NORTH CAROLINA FOREST SERVICE
2020 Forest Health Highlights

Our Forests

North Carolina's forests cover 18.6 million acres or about 60% of the state's land area. Most of this forestland, about 11.3 million acres, is owned by individuals, families and non-corporate entities. About 2.9 million acres is owned by private corporations not involved in forest product manufacturing, and about 1.3 million acres is owned by forest industry. Federal, state and local public lands total 2.6 million acres. Forestry is an important industry in the state, providing nearly 180,000 jobs and ranking second in employment.

Forests in North Carolina are also prized for their scenic beauty, supporting tourism and outdoor recreation, and providing wildlife habitat from the Appalachian Mountains to the lowlands of the Atlantic Coastal Plain. The beauty and productivity of North Carolina's forests have historically been challenged by a variety of threats, both native and nonnative. In the past 10 years, three nonnative invasive species were detected for the first time in the state: **laurel wilt** in 2011; **thousand cankers disease** of walnuts in 2012; and, **emerald ash borer** in 2013. Pests such as **hemlock woolly adelgid** and **gypsy moth** have impacted forests in the state for more than 20 years. Others, such as **spotted lanternfly** and **Asian longhorned beetle**, have been found in adjacent states and are being monitored closely in North Carolina

COVID-19 Impacts

N.C. Forest Service (NCFS) programs and services were greatly impacted by the Coronavirus pandemic. Aerial surveying to detect and document **southern pine beetle** mortality, **forest tent caterpillar** defoliation, and damage caused by other pests was grounded, and alternative technologies, such as satellite remote sensing, were necessarily utilized for detection of forest health threats. Forest health meetings, training and education and outreach events were delivered through online formats. Field services were provided with social distancing, and many visits were prioritized or eliminated through diagnostic use of photographs from landowners, homeowners and forestry professionals.

Invasive Pests

Laurel Wilt Detected in One Additional County in 2020:

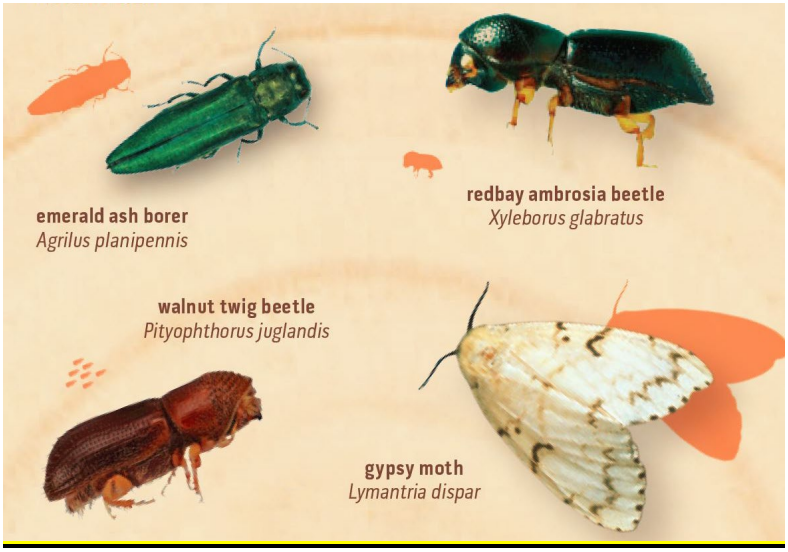
The devastating **laurel wilt disease** was first confirmed in North Carolina in 2011. This year, it was detected in Wayne County, bringing the total to 12 positive counties in the southeastern part of the state. Laurel wilt was previously detected in Bladen, Brunswick, Columbus, Cumberland, Duplin, Lenoir, New Hanover, Onslow, Pender, Robeson and Sampson counties. Historically, detections of laurel wilt and its insect vector, **redbay ambrosia beetle**, were confined to redbay and swampbay trees. More recent detections have also been recorded in sassafras. A map of the current known distribution of laurel wilt in North Carolina can be found here: http://www.ncforestservice.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 the **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 United States Department of Agriculture Forest Service (USFS) to trap and survey for newly affected areas in the state. In 2020, 40 traps were set statewide and the **walnut twig beetle** was not detected in any additional areas. A map of the current known distribution of thousand cankers disease of walnuts in North Carolina can be found here: http://www.ncforestservice.gov/forest_health/pdf/Map_TCD_NCTracking.pdf



Like Trojan soldiers, these nonnative invasive pests hide on or in the trees they kill and can be transmitted from one location to another through movement of untreated firewood. Graphic Credit: www.dontmovefirewood.org.

Emerald Ash Borer Detected in Six Additional Counties in North Carolina:

Since its initial 2013 detection in North Carolina, the **emerald ash borer (EAB)** has been found in 61 counties across the state, with six new 2020 detections in Alexander, Clay, Cleveland, Montgomery, Northampton and Union counties. In 2015, the entire state was placed under state and federal **quarantines** to prevent the spread of this pest to noninfested areas. A map of the current known distribution of EAB in North Carolina can be found here: http://www.ncforestservice.gov/forest_health/pdf/Map_EAB_NCTracking.pdf.

This year, the NCFS continued the Ash Protection Program, a reimbursement program to assist communities in protecting ash trees in urban settings. In 2020, seven communities signed up for the program, but due to COVID-19 staff restrictions and other limitations, only three communities were able to treat this year, protecting more than 165 high value ash trees. Since 2018, 788 urban ash trees have been protected with appropriate insecticides. The program will continue for at least another year.

Through cooperative efforts with the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), NCFS forest health staff have participated in a long-term biocontrol effort by releasing parasitoid wasps at several sites in Granville, Vance and Wayne counties since 2013. More recently, releases have also occurred in Forsyth, Chatham and Wake counties. Over the past year, trapping efforts have been conducted to determine if these wasps are reproducing and contributing to EAB control. Trapping data is currently being evaluated.

In addition, the NCFS Forest Health Branch, N.C. Department of Agriculture & Consumer Services (NCDA&CS)-Beneficial Insect Lab, and N.C. State University, though a grant from the USDA-APHIS Emerald Ash Borer Biocontrol Program, are collaborating to study the phenology of EAB in North Carolina. This is the

second year of this effort to document life stage timing of EAB in the state. This information will be utilized to better time and manage future treatments and biological control efforts.

Hemlock Woolly Adelgid and the Hemlock Restoration Initiative:

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. At an alarming rate, hemlocks continue to suffer from these infestations.

Five years ago, a cooperative effort between the 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. From fall 2019 to spring 2020, 6,078 hemlocks were treated. Fall/winter 2021 treatments are ongoing. Meanwhile, HRI continues to release predatory beetles that prey on the adelgids.

Gypsy Moth Program:

Since 1982, the entire state of North Carolina has been monitored for **gypsy moth** by the NCDA&CS-Plant Industry Division Gypsy Moth Program and the USFS Slow the Spread Program. The 2020 trapping season is complete, and 1,037 male gypsy moths were captured in 371 traps, with 16,577 traps set statewide. This is slightly more captures compared with last year (2019) when 1,019 moths were captured in 507 traps, with 17,615 traps set statewide. Male moth captures do not necessarily indicate a population of gypsy moth is developing in an area but triggers further investigation to determine if females are present and if control is warranted.

Based on this year's trap captures, four mating disruption treatments totaling 7,664 acres and one Btk treatment totaling 451 acres have been proposed to receive treatments in 2021.

The gypsy moth has historically been held at bay from becoming established in North Carolina with only two counties, Currituck and parts of Dare, being quarantined for the pest since 1988. These two counties remain the only two in the state with a gypsy moth quarantine in place.

On the lookout

Left: Spotted lanternfly, Credit: Richard Gardner, Bugwood.org
Right: Asian longhorned beetle, Credit: Kenneth R. Law, USDA-APHIS, Bugwood.org

Two pests of concern not yet found in North Carolina have been detected in adjacent states. **Spotted lanternfly** has been found in northeastern states for the past several years and two years ago was reported for the first time in Virginia. While mostly a pest of fruit trees and grapes, it is known to attack a variety of hardwood trees found in North Carolina forests. Likewise, **Asian longhorned beetles** have been previously reported in the northeast

over the past decade impacting a variety of hardwood species. Last year, it was detected for the first time in the Southeast near Charleston, South Carolina. Efforts are underway to control the pest before it spreads further. Both species are not wanted in North Carolina. Multiple federal (USDA-APHIS and USFS) and state (NCDA&CS-Plant Industries Division and NCFS) agencies are surveying and monitoring for these insect pests to detect and respond to early infestations.

Native Pests

Bark Beetles:

The **southern pine beetle (SPB)** has historically been North Carolina's most significant forest insect pest. From 1999 through 2002, SPB killed at least $84 million worth of timber in North Carolina. Since then, beetle activity has been relatively low. In 2017 and 2018, however, activity picked up on federal, state and private lands, then began to subside in 2019. This year, only one small spot of activity was reported on private lands in the western part of the state. In the spring, the NCFS set 33 SPB prediction traps across the state. These traps, plus additional traps deployed by the USFS, indicated correctly that low SPB activity should be expected across state this year.

The **Southern Pine Beetle Prevention Program**, funded through a grant from the USDA Forest Service, partially reimburses nonindustrial private forest landowners in North Carolina for the cost of completing forest management practices to improve pine forest health and to reduce the likelihood of SPB infestations. Precommercial thinning has been the most utilized practice under this program in North Carolina. The practice reduces the number of trees in a young stand that compete for available sunlight, nutrients and water—improving growing conditions for remaining trees. Since 2005, 79,100 acres in North Carolina have been treated through this program. In 2020, additional practices, including understory prescribed burns and understory vegetation control, were added to the program to further encourage healthy growing conditions.

While southern pine beetle activity was low, ***Ips* engraver beetle** continued to cause pine mortality statewide. *Ips* are secondary pests, meaning they attack 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 48 reports of severe damage on 53 acres across the state.

Defoliators:

Native foliage-consuming pests cause damage that is mainly unsightly, but usually have little impact on healthy trees in the long run.

The **forest tent caterpillar** is a caterpillar that defoliates bottomland hardwoods. In 2020, North Carolina experienced its sixth consecutive year of forest tent caterpillar outbreak. Through use of satellite assisted remote sensing (USDA Forest Service FORWARN) followed by ground validation checks, an estimated 158,700 acres were impacted along the Roanoke and Chowan Rivers. Trees recovered by summer and no mortality was observed. In 2019, 104,793 acres of bottomland hardwoods were defoliated by this pest.

Stem Disease

Pitch canker is a disease that has typically had a minor impact among native pines in North Carolina. This year there was a noticeable increase in activity with this disease, likely due to ideal moisture levels caused by higher than normal rainfall over the past several years. Pitch canker was documented in short leaf, loblolly and white pine stands, with scattered pitch canker mortality found throughout the state. Mortality was usually limited to exposed outer edges of pine stands, as well as in open grown pines located in fields and rights of way. Tree mortality was most prevalent in edge trees with access to nitrogen from adjacent fields. High nitrogen levels have a direct relationship to pitch canker infection rates. Another factor was significant exposure to wind and hail that

caused branch wounds—access points for disease infection. Although highly visible, overall mortality was only present in very small percentages of most of the infected forested stands.


Left: Pitch canker foliar symptoms (discoloration and branch dieback). Credit: Brian Health, NCFS
Right: Pitch canker stem symptoms (oozing pitch). Credit: Mark Bost, NCFS

Forest Health Assistance in North Carolina

With assistance and support from the USDA Forest Service, the NCFS is responsible for helping forest landowners of the state in 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 the forest health section staff providing appropriate training along with professional and technical expertise in the diagnosis and control of destructive insects and diseases.

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Southern Region, State & Private Forestry
Forest Health Protection
200 W.T. Weaver Road
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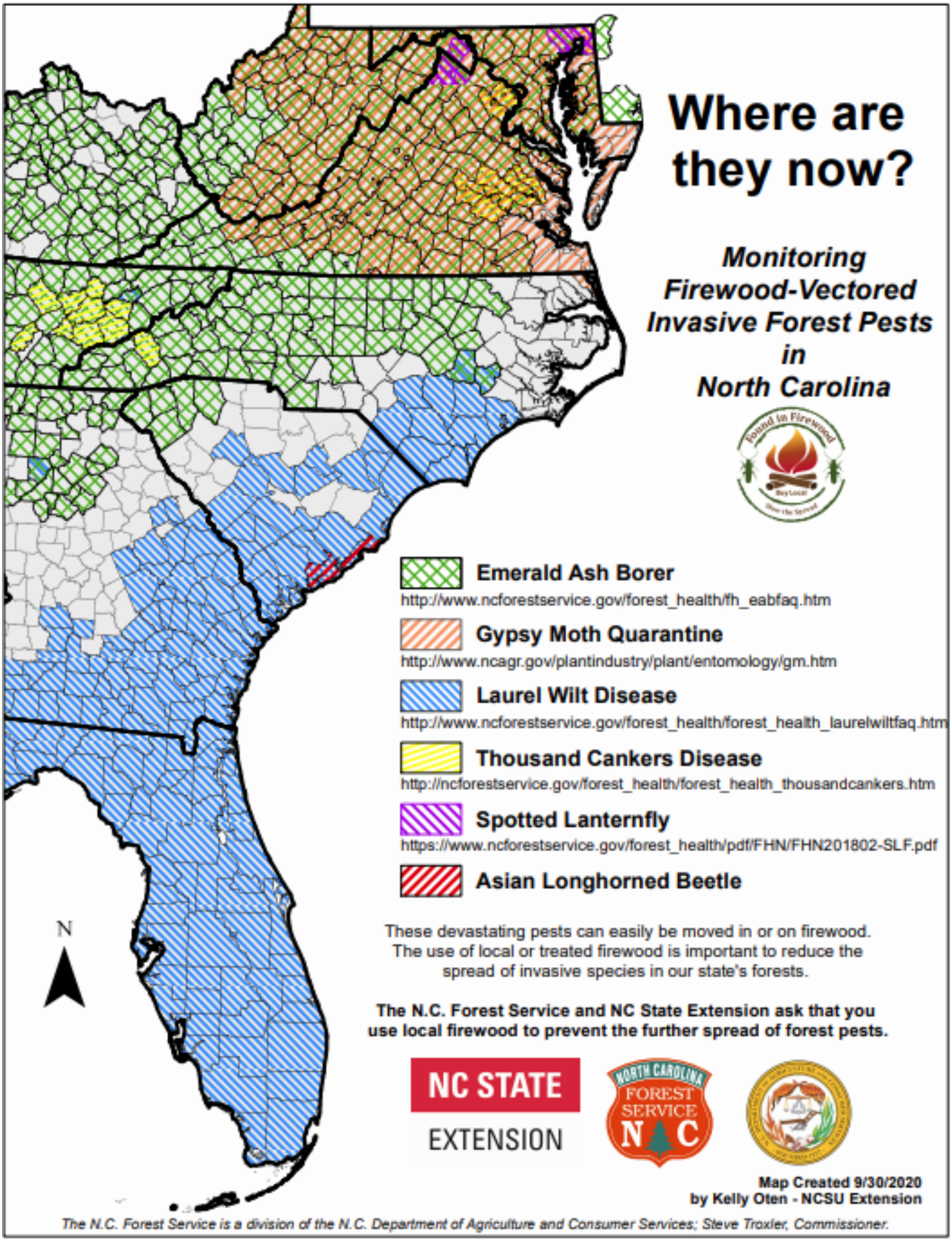
http://www.fs.fed.us/r8/foresthealth/


Where are they now?
Monitoring Firewood-Vectored Invasive Forest Pests in North Carolina
Emerald Ash Borer
http://www.ncforestservice.gov/forest_health/fh_eabfaq.htm
Gypsy Moth Quarantine
http://www.ncagr.gov/plantindustry/plant/entomology/gm.htm
Laurel Wilt Disease
http://www.ncforestservice.gov/forest_health/forest_health_laurelwiltfaq.htm
Thousand Cankers Disease
http://ncforestservice.gov/forest_health/forest_health_thousandcankers.htm
Spotted Lanternfly
https://www.ncforestservice.gov/forest_health/pdf/FHN/FHN201802-SLF.pdf
Asian Longhorned Beetle
N
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 and NC State Extension ask that you use local firewood to prevent the further spread of forest pests.
NC STATE
EXTENSION
NORTH CAROLINA FOREST SERVICE NC
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by Kelly Oten - NCSU Extension
The N.C. Forest Service is a division of the N.C. Department of Agriculture and Consumer Services; Steve Troxler, Commissioner.