



N.C. Forest Service Forest Health Highlights 2023



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FOREST RESOURCE SUMMARY

From the Appalachian Mountains to the Atlantic Coastal Plain, North Carolina is one of the most ecologically diverse states in the U.S. North Carolina ranks fourth on the list of states with the highest forestland acreage, and our forests cover more than 18.3 million acres, approximately 61% of the state's total land area. Together, our forests represent a mosaic of diverse cover types, from the high-elevation spruce-fir forests of the Appalachian Mountains to the pine savannas and maritime forests on the coast. Major forest types in the state include oak-hickory, oak-pine, gum-cypress swamps and loblolly-shortleaf pine.

Our forests are also prized for their scenic beauty, supporting tourism and outdoor recreation and providing habitat for many plants and animals. With approximately 65 salamander species statewide, North Carolina's salamander population is the most diverse in the world. The forests of the southern Appalachians are a global hotspot for amphibian diversity and the epicenter for a group of salamanders known as plethodontids, or woodland salamanders. Our state also hosts more than 460 species of birds, 70 species of reptiles and 121 mammal species, many of which depend on our forests for all or part of their life cycle. Several species of conservation concern such as the eastern diamondback rattlesnake and northern pine snake require large contiguous tracts of longleaf pine forests on the coastal plain for their continued persistence.

Most of North Carolina's forestland, roughly 11.3 million acres, is owned by families or individuals while approximately 2.9 million acres are owned by private corporations not involved in forestry. Approximately 1.3 million acres are owned by the forest industry. Federal, state and local public lands total 2.6 million acres. Expectedly so, forestry is the second largest industry in the state providing more than 138,000 jobs and contributing \$32.8 billion to the North Carolina economy annually. The forest industry ranks first in manufacturing sector jobs and second in statewide employment.

Forestland Ownership

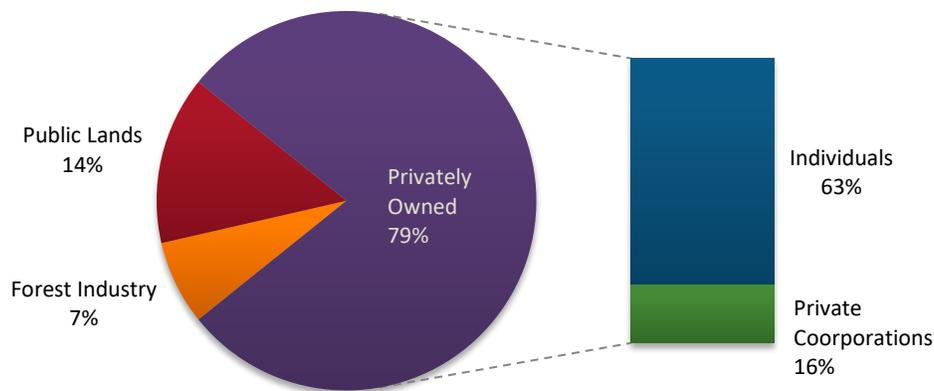


Figure 1: Forestland ownership in North Carolina as of 2023.

Historically, the beauty and productivity of North Carolina's forests have been challenged by widespread insects and diseases, both native and nonnative. In the past 12 years, at least seven nonnative invasive species were detected for the first time in the state: **laurel wilt** in 2011, **thousand cankers disease** of black walnut in 2012, **emerald ash borer** in 2013 and the **spotted lanternfly** and **elm zigzag sawfly** in 2022. Insects and diseases such as chestnut blight, Dutch elm disease, **hemlock woolly adelgid**, **balsam woolly adelgid** and **spongy moth** have impacted forests in North Carolina beginning in the early to mid-1900s.

In 2023, new challenges continue to arise. **Asian long-horned beetle** remains in an adjacent state to the south, posing a significant threat to our hardwood forests. In recent years, beech bark disease has been the primary threat to beech trees in North Carolina. However, an emerging disease known as **beech leaf disease (BLD)** is causing widespread mortality of American beech and appears to pose a greater danger. BLD has rapidly spread across the Northeast and was detected for the first time in a neighboring state to the north in 2021.

AERIAL SURVEY SUMMARY

Aerial surveying of approximately 5.6 million acres, or 16% of the entire state, was accomplished during the 2023 flight season (July-September). Routine flights are carried out to detect and map forest health issues including southern pine beetle and ips engraver beetle mortality. Other events such as storm damage, large defoliation occurrences and assessment of the extent of ghost forests along the coastal plain induced by saltwater intrusion are flown as needed.



Tornado damage from July 2023. Photo by NCFS.

FOREST INSECTS

Pine Beetles

Historically, the **southern pine beetle (SPB)** has been North Carolina’s most significant forest insect pest. In most years, SPB exists at nearly undetectable levels, behaving as a secondary pest that attacks stressed trees. Outbreaks tend to be cyclical, resulting in widespread pine mortality and significant economic losses. From 1999 to 2002, a four-year outbreak across the southeast resulted in nearly \$84 million in losses for the timber industry in North Carolina. Since then, SPB activity has remained relatively low. In 2017 and 2018, there was a spike in activity on federal, state and private lands, which then subsided in 2019.

In spring 2023, the N.C. Forest Service (NCFS) deployed 39 SPB prediction traps in 39 counties across the state. Three additional traps were deployed by Alligator River National Wildlife Refuge. Aerial surveys for forest health issues, including southern pine beetle, were conducted in the late summer of 2023. Trap counts were low and aerial observations of bark beetle spots were light. One additional SPB spot was verified in Alligator National Wildlife Refuge by a partner organization.



Southern pine beetle pitch tubes. Photo by NCFS.



[The Southern Pine Beetle Prevention Program](#), funded through a U.S. Forest Service (USFS) grant, provides partial reimbursement to nonindustrial, private woodland owners in North Carolina to cover costs associated with managing pine stands for the prevention of southern pine beetle infestations. Pre-commercial thinning is the most utilized practice under this program in North Carolina. Thinning reduces the number of trees in a young stand that would otherwise compete for available sunlight, nutrients and water, ultimately improving growing conditions for remaining trees.

Southern pine beetle damage in Eastern NC. Photo by NCFS.

Since 2005, there have been more than 2,971 cost share projects on 97,724 acres of forestland in North Carolina. In 2020, additional practices including understory prescribed burning and understory vegetation control were added to the program. However, these were removed from the list of eligible practices in 2023 to meet the demand for funds to cover our core practice of pre-commercial thinning. The SPB program remained exceedingly active in 2023 with 75 projects completed on 3,442 acres. There are currently 59 projects still pending for 2,252 acres.

While SPB activity was low, **ips engraver beetle** continued to cause pine mortality statewide. Ips are secondary pests, attacking trees that are stressed or weakened by other factors such as overstocking, drought, flooding, wind damage and poor soil and growing conditions. While ips was seen in many locations, there were 37 reports from 17 counties. Impact ranged from a few single trees to upward of 50 acres.

Emerald ash borer continues to spread across North Carolina



Damage caused by EAB.
Photo by NCFS.

In 2013, **emerald ash borer beetle (EAB)** was first detected in North Carolina in Granville, Person, Vance and Warren counties. Since then, they have continued to cause widespread mortality of ash trees across 71 counties. Susceptible trees in North Carolina include green ash, white ash, Carolina ash, pumpkin ash and white fringetree. In 2023, EAB presence was confirmed for the first time in Cumberland, Lee, Craven and Hertford counties.

Although the federal quarantine prohibiting the movement of potentially EAB infested materials was lifted, the NCFS continues to monitor the spread of EAB across our state. By reporting the spread and continuing to provide outreach, we can keep our citizens aware of the pest's proximity to their forestlands and assist landowners with making informed decisions about their options to protect ash trees on their property.

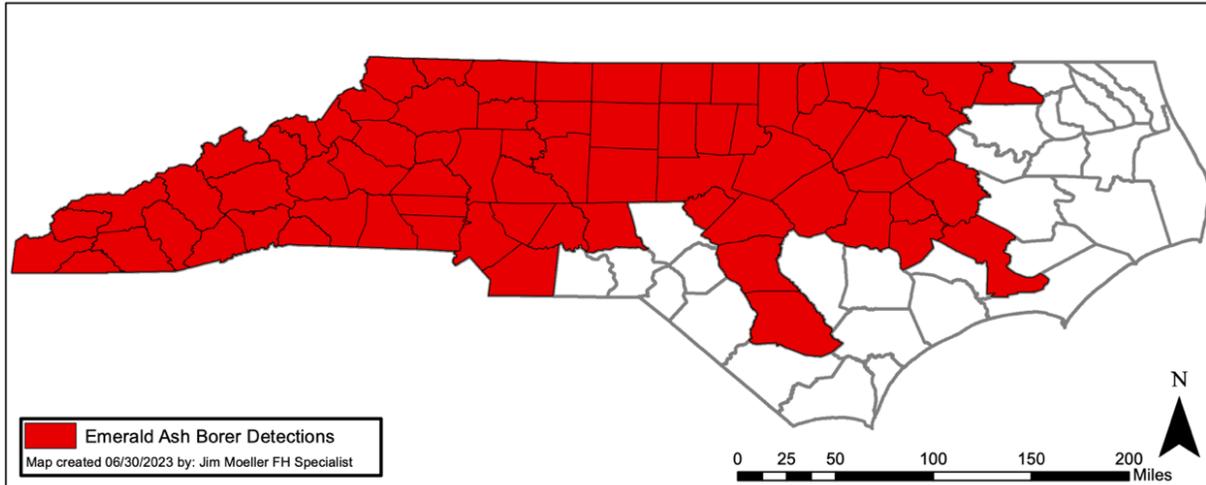


Figure 3: Map representing counties where emerald ash borer has been confirmed in North Carolina. View the map online here: https://www.ncforestservice.gov/forest_health/pdf/Map_EAB_NCTracking.pdf

Larger elm leaf beetle



Larger elm leaf beetle on a fingertip. Photo by NCFS.

From June to September 2023, heavy defoliation caused by **larger elm leaf beetle** larvae was reported in several counties from the upper coastal plain throughout many portions of the piedmont. The larger elm leaf beetle is a native forest insect that primarily feeds on elms and less often on dogwood, hazelnut and other hardwoods. While adult larger elm leaf beetles chew holes in the leaves, the larvae skeletonize leaves as they feed, leaving infested trees appearing scorched or drought stricken.



Defoliation caused by larger elm leaf beetle larvae. Photo by NCFS.

Like many native insects, larger elm leaf beetle populations fluctuate depending on environmental conditions and natural cycles including predator population densities. In North Carolina, larger elm leaf beetle populations pulse for a year or two, causing significant defoliation, then return to less damaging levels. Since the larvae are late season defoliators, the damage is mainly unsightly and rarely causes tree mortality on otherwise healthy trees in the long run.

Hemlock woolly adelgid and the Hemlock Restoration Initiative



During most times of the year, HWA can be recognized because of the woolly covering it creates to protect itself. Photo by NCFS.

The **hemlock woolly adelgid (HWA)** was first detected in North Carolina in 1995 and has since spread to all regions where hemlocks naturally occur in the state. Nearly all untreated hemlock stands in Western North Carolina are dead or in sharp decline due to HWA.

In 2014, a cooperative effort between the N.C. Department of Agriculture and Consumer Services (NCDA&CS), WNC communities, USFS and NCFS formed the Hemlock Restoration Initiative (HRI). Part of this effort includes protecting hemlocks with chemicals and working to establish biological control agents throughout the region. Since the NCFS became involved in treating hemlocks, more than 120,000 hemlocks have been

treated and are either still under protection from said treatment, are being treated a second time or are part of biocontrol releases. Meanwhile, HRI and the NCDA&CS Plant Industry Biocontrol Program continue to release and monitor biocontrol agents that prey on the adelgids. More than 1,600 *Laricobius* beetles were released as biocontrol in 2022. During the 2023 survey season, *Laricobius* beetles were consistently found near release sites and sometimes miles from the nearest release area, suggesting they are surviving and spreading.



One of the first eastern hemlocks treated at Dupont State Recreational Forest. Photo by NCFS.

Kermes oak scale

Kermes oak scale (*Kermes spp.*) is a soft scale that primarily feeds on oak trees in the red oak group. Several counties across the inner coastal plain saw a noticeable uptick in flagging caused by kermes oak scale on willow oak, water oak and black oak in 2023. Common symptoms of infestation include flagging and sooty mold, a dark colored fungus that grows on the honeydew excreted by piercing-sucking insects like scales, causing twigs to blacken.

As with most native forest insects, natural predators such as lady beetles, lacewings, parasitic wasps and



Kermes oak scale where flagging is occurring. Photo by NCFCS.



Kermes oak scale guarded by ants. Photo by NCFCS.

predaceous moth larvae like the kermes scale moth (*Euclemensia bassettella*) keep scale populations in check. The damage is mainly unsightly and rarely causes tree mortality on otherwise healthy trees. However, successive years of heavy infestations combined with other stressors such as tree damage from other insects, disease or environmental may result in reduced growth rate or tree mortality.

One cause of concern is the feeding sites create a point of entry for fungal diseases. Botryosphaeria canker is causing dieback in northern red oaks in the Midwest, although this does not seem to be the case in North Carolina.

North Carolina continues to hold the line against the spread of spongy moth

Since 1982, the NCD&CS Plant Industry Division Spongy Moth Program has continued to monitor the entire state of North Carolina for **spongy moth** through the USDA, APHIS and USFS Slow the Spread Program. Spongy moth is only established in two North Carolina counties, Currituck and the northern portion of Dare on the Outer Banks. These two counties have remained the only two in the state with a federal spongy moth quarantine since 1988.

During the 2023 trapping season (May-October), 17,351 pheromone traps were set statewide. More than 1,100 male spongy moths were captured in 535 traps, a slight decrease in captures compared to 2022 when 1,433 moths were captured in 826 traps with 17,248 traps set statewide.

Male moth captures do not necessarily indicate a spongy moth population has established in an area. However, it does warrant further investigation to determine if females are present and whether

control methods are necessary. In 2023, six mating disruption treatments were administered between May and September across 16,837 acres. No larvicide treatments were applied.

Based on 2023's trap captures, 11 mating disruption treatments totaling 34,485 acres have been proposed for 2024.



Figure 4: Map showing locations of the 2023 spongy moth treatment sites. View the map online here: <https://ncagr.maps.arcgis.com/apps/Minimalist/index.html?appid=3df6f80cc8354f61899c5a8056137350%20>

Fall cankerworm makes an appearance in Western North Carolina, while Eastern North Carolina sees its ninth consecutive year of forest tent caterpillar defoliation

Forest tent caterpillars commonly defoliate bottomland hardwoods in our state. In 2023, North Carolina experienced its ninth consecutive year of major forest tent caterpillar defoliation. During routine forest health flights, damage was detected over portions of 10 counties throughout the outer coastal plain of the state. An estimated 50,000 acres were impacted, with most of the defoliation occurring in water tupelo stands and associated bottomland hardwoods. Impacted river drainages included the Chowan, Roanoke, Lumber and Waccamaw Rivers. Damage was also documented in the Great Dismal Swamp.

Trees recovered by summer and no mortality was observed. It is believed that, at some level, this is an annual occurrence within water tupelo swamps and associated forest types as it coincides with the emergence of leaves of those species.



Forest tent caterpillar defoliation. Photo by NCFS.

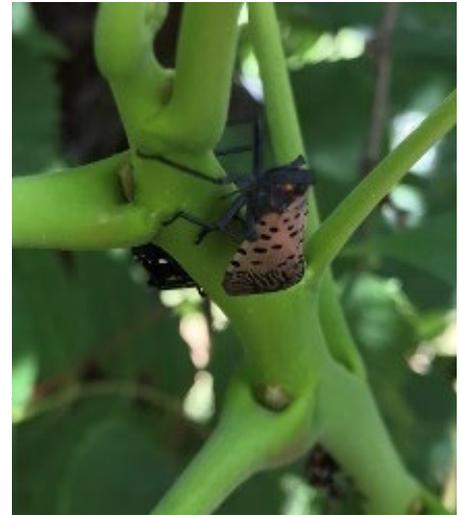
Fall cankerworm made an appearance in Western North Carolina in 2022 causing significant defoliation. Named after the time of the adult moth emergence, fall cankerworms are a native insect to North America. They feed on a wide range of broadleaf trees and smaller woody plants. Periodically, their populations build to levels that cause extensive defoliation. Observations of the same area in 2023 revealed light defoliation from this insect and no mortality directly attributable to it. However, the same area had experienced mortality from emerald ash borer and beech bark disease.

Spotted lanternfly remains contained in one county



Spotted lanternfly late instar nymphs.
Photo by NCFS.

An established **spotted lanternfly** population was first detected in Forsyth County near the border of Guilford County in June 2022. The initial report came from an informed citizen, owing to a statewide cooperative outreach effort between the NCFS, NCDA&CS Plant Industry Division, N.C.



State University and other conservation groups within the state. A developing, less established population was also detected in Surry County. However, this population appears to be suppressed. As of 2023, there have been no new reports of established populations in North Carolina. The spotted lanternfly is a piercing-sucking insect that feeds on the sap of its host. Due to a sugar-laden diet, they excrete copious amounts of a sweet, sticky substance known as honeydew.

This buildup of honeydew attracts stinging insects like wasps and ants and causes sooty mold, a dark colored fungus that will grow on other plants, infrastructure and personal property left near infested plants. While the spotted lanternfly primarily feeds on the tree of heaven, it is of major concern to the agricultural industry, notably viticulture. They are also a known pest of over 70 other species of plants including stone fruits, hops, apples, maple, oak, walnut and willow.

NCDA&CS Plant Industry Division has since taken the lead on control efforts with support provided by the NCFS. NCFS staff continued to be heavily involved in public outreach efforts, delimiting surveys and treatment operations throughout the summer of 2023. This effort remains ongoing.

Elm zigzag sawfly

The **elm zigzag sawfly (EZS)** is a nonnative, invasive insect native to China and Japan. The species gets its name from the characteristic zigzag pattern left by the larva as it eats its way through leaves. Since its first detection in Canada in 2020, the species has moved into five other states in the U.S. North Carolina is



Defoliation on an American elm tree.
Photo by NCFS.

currently the southernmost extent of their spread. EZS was initially detected and identified in August 2022 near the border of Stokes and Surry counties following a call to one of our county offices. NCFS Forest Health staff were alerted and subsequently detected elm zigzag sawfly infestations at other sites across the same counties after receiving multiple reports from private landowners.

EZS is capable of significant defoliation of elm trees, are strong fliers traveling up to 56 miles per year, reproduce asexually and have multiple generations annually. All of which may be significant contributing factors to their invasive potential. However, there have been no reports of the EZS causing mortality in elm trees. Research led by N.C. State University is ongoing to better understand the ecological impact the species may have on our forests and urban landscapes.

As of 2023, feeding damage from EZS larvae has been observed at various locations. However, there have been no new reports of infestations in North Carolina outside of Stokes and Surry counties. Monitoring efforts remain ongoing.



Elm zigzag sawfly typical feeding pattern. Photo by NCFS.



EZS larvae underneath an infested tree .
Photo by NCFS.

FOREST DISEASES

Laurel wilt continues to spread across the state

The fungal pathogen that causes laurel wilt is native to Asia and is primarily vectored by the redbay ambrosia beetle. Most native ambrosia beetles behave as secondary pests, attacking only dead and dying trees. However, the redbay ambrosia beetle attacks healthy trees. The major



Redbay mortality due to laurel wilt. Photo by NCFCS.

cause of mortality is not so much from the beetles feeding on the tree but from the introduction of the plant pathogen, the laurel wilt fungus that adult redbay ambrosia beetles carry and 'plant' into the tree. As the fungus grows within the tree, it prevents the movement of food and water, eventually killing the infected tree.

The devastating disease was first discovered in Georgia in 2003. It was first confirmed in North Carolina in 2011. The most severely impacted tree species in North Carolina has been redbay, commonly found in our coastal forests throughout the eastern part of the state.



Vascular streaking due to laurel wilt fungus. Photo by NCFCS.

As the disease spreads beyond the native redbay range, sassafras across the inner Coastal Plain have faced the same demise. Other susceptible trees and shrubs in the laurel family include spicebush, the rare pondspice (Special Concern - NC), and pondberry (Endangered - US).

As of 2023, laurel wilt remains in 17 counties across North Carolina. However, the disease continues to spread within those previously confirmed counties.

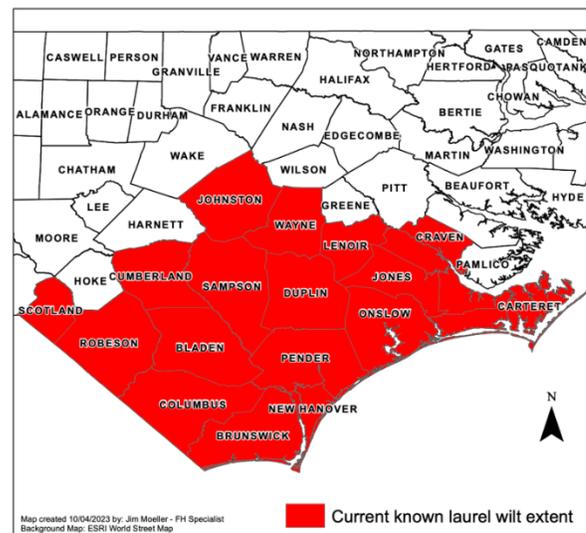


Figure 5: Map representing counties where laurel wilt been confirmed in North Carolina.

View the map online here: https://www.ncforests.gov/forest_health/pdf/Map_LW_NCTracking.pdf

Thousand cankers disease remains only in Haywood County

Since 2012, when thousand cankers disease was first detected in Haywood County, neither the fungus nor walnut twig beetle that carries it have been found in additional counties within the state. In January 2013, a quarantine was enacted that prohibits the movement of regulated materials from Haywood County to unaffected areas of North Carolina.

The NCFS works with the USFS to trap and survey high risk areas in the state. In 2023, the walnut twig beetle was not detected in any new areas following the 41 traps that were set statewide. A map of the distribution of thousand cankers disease of walnuts may be found at:

https://www.ncforestservice.gov/forest_health/pdf/Map_TCD_NCTracking.pdf

White pine dieback in Western North Carolina

In Western North Carolina, it is not uncommon for stressed white pines to succumb to a native **insect/disease complex** caused by **white pine bast scale** and **caliciopsis canker**. Dieback by this complex has been observed sporadically since 2016. However, a considerable increase in dieback and mortality has occurred in the past few years.



Dieback in white pines. Photo by NCFS.



Fruiting body of the fungi causing caliciopsis canker. Photo by NCFS.

The white pine bast scale is often found in branch unions beneath lichen and embedded in cankers. The scale

insect is only visible with a magnifying lens. Feeding sites facilitate a point of entry for an infection from fungal pathogens, which in this case is believed to be *Caliciopsis* causing the caliciopsis canker. The disease then causes cankers to develop beneath the bark, reducing the tree's ability to transport water and nutrients. If the white pine develops too many cankers, mortality becomes possible.

In 2022 and 2023, NCFS staff received numerous calls from landowners regarding diseased and dying white pines on their land, prompting forest health staff to investigate further. Current symptoms have ranged from minor declines to mortality in stands that were seemingly healthy several years prior. NCFS Forest Health specialists have noted the most significant white pine dieback is occurring in Ashe and Alleghany counties.

Currently, there are no management or treatment options for controlling this pest. It is unknown why this complex has recently started impacting healthy trees. However, the USFS, University of Georgia and N.C. State University researchers are currently investigating this issue.

INVASIVE PLANTS

Invasive insects and pathogens have been the primary focus of forest health initiatives. Likewise, nonnative invasive plants create competitive pressure on our native plant and animal populations by altering forest composition, reducing biodiversity, damaging wildlife habitat and presenting challenges to management, site preparation and reforestation efforts.

North Carolina foresters, landowners and homeowners have been increasingly engaged in attempting to control a large variety of nonnative invasive plant species on properties they own and manage. The NCFS is currently awaiting final approval to launch a cost share program to assist private landowners with invasive plant removal. The following list addresses just a few of the problematic nonnative invasive plant species by physiographic region in North Carolina.

Coastal Plain	Piedmont	Mountain
1. Chinese privet	1. Chinese privet	1. Multiflora rose
2. Microstegia/Stiltgrass	2. Kudzu	2. Kudzu
3. Kudzu	3. Wisteria	3. Oriental bittersweet
4. Phragmites/Common reed	4. Microstegia/Stiltgrass	4. Chinese privet
5. Wisteria	5. Tree of heaven	5. Japanese honeysuckle

ABIOTIC CONDITIONS

Wildland fire

In 2023, 4,240 wildland fires were reported on 17,505 forested acres. Most of which were human caused with only 32 fires burning 157 acres resulted from lightning strikes.

First EF-3 tornado on record for July touches down in Nash and Edgecombe counties

On July 19, 2023, an EF-3 tornado touched down in parts of Nash and Edgecombe counties. This was the first EF-3 tornado observed in this part of North Carolina in July, and only the third tornado of EF-3 or greater strength recorded in the state during summer since 1950.

The tornado touched down just east of U.S. Interstate 95 and traveled in a northeasterly direction destroying several homes and snapping power poles and trees along the way. The path of damage extended across approximately 16.5 miles and was about 600 yards wide at its widest point. Estimated winds were at least 150 mph. The tornado also significantly damaged a large Pfizer manufacturing plant in Rocky Mount, NC. Following the event, the NCFS conducted an aerial flight to assess the extent of the damage and assisted landowners with storm-damaged trees and woodlands. The total area damaged was 319.7 acres with an estimated economic loss of over \$492,000.



Tornado damage along I-95. Photo by NCFS.

Stressed hickories in Eden, North Carolina

Weather patterns across the state have fluctuated between moderate to abnormally dry to wet over the last several years. Some regions have experienced drastic shifts from wet-to-dry and dry-to-wet conditions. When other factors such as prolonged drought, soil compaction, nutrient deficiencies and competition are present, it can have an impact on forest health.

During a NCFS District 10 flight conducted in August 2023, forest health staff noted premature defoliation across roughly 200 acres in a hardwood stand in Rockingham County. NCFS staff visited the site to investigate further and found shagbark hickories within the stand exhibiting premature defoliation. No sign of serious insect or pathogen was observed. Forest health staff concluded that the observed damage was most likely attributed to poor site conditions further exacerbated by wet-to-dry weather patterns on clay soils with high shrink-swell potential.



Shagbark Hickory exhibiting early leaf drop in Eden, NC. Photo by NCFS.

Sea level continues to rise

Sea levels have continued to rise due to the expansion of ocean water from warming and melting ice sheets and glaciers. Due to its low elevation, much of North Carolina's coastline is vulnerable to rising sea levels. High tide flooding, defined as water levels of 1.6 to 2.1 feet above normal high tide, is projected to become a nearly daily occurrence by the year 2100. Storm surges are also expected to intensify with the predicted rise, resulting in increased coastal inland flooding, particularly when storm surges coincide with normal high tides.



Coastal Ghost Forest. Photo by NCFS.

As sea levels rise along the coasts, saltwater encroaches onto the land, a process known as saltwater intrusion. Saltwater intrusion can also occur further inland due to storm surges from hurricanes. This intrusion is often temporary and does not typically lead to significant tree mortality. However, with the predicted increase in flooding from storm surges, tree mortality and changes in our coastal forest ecosystems will likely be more significant.

When saltwater intrusion is more permanent due to rising sea levels and higher storm surges pushing saltwater farther inland, elevated salinity levels in the soil slowly poison trees, leaving behind ghostly gray stands of deadwood. The stands of dead trees resulting from this phenomenon have become known as coastal ghost forests.

Coastal ghost forests have become more common along the Atlantic coastline. The NCFS began conducting routine forest health flights over the North Carolina coast in 2021 in collaboration with the USFS and six other Atlantic coast states to estimate and map the extent of these ghost forests. Flights conducted in 2021 by the NCFS helped collect baseline data for the [Coastal Ghost Forest Mapping](#)

Project. In 2022 and 2023, monitoring plots and photo points were established in affected areas to track changes to our coast over time.

North Carolina has experienced some of the most significant impacts of saltwater intrusion, with more than 56,608 acres of forestland converted to these desolate ghost forests—more than any other state on the East Coast. Tree mortality ranges from 1% to more than 50% in damaged areas. A link to the Coastal Ghost Forest Mapping Project is located below:

<https://www.arcgis.com/apps/dashboards/91a0a6caab264c17885e1945d8d389d1>

WATCHLIST

Asian long-horned beetle

Asian long-horned beetles have been previously reported in the Northeast and Midwest over the past decade, impacting a variety of hardwood species. In May 2020, it was detected for the first time in the Southeast near Charleston, SC. Efforts are underway to control the pest before it spreads further as this species is not wanted in North Carolina. Forest health personnel have familiarized themselves with identifying and controlling the insect and continue to monitor for this pest closely. Multiple federal (USDA-APHIS and the USFS) and state (NCDA&CS Plant Industries Division and the NCFS) agencies are surveying and monitoring for this insect to detect and respond early to any infestation.



Asian long-horned beetle. Photo by Kenneth R. Law. USDA-APHIS.

Beech leaf disease

Beech leaf disease (BLD) is a newly described disease, first identified in Ohio in 2012. The disease has spread rapidly, killing native and ornamental beech trees and saplings across the Northeast. Since its initial discovery, BLD has spread to 12 states and the province of Ontario. BLD was detected for the first time in neighboring Virginia in 2022.

The disease is associated with a foliar nematode (*Litylenchus crenatae mccannii*). There is no consensus on the nematode's origin, but there is agreement that it's a nonnative species to North America. Spreading of the parasite is thought to coincide with mast production through hitchhiking on animals that feed on beechnuts, or defecation following the consumption of nematode infected beech buds.



Foliar nematode causing beech leaf disease. Photo by Paulo Vieira, USFS.



The nematodes overwinter within beech buds. Infected leaves will emerge in the spring, showing dark bands and puckering or raised areas between leaf veins. The disease can kill mature trees within six to 10 years following infestation.

Beech trees are ecologically important to our forest ecosystems. Loss attributed to BLD could be devastating. If you suspect your beech tree is infected, notify forest health staff immediately.

Leaf banding associated with beech leaf disease damage. Photo Kristen Wickert, USFS, Bugwood.org.

ACKNOWLEDGEMENTS

With assistance and support from the USFS, the NCFIS is responsible for assisting woodland owners in the state with the detection and control of destructive forest insects and diseases. Forest health specialists in the Forest Protection Division direct this responsibility. Services are provided to forest landowners by district and county personnel with forest health staff providing appropriate training along with professional and technical expertise in the diagnosis and control of destructive insects and diseases.

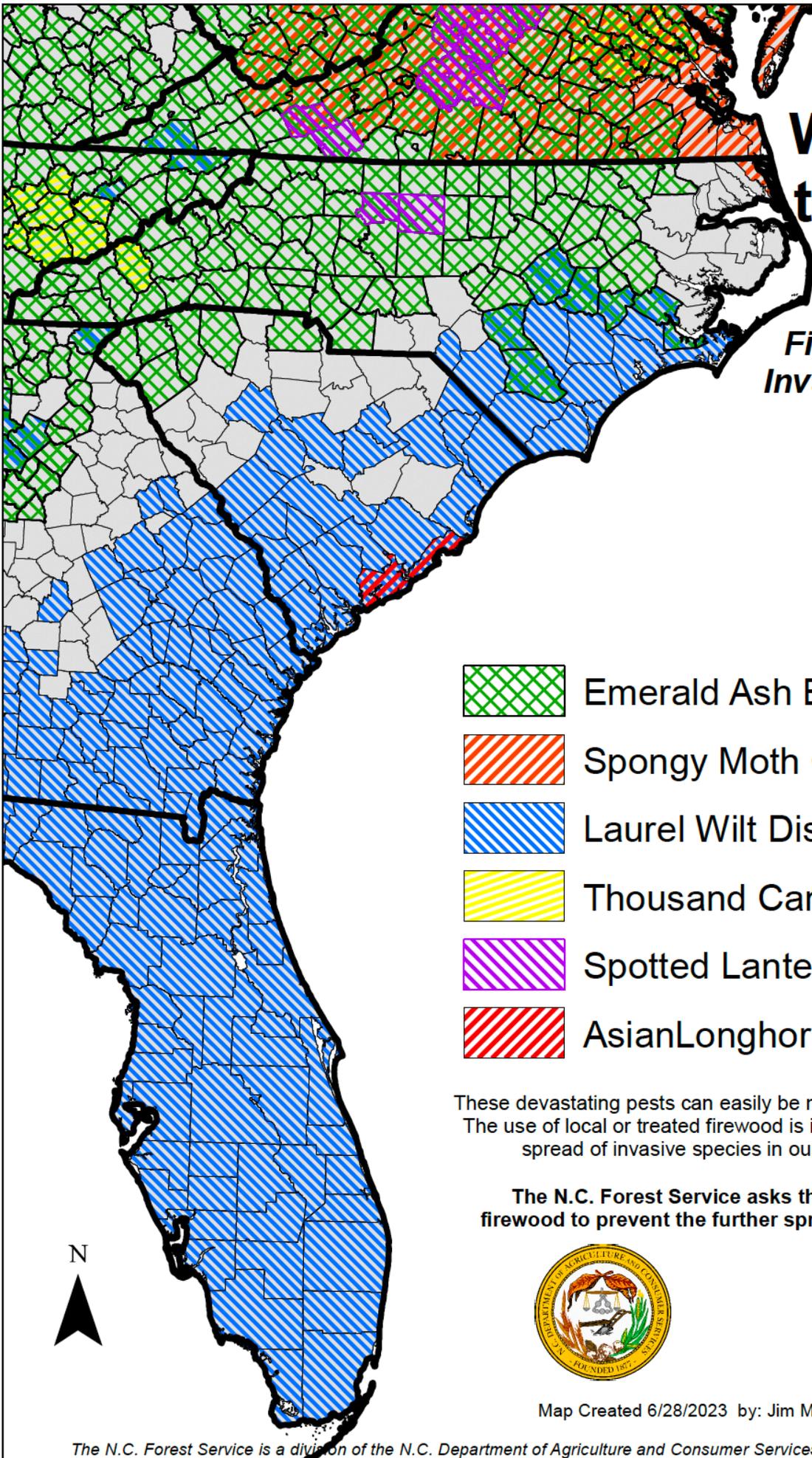
<p>N.C. Department of Agriculture & Consumer Services N.C. Forest Service Forest Health Branch 1616 Mail Service Center Raleigh, NC 27699-1616 919-857-4858 http://www.ncforestservation.org</p>	<p>U.S. Department of Agriculture Forest Service Southern Region, State and Private Forestry Forest Health Protection 200 W.T. Weaver Road Asheville, NC 28804 828-257-4320 http://www.fs.fed.us/r8/foresthalth/</p>
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The N.C. Forest Service is an equal opportunity employer. Its programs, services, activities and employment opportunities are available to all people regardless of race, color, religion, sex, age, national origin, disabilities or political affiliation.

Users are encouraged to report any sightings of emerald ash borer, laurel wilt and thousand cankers disease to newpest@ncagr.gov.

Where are they now?

Monitoring Firewood-Vectored Invasive Forest Pests in North Carolina



Emerald Ash Borer



Spongy Moth Quarantine



Laurel Wilt Disease



Thousand Cankers Disease



Spotted Lanternfly



Asian Longhorned Beetle

These devastating pests can easily be moved in or on firewood. The use of local or treated firewood is important to reduce the spread of invasive species in our state's forests.

The N.C. Forest Service asks that you use local firewood to prevent the further spread of forest pests.



Map Created 6/28/2023 by: Jim Moeller - FH Specialist

The N.C. Forest Service is a division of the N.C. Department of Agriculture and Consumer Services; Steve Troxler, Commissioner.