



Forest Health Highlights 2021



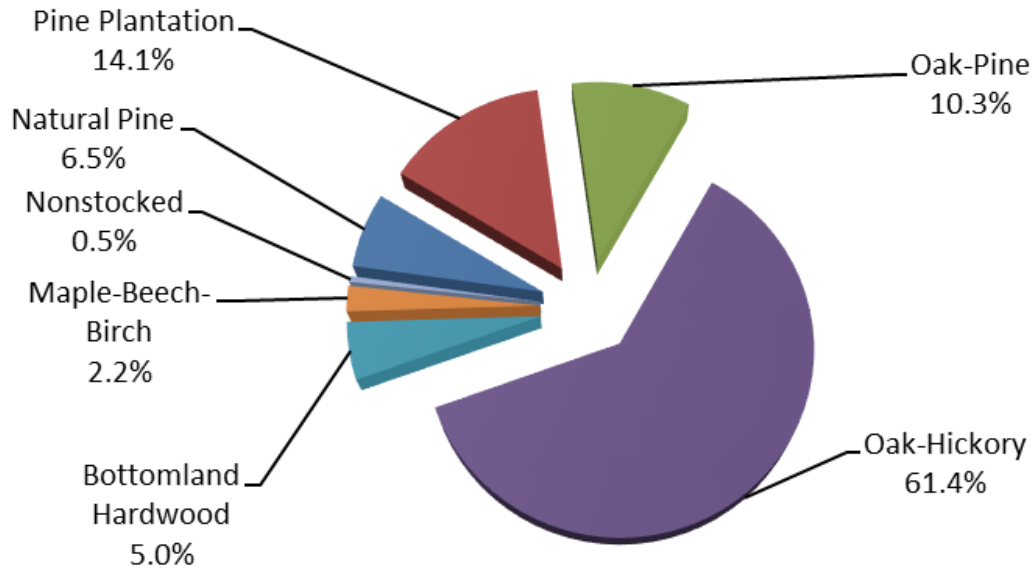
The Resource:

Forests are a valuable resource in Virginia, for both the ecological and economic benefits they provide. Virginia's forests cover 16 million acres, which is 59% of the state's total land area. Of this forestland, 61% is classified as oak-hickory, 10% oak-pine, and 14% planted pine. The majority of this land is privately owned (82%) and provides landowners with timber, wildlife, recreation, and aesthetic value. Over 100 species of live trees have been documented, and FIA (Forest Inventory Analysis) plots estimate over 11 billion trees with diameters greater than or equal to one inch. Yellow-poplar, loblolly pine, chestnut oak, and white oak are the most abundant in terms of standing volume, but red maple ranks most abundant by number of stems. Virginia's forests are impacted by a number of forest health disturbances including non-native invasive plants, insect pests, tree diseases, and abiotic disturbances. Some of these common forest health threats are described below. The Virginia Department of Forestry (VDOF) strives to protect and develop healthy, sustainable forest resources for Virginians.

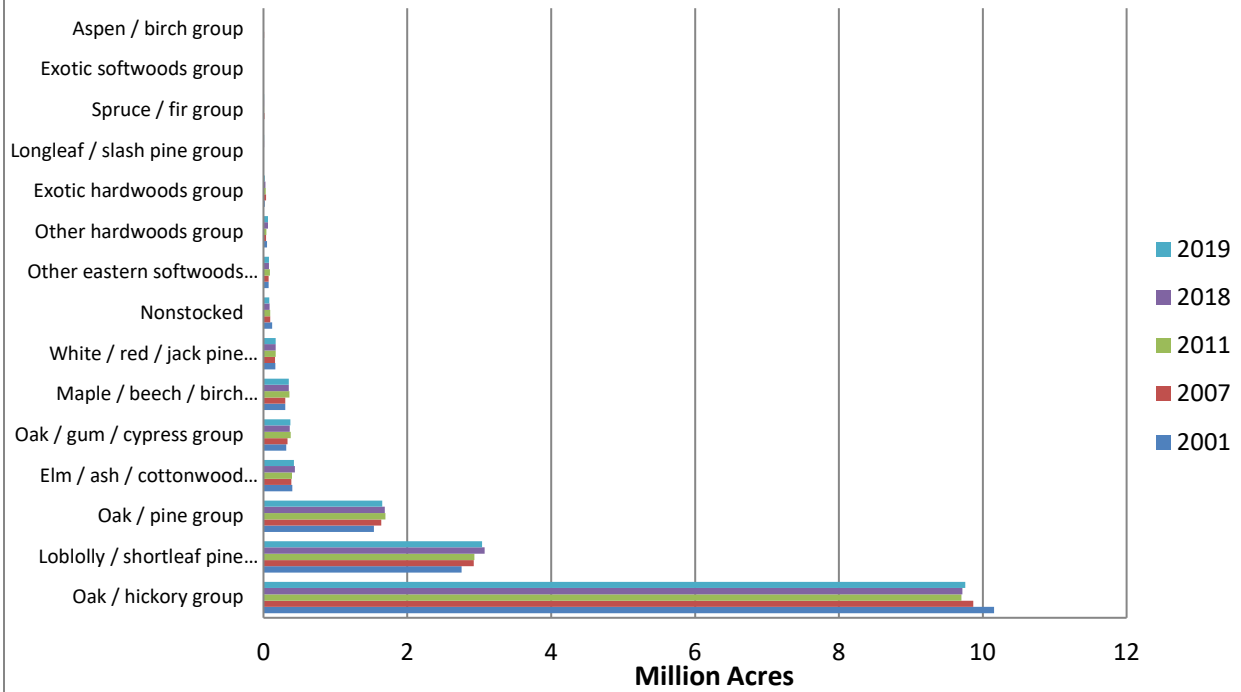
Source:

Brandeis, T.J.; Hartsell, A.J.; Randolph, K.C.; Oswalt, C.M. 2018. Virginia's Forests, 2016. Resource Update FS-150. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 4 p.

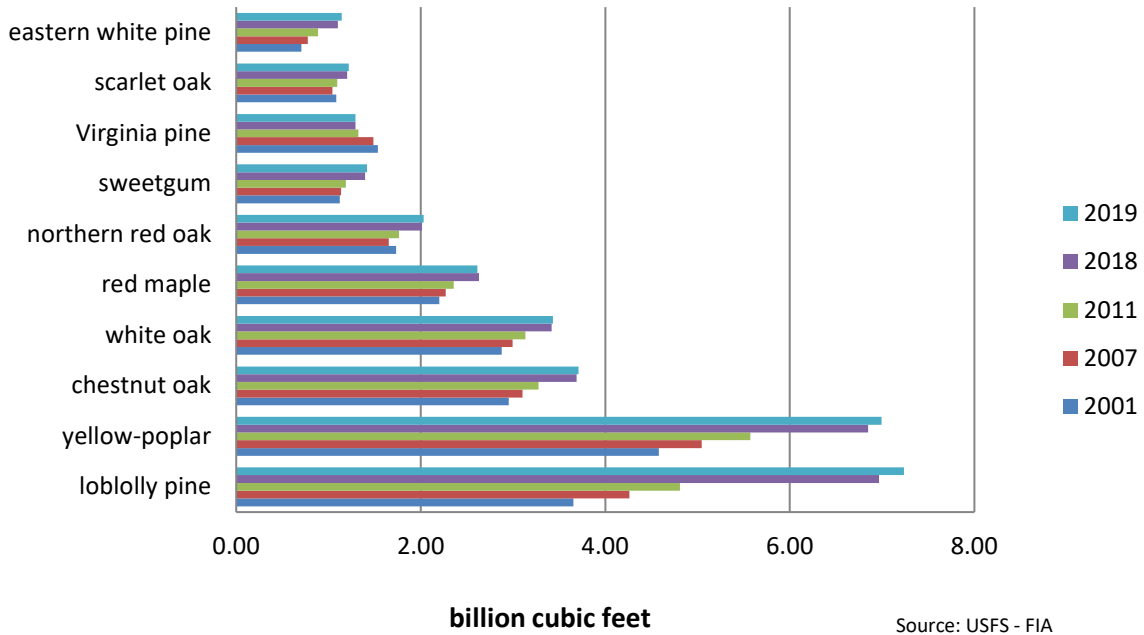
Virginia Forest Type Distribution, 2019



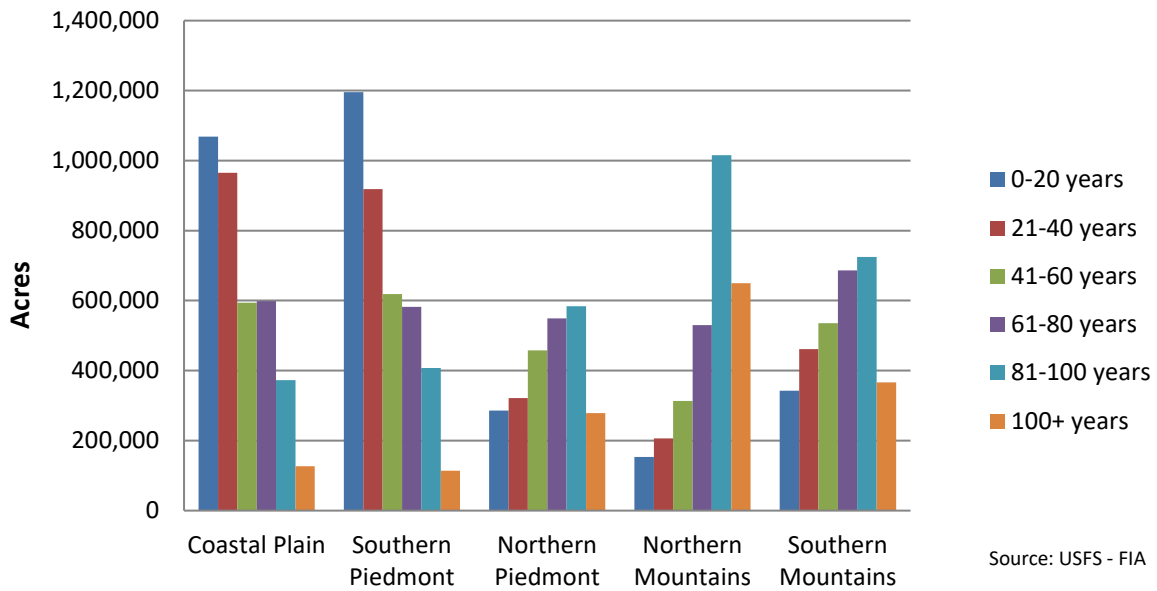
Acres by Forest Type Group



Top 10 Tree Species by Volume



Forest Land Area by Survey Unit & Age Class, 2019



Forest Health Influences and Programs:

Pine Bark Beetles-

Southern pine beetle (SPB) activity has been consistently low for many years in Virginia; however, given that close to 3 million acres are pine, the threat of this native pest is always a concern. VDOF continues to participate in an annual SPB spring survey. In April 2021, twenty-five pheromone baited funnel traps were placed in high risk areas across 11 counties to predict SPB populations. There was a slight increase in the number of SPB trapped in 2021 compared to recent previous years, but the probability of an outbreak still remains low. Over the four week trapping period, SPB were consistently recovered from traps in Chesterfield, Cumberland, Gloucester, Prince Edward and New Kent counties, and a few beetles were found in Accomack, Hanover and Sussex counties. Additionally, there were 18 SPB spots reported to VDOF forest health staff this year, totaling over 39 acres. All spots were small, ranging from a few trees to a few acres, and mostly located in the eastern region.

Ips bark beetle activity has become common in mature pine stands that have never been thinned, or are experiencing stress from other factors such as construction or extended periods of drought. Spots of *Ips* bark beetles were reported to VDOF forest health staff in late winter through the summer months. There were 17 reports of *Ips* bark beetles totaling over 23 acres of damage. These spots were located in 13 central and eastern Virginia counties.

Proper forest management with silvicultural practices such as thinning increase the health of a pine stand and decrease the risk of attack by pine bark beetles. VDOF offers the following three cost-share programs to assist private landowners with practices to minimize the risk of bark beetle attack: pre-commercial pine thinning for landowners, first commercial pine thinning for loggers, and longleaf restoration for landowners. The Virginia Pine Bark Beetle Prevention Program is supported by USFS Forest Health Protection Southern Pine Beetle Program funds. To date, Virginia has thinned nearly 69,000 acres of pine (mostly pre-commercial) through such cost share programs since 2004.



Left: Pine tree with southern pine beetle pitch tubes, Right: Southern pine beetle spot in Chesterfield County

Laurel Wilt Disease-

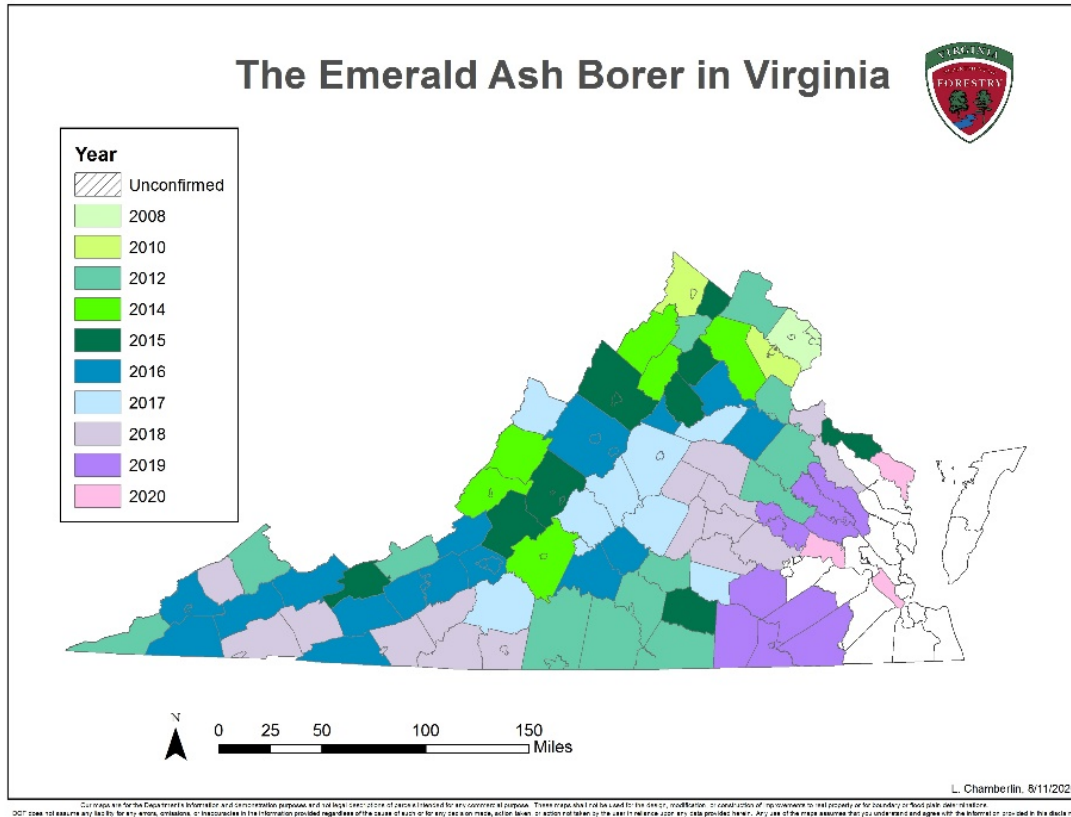
A new tree disease was detected in Virginia in 2021. Laurel wilt disease, which involves both the redbay ambrosia beetle and the fungal pathogen *Raffaelea lauricola*, was confirmed in Scott County in southwest Virginia. This location is just north of a site with laurel wilt disease in Tennessee. VDOF staff visited the site in Tennessee, and then found a symptomatic sassafras tree after driving back north into Virginia. A sample was taken to the Virginia Tech Plant Disease Clinic for preliminary diagnosis, and official confirmation was later announced by USDA-APHIS. Laurel wilt disease impacts all species in the Lauraceae family, including sassafras, redbay and spicebush. Redbay is found in coastal southeast Virginia, and sassafras is widespread but most abundant in the western region.



Left: Vascular steaking beneath bark of sassafras infected with laurel wilt, Right: Dead sassafras along field edge

Emerald Ash Borer-

The invasive wood boring beetle, emerald ash borer (EAB) continues to be a threat to all ash species found within Virginia. EAB has been detected in 83 counties; no new counties were added in 2021 (see map). Only counties in the southeast remain unconfirmed, though EAB is most likely present. VDOF continues to support chemical and biological control efforts against EAB. No biocontrol agents were released by VDOF in 2021, but recovery surveys with yellow pan traps were conducted at James Madison's Monpelier where EAB parasitoids had been released the previous two years. Additionally, forest health staff treated 85 ash trees on State Land in 2021. VDOF's ash treatment cost-share program provides financial assistance to landowners and municipalities treating specimen ash trees. In 2021, landowners in the eastern region and municipalities statewide treated 150 trees through this cost-share program.

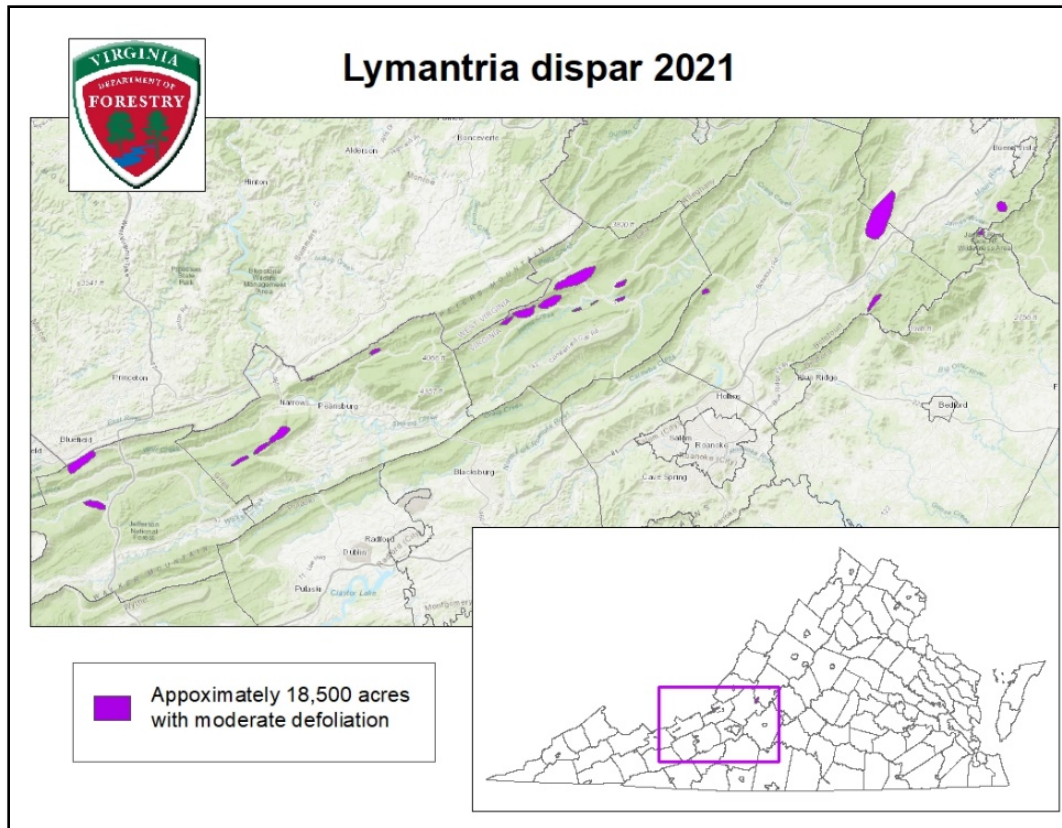


Oak Decline-

Similar to previous years, reports of declining oak trees increased in late summer and early fall. These declining oaks are usually mature trees that are also experiencing stress due to factors such as poor site condition, mechanical injury, defoliation, and/or drought conditions. As the seasons change and fall approaches, the symptoms of oak decline can become much more apparent. Insect herbivory, foliar pathogens, and abiotic stress factors all contribute to a gradual decline that results in thin canopies and premature leaf browning. Oak decline is a significant forest health concern in Virginia, especially because many oak trees are reaching maturity which is a predisposing factor for oak decline.

Lymantria dispar-

L. dispar (formerly known as gypsy moth), was present in relatively low numbers in Virginia throughout 2021. Signs and symptoms of *L. dispar* were reported to VDOF in July from ridgetops in western Virginia and central district of Shenandoah National Park. An aerial survey over these areas revealed light/moderate defoliation along ridgetops. In total, 18,538 acres **with** defoliation (4,104 acres **of** defoliation) were mapped. When ground thruthing some of these location, dead and desiccated *L. dispar* larvae were observed, indicating *Entomophaga maimaiga* was present. *E. maimaiga* is a fungus that proliferates in wet weather and causes *L. dispar* larval mortality. We predict that populations of *L. dispar* would have been much larger without the control from *E. maimaiga* this year.



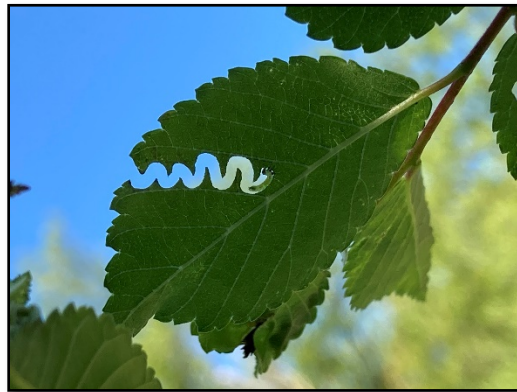
Hemlock Woolly Adelgid-

The hemlock woolly adelgid (HWA) has been plaguing hemlocks in Virginia for over half a century. Many hemlock trees have succumb to this invasive insect and hemlock mortality is common in forests throughout its range. However, VDOF works to protect the remaining hemlocks on public land with chemical and biological control. In 2021, forest health staff treated a total of 173 hemlocks on two state forests and one county park. Additionally, forest health staff released 435 *Leucotaraxis argenticollis*, a predatory fly, for biological control of HWA at Sandy Point State Forest. These sites will be monitored and new sites will be assessed for future treatment.

Elm Zigzag Sawfly-

The elm zigzag sawfly (*Aproceros leucopoda*) is native to east Asia, but was detected in Europe in the early 2000s, and confirmed in Quebec, Canada in 2020. The larvae are small, green, and feed on foliage in a zigzag pattern until they eventually consume the entire leaf. Hosts include species of Elm (*Ulmus* spp.). In 2021, a Canadian research group noticed an iNaturalist photo taken in Clarke County, Virginia that resembled the zigzag sawfly. Pest alerts were distributed to natural resource professionals prompting an inspector with the Virginia Department of Agriculture and Consumer Services (VDACS) to remember seeing similar damage the previous year in Winchester, Va. The elm zigzag sawfly was confirmed at this site in May, 2021. It has since been confirmed in Frederick, Clarke, Shenandoah, Page, Rockingham, Augusta, Rockbridge and Montgomery counties. Most severe damage has been observed on Siberian Elm, but minor, incomplete defoliation has been observed on some American elm trees

in Virginia. In Europe, repeated severe defoliation has led to some tree mortality, but it is too soon to know the long-term impacts to elms here in Virginia.



Elm zigzag sawfly larvae feeding on elm foliage

Beech Leaf Disease-

This foliar disease impacts American beech trees, but can also impact planted European, Oriental, and Chinese beech. It is caused by a foliar nematode, *Litylenchus crenatae* ssp. *mccannii* (Anguinata), which overwinters in buds and detached leaves. It was first detected in Ohio in 2012 and is found in other states such as Pennsylvania, New York, Connecticut, Rhode Island, and Massachusetts. In 2021, symptomatic beech trees were observed in a park in Prince William County, which was the first detection of beech leaf disease in Virginia. Early symptoms include interveinal greening, in which the plant tissue darkens and thickens between lateral leaf veins. This is followed by leaf wilting and curling, leaf discoloration, and eventual leaf drop. Reduced bud and leaf production lead to thin canopies over time. Tree mortality has been observed within 2-7 years of infection, mostly in smaller, understory trees. The current known distribution of beech leaf disease in Virginia is just one site in Prince William County, but more surveys will be conducted in 2022.



Interveinal greening on beech leaves, a symptom of beech leaf disease

Spotted Lanternfly-

Virginia's first detection of the spotted lanternfly (SLF) was in 2018 in Frederick County and the city of Winchester. Since this initial detection, it has spread to the counties of Clarke, Warren, Shenandoah, Page, Rockingham and Prince William, and the City of Lynchburg. Additional detections of a single insect or small population were made in Fauquier, Madison, Albemarle, Augusta, Rockbridge, and Carroll counties. VDOF continues work with VDACS and Virginia Cooperative Extension to trap, survey, and distribute SLF information. The goal the cooperative SLF program in Virginia is to slow the spread of this invasive insect.



Spotted lanternfly adults with egg masses

Abiotic Factors-

In 2021, the most noticeable impact from abiotic factors was a storm in February that caused ice damage to recently thinned pine stands. Damage was observed in Lunenburg, Brunswick, Chesterfield, Dinwiddie, Amelia, Nottoway, and Price Edward counties where young trees bent over, snapped, or uprooted.

Forest Health Assistance in Virginia:

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