
- Hardwood stands were affected to a larger extent than conifer stands
- Most damage was blowdown with top/stem breakage being lighter
- Mudslides and flooding were a small proportion of the overall timber damage.

Source: NCFS Forest Damage Appraisal, Hurricane Helene, September 2024

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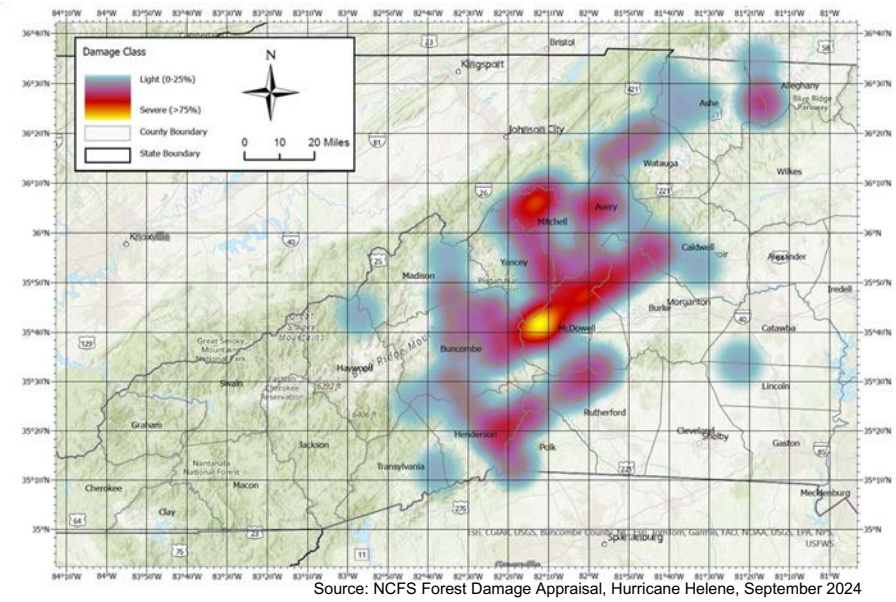
Hurricane Helene



Source: NCFS Forest Damage Appraisal, Hurricane Helene, September 2024

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Hurricane Helene

Table 1. Hurricane Helene timber damage estimation by ownership.

County	Public Ac.	Private Ac.	Reserve Ac	Total Ac.	Public Land $	Private Land $	Reserve $	Total Value
Alleghany	0	11,843	1,048	12,892	$14,158.79	$325,652.10	$14,158.79	$353,969.67
Ashe	2,174	48,397	0	50,571	$381,872.72	$9,164,945.33	$0.00	$9,546,818.06
Avery	17,486	56,951	0	74,437	$3,755,495.64	$12,572,746.26	$0.00	$16,328,241.90
Buncombe	24,805	64,635	0	89,440	$5,402,468.16	$13,892,060.98	$0.00	$19,294,529.14
Burke	12,071	32,557	1,127	45,755	$2,857,454.60	$7,514,047.27	$211,663.30	$10,583,165.18
Caldwell	14,589	38,143	0	52,732	$3,170,057.89	$8,151,577.43	$0.00	$11,321,635.32
Haywood	2,785	9,505	4,447	16,737	$471,355.26	$1,221,238.64	$449,930.03	$2,142,523.93
Henderson	13,481	43,562	0	57,043	$3,994,292.04	$12,648,591.47	$0.00	$16,642,883.52
Lincoln	0	28,925	0	28,925	$0.00	$4,742,073.77	$0.00	$4,742,073.77
Madison	24,526	13,683	1,556	39,764	$4,723,735.12	$2,590,435.39	$304,757.10	$7,618,927.62
McDowell	14,541	116,265	0	130,805	$1,857,992.01	$15,032,844.45	$0.00	$16,890,836.46
Mitchell	12,337	46,908	0	59,244	$8,623,351.80	$32,440,228.21	$0.00	$41,063,580.01
Polk	2,157	21,490	0	23,647	$1,498,164.36	$15,148,106.29	$0.00	$16,646,270.65
Rutherford	3,332	39,255	0	42,587	$472,952.39	$5,438,952.47	$0.00	$5,911,904.86
Transylvania	11,346	10,029	0	21,376	$1,732,402.31	$1,536,281.30	$0.00	$3,268,683.61
Watauga	973	12,066	0	13,039	$271,587.49	$3,608,233.77	$0.00	$3,879,821.26
Yancey	11,930	48,519	2,463	62,912	$5,499,842.02	$21,174,391.77	$824,976.30	$27,499,210.08
	168,532	642,733	10,641	821,906	$44,727,182.60	$167,202,406.91	$1,805,485.52	$213,735,075.04

*Reserved lands are those lands, such as park lands, reserved from timber harvesting.

Source: NCFS Forest Damage Appraisal, Hurricane Helene, September 2024

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Ecological Disturbance

Wildland Fires / Wildfires / Prescribed Fires

- Impact depends on the severity of the fire.
- High-severity fires involve high heat, which can scorch soil and tree roots, often resulting in substantial mortality of vegetation, changes to forest structure and impacts on wildlife habitat.
- Low severity fires burn close to the ground, “cleaning” and thinning the forest by removing thick and flammable vegetation from the forest floor and generally have minimal impact on overstory trees.

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Wildfires in NC

- One of the **greatest threats to our critical forest resources**
- From the 2015-2024 fiscal years, 270,859 acres of woodlands burned because of North Carolina wildfires.
- Nearly every wildfire, or its associated smoke, may impact homes, roads, farms or other developments.

Wildfire Summary from January 1 to June 4, 2025

Human		Lightning	
Fires	Acres	Fires	Acres
4193	26040.1	4	27.3

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Resources to help with preparedness

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Homes can withstand

When a house survives a forest fire virtually undamaged, that is often portrayed as a "miracle," but in fact it's almost always a direct result of the house's construction and its immediate surroundings, Cohen said. "The key to reducing WUI home fire losses is to **reduce home ignitability**," he wrote.

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Ignition-Resistant Homes

A screenshot of a demonstration video by the Insurance Institute for Business and Home Safety shows the effects of embers on a traditionally built home compared to one designed for fire resistance. 2019.

Insurance Institute for Business and Home Safety Research Center Ember Storm Test Highlights

The majority of homes lost to wildfire are first ignited by embers and small flames. **By reducing the susceptibility of the home and the area immediately around the home (also called the "home ignition zone"), the chances of a home surviving a wildfire are greatly increased.**

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Home Ignition Zone

The home and the area 0-5' from the furthest attached exterior point of the home; defined as a non-combustible area. Science tells us this is the most important zone to take immediate action on as it is the most vulnerable to embers. **START WITH THE HOUSE ITSELF** then move into the landscaping section of the Immediate Zone.

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In the Immediate Zone (0-5 feet)

- **Clean roofs and gutters** of dead leaves, debris and pine needles that could catch embers.
- **Replace or repair any loose or missing shingles** or roof tiles to prevent ember penetration.
- Reduce embers that could pass through vents in the eaves **by installing 1/8- inch metal mesh screening.**
- **Clean debris from exterior attic vents** and **install 1/8-inch metal mesh screening** to reduce embers.
- **Repair or replace damaged or loose window screens and any broken windows**
- Screen or **box-in areas below patios and decks with wire mesh** to prevent debris and combustible materials from accumulating.
- **Move any flammable material away from wall exteriors** – mulch, flammable plants, leaves and needles, firewood piles – anything that can burn. **Remove anything stored underneath decks or porches.**

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Recent Events

Revealed that small LP Gas Tanks under decks contributed to fire intensity.

Source: WCNC (YouTube)

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Another example

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Let's take a closer look.

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Home Ignition Zone

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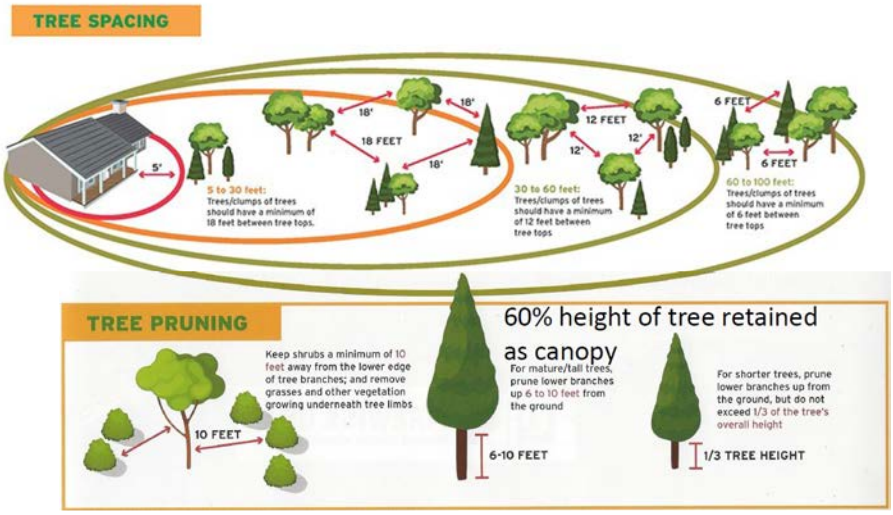
Intermediate & Extended Zones



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NC Fuels Removal Program

Anatomy of a Fuels Reduction Program Pile. Photograph credit: Justin Query

https://www.ncagr.gov/divisions/nc-forest-service/resist-wildfire-north-carolina/fuels-removal-program

A program that reduces wildfire risk by removing roadside debris piled by residents in communities within North Carolina.

- 12 Sites Selected in 2025

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The national Firewise USA® recognition program provides a collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks at the local level. Any community that meets a set of voluntary criteria on an annual basis and retains an "In Good Standing Status" may identify itself as being a Firewise® Site.

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Steps for applying and maintaining Firewise USA® Recognition

1. Organize Your Efforts
   A. Identify a Committee. Form a committee that is comprised of residents and other stakeholders.

2. Create a Plan
   A. Request a Community Assessment (NC Forest Service)
      i. Must be updated every 5 years
   B. Create a Site Action Plan
      i. Must be updated every 3 years
   C. Upload Action Plan to Firewise USA® Portal

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Steps for applying and maintaining Firewise USA® Recognition (cont.)

3. Implement Your Plan
   A. Host an Annual Outreach/Risk Reduction Action Event
   B. Work with Neighbors on Projects in your Site Action Plan
   C. Begin Tracking Investments in the Firewise USA® Portal
   D. Collect Information for Completed Risk Reduction Actions

4. Tell the Story of Wildfire Risk Reduction in your Site
   A. Report the Actions and Efforts in your Community
   B. Submit your Application for Approval or Renewal
   *All actions are reported in the Firewise USA® Portal

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Firewise USA™ Site Criteria

Minimum Number of Dwelling Units:
8
Maximum Number of Dwelling Units:
2,500

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FIREWISE USA™
Residents reducing wildfire risks

Invest a minimum of $34.79* or 1 hour of time per dwelling unit, annually

(*based on the National Hourly Volunteer Rate, which is adjusted in April of each year)

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Benefits of the Firewise USA® Program

For Homeowners

- Increased Home Safety
- Reduced Risk of Damage
- Potential Discounts in some States (Currently: CA, CO, TX, AZ, OR, NM, UT, WY, MT, & ID)
- Peace of Mind

For Communities

- Community Preparedness
- Enhanced Wildfire Resilience
- Improved Firefighter Safety
- Stronger Community Bonds
- Access to Funding and Resources
- Positive Publicity and Recognition

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Tree Farmers and Landowners can help!

Fuel Reduction	• Thinning • Prescribed Fire • Fuel Breaks
Defensible Space	• Defensible Space Creation • Vertical Space
Other Management Practices	• Landscaping Choices • Maintaining Property • Fire-Resistant Construction
Community Involvement	• Firewise USA® • Ready, Set, Go!

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Prescribed Fire in North Carolina …& Beyond

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Prescribed Fire

The **planned use**
of fire under **predetermined**
weather and fuel parameters to obtain
specific management objectives.

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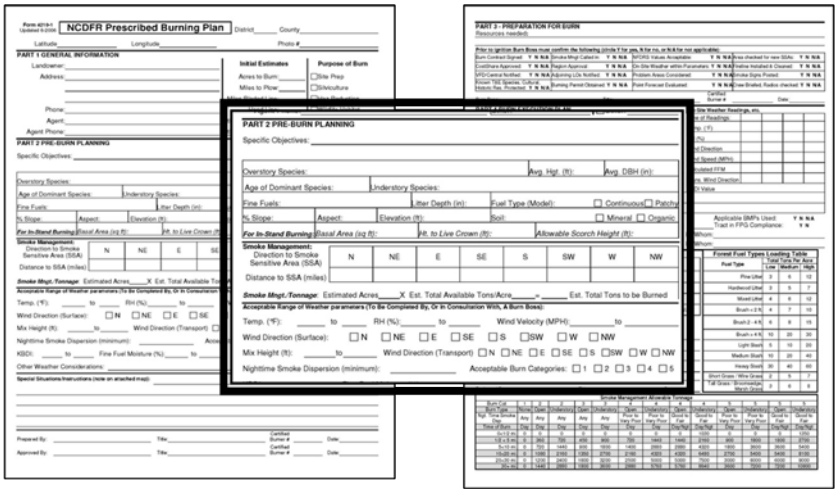
Prescribed Burns follow…..
a prescription!



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Why prescribed fires?

Fuel reduction, ecosystem restoration, site preparation, wildlife management, disease management, invasive species, ticks!

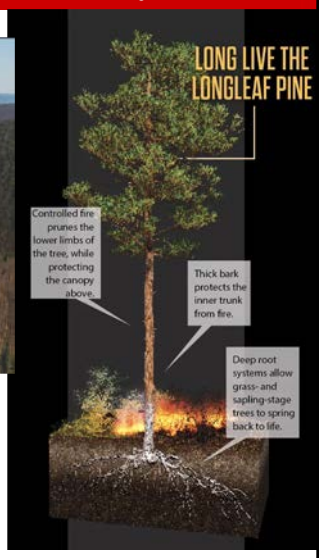

Diagram by Peter Bull

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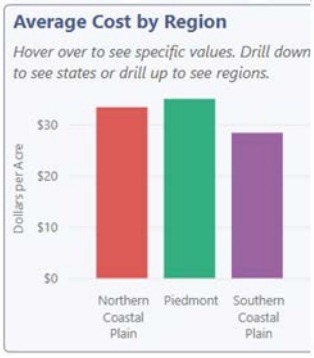
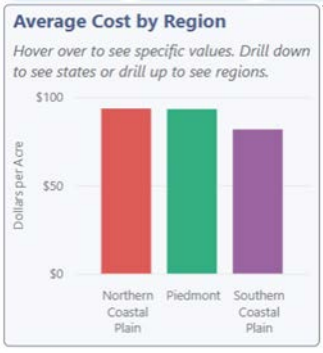
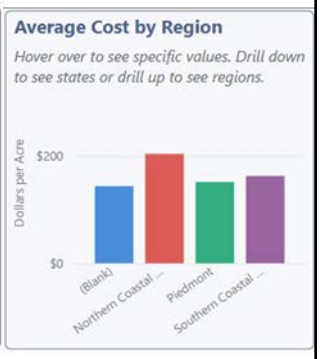
Costs & Trends Survey







Prescribed Fire Herbicide Mechanical Site Prep

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Poll Question:

How many acres do you think are prescribed burned in NC annually?

40

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Nationally in 2020….
- 9.4 million ac
- 84% on state & private lands
- 16% on federal lands

In the Southeast…
- Usually 65-75% of the entire nation

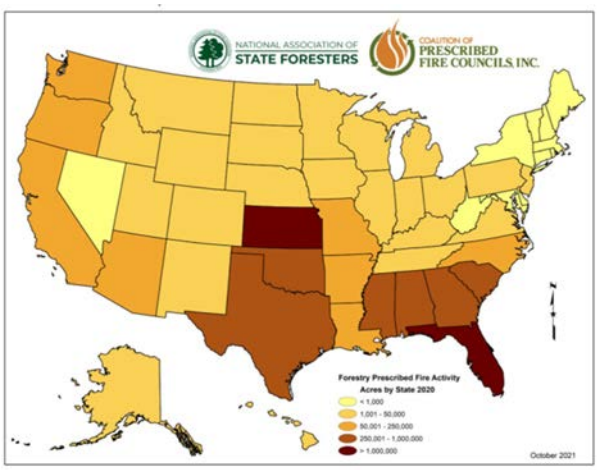

Figure 2 - Acreage of prescribed fire use (including federal, state, and private ownership) for forestry and rangeland objectives by state in 2020. Coarse acreage classes were created using a histogram that determined the most significant breaking points in acres reported.

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Prescribed Fire on Your Land

Options to burn:

- Hire a contractor or state forestry agency
- Collaborate with an agency or non-profit
- Do it yourself
  - Recommendation: Become a Certified Burn Manager in your state, if available
- Join a Prescribed Burn Association

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Rogue Valley Prescribed Burn Association members share equipment.

Credit: Chris Adlam © Oregon State University

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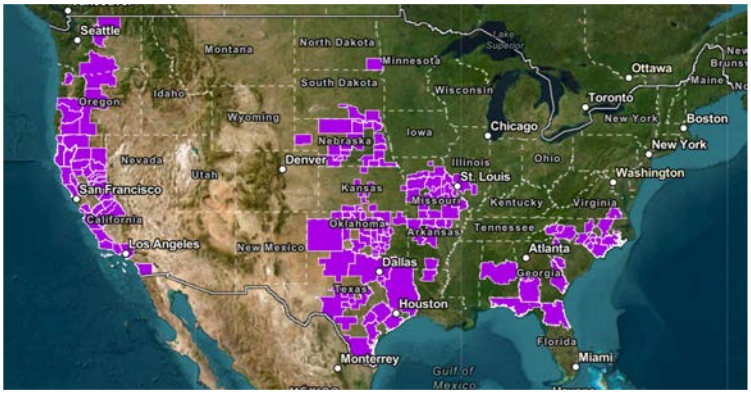
Prescribed Burn Associations



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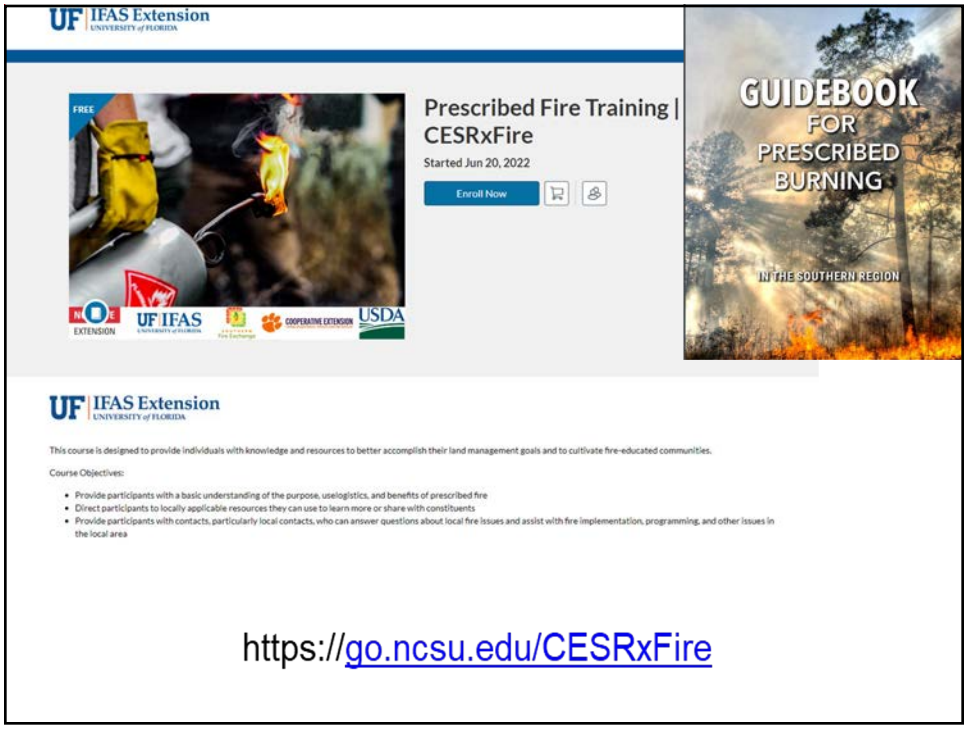
Hurricane Considerations

Before responding to wildfires and planning prescribed fires, fire managers should anticipate how changes caused by tropical storms and hurricanes will affect:

- fire behavior,
- smoke,
- hazards to personnel,
- and access to the fire.

Figure 1. Hurricane Michael drastically transformed forests in northwest Florida, significantly altering fuels and potential fire behavior. Credit: David Godwin, UF/IFAS


UF IFAS Extension
UNIVERSITY of FLORIDA
FREE
Prescribed Fire Training | CESRxFire
Started Jun 20, 2022
Enroll Now
GUIDEBOOK
FOR
PRESCRIBED
BURNING
IN THE SOUTHERN REGION
UF IFAS Extension
UNIVERSITY of FLORIDA
This course is designed to provide individuals with knowledge and resources to better accomplish their land management goals and to cultivate fire-educated communities.
Course Objectives:
Provide participants with a basic understanding of the purpose, uselogistics, and benefits of prescribed fire
Direct participants to locally applicable resources they can use to learn more or share with constituents
Provide participants with contacts, particularly local contacts, who can answer questions about local fire issues and assist with fire implementation, programming, and other issues in the local area
https://go.ncsu.edu/CESRxFire

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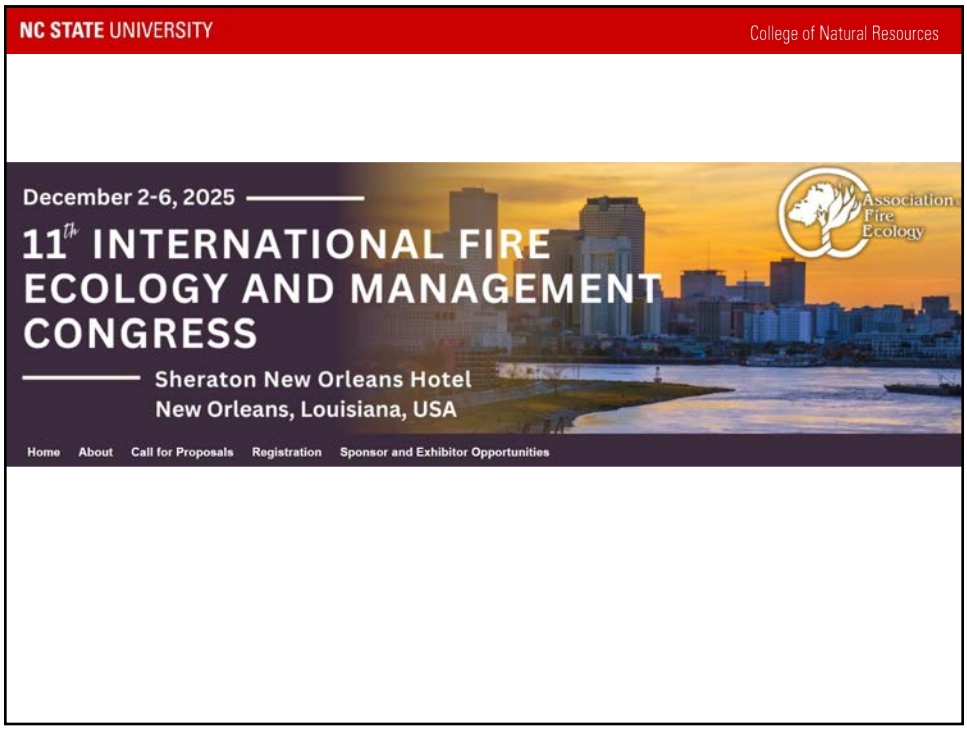
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