



FOREST HEALTH REVIEW

February 2016



Pine mortality due to the southern pine beetle on Chincoteague Island, VA.

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GREETINGS

This past year was a year of change. Some forest pests that had become commonplace in parts of Virginia were not as abundant this year (e.g. fall cankerworm), while other more infrequent pests rose to outbreak status (e.g. yellow poplar weevil). However, the biggest change within the Forest Health Program at VDOF was that we said goodbye to Dr. Chris Asaro, the forest health program manager with VDOF for more than 10 years. Chris left our agency to continue his career in forest health monitoring with the USDA Forest Service. We were extremely sad to see him leave, but glad that he will still be supporting our program's mission.

After working for VDOF for almost two years, I am thrilled to be taking on the position of forest health program manager. Chris left big shoes to fill, and it may take me some time to get up to speed, but I am excited about continuing the program's work. Please reach out to me with any and all forest health issues and concerns. I hope to provide assistance, but also learn from you and your experiences. This publication will remain a vehicle to report the most current forest health information in Virginia. Enjoy!

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**Lori Chamberlin,
forest health program manager**

FALL CANKERWORM AND GYPSY MOTH DEFOLIATION



Gypsy moth caterpillars killed by the fungus *Entomophaga maimaiga* on a white oak tree in Highland County, VA.

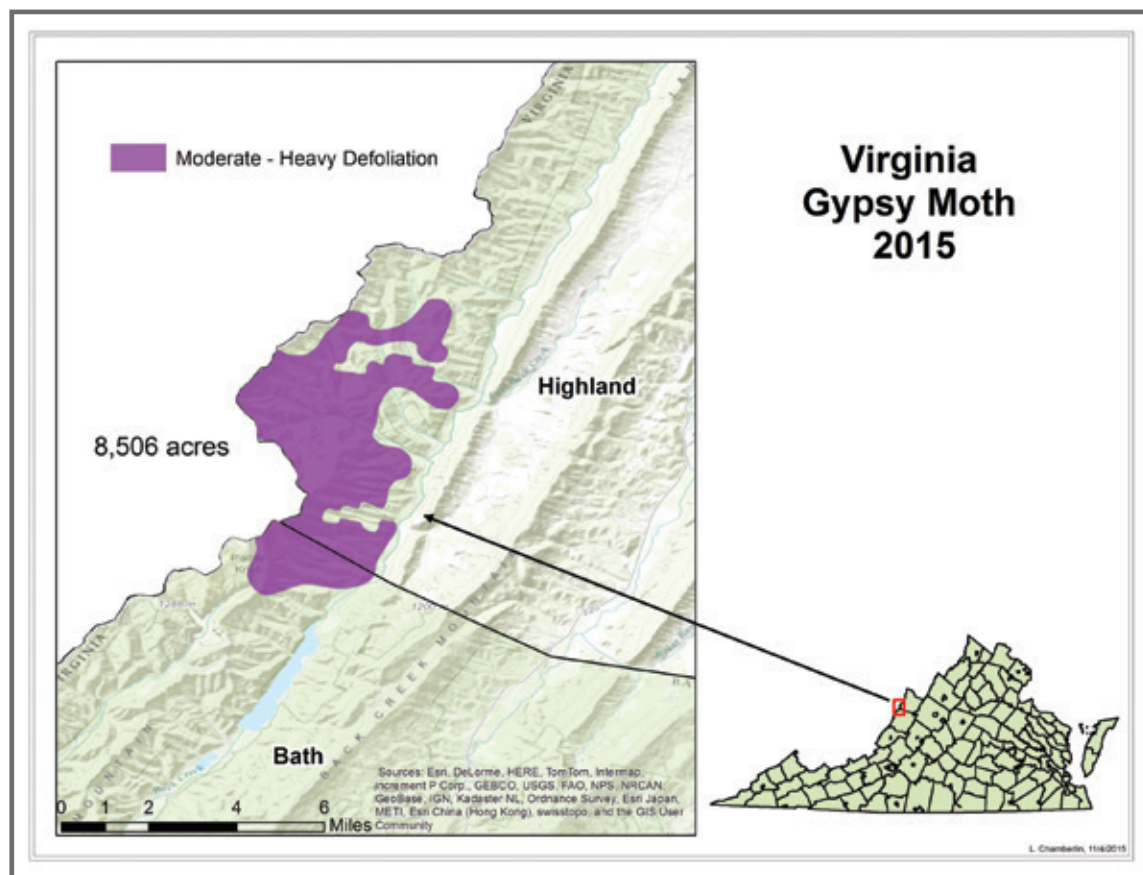
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FALL CANKERWORM AND GYPSY MOTH DEFOLIATION, CONTINUED

Parts of eastern Virginia experienced an extensive fall cankerworm outbreak in 2012 that continued for a few years. However, after three years of heavy defoliation by the fall cankerworm, minimal damage was reported in 2015. Light patchy defoliation was noted this past year in the parts of eastern Virginia that experienced the outbreak from 2012 to 2014, but nothing of significant widespread damage. Aerial survey revealed 884 acres of defoliation by fall cankerworm on the Bull Run Mountains in northern Virginia, which has been a hot spot for fall cankerworm activity since 1973.

As fall cankerworm populations appear to be declining in Virginia, gypsy moth may be on the rise. The last time gypsy moth caused significant detectable defoliation in Virginia was 2009. Since then, there has been little defoliation due to gypsy moth (at least not significant enough to map). Low

gypsy moth populations have been attributed, at least in part, to the fungus *Entomophaga maimaiga* that kills gypsy moth caterpillars. *E. maimaiga* proliferates in wet conditions, so cool wet spring weather may have been augmenting these fungi populations for the last few years and preventing gypsy moth resurgence. This year however, moderate to heavy defoliation was observed in Highland and Bath counties along the state's border with West Virginia. Satellite imagery suggested that there were pockets of gypsy moth damage all throughout these counties, but only 8,506 acres were confirmed with ground surveys. After a five-year hiatus from gypsy moth mapping, this is the first defoliation event significant enough to map. While evidence of the *Entomophaga maimaiga* fungus was observed again this year, it appears that gypsy moth populations have increased in western Virginia.



YELLOW POPLAR WEEVIL

Poplar trees are generally resistant to diseases and relatively free of pests, so we were surprised this year when we started receiving calls about damage on poplar trees. The widespread damage reported on yellow poplar trees in Virginia was unexpected and unusual. However, poplar does have a few common insect pests, including the yellow poplar weevil *Odontopus calceatus*. It is a small, black beetle about 1/8th-inch long that feeds on yellow poplar, sassafras and magnolia trees. It is native to eastern North America from Massachusetts to Florida, but most abundant in the central Appalachian area. This insect normally causes little damage and is not of great economic or ecological importance, but every now and then, they will reach outbreak levels and cause severe damage to trees. The summer of 2015 was an outbreak year in Virginia with abnormally high reports of yellow poplar damage.

The yellow poplar weevil has one generation per year. Adults overwinter in leaf litter on the ground and become active in early spring. They start feeding on buds right before budbreak, and then continue feeding on the leaves. This feeding makes “bean-shaped” holes in leaves about the size of a grain of rice. Adult beetles lay eggs on the midvein of leaves in May and early June, and the larvae that hatch are white and legless. Weevil larvae feed for three to four weeks and create brown blotches on poplar leaves. They pupate on the leaves; then adults emerge soon after to continue feeding from June through July, at which point they drop to the ground in search of a safe place to overwinter.



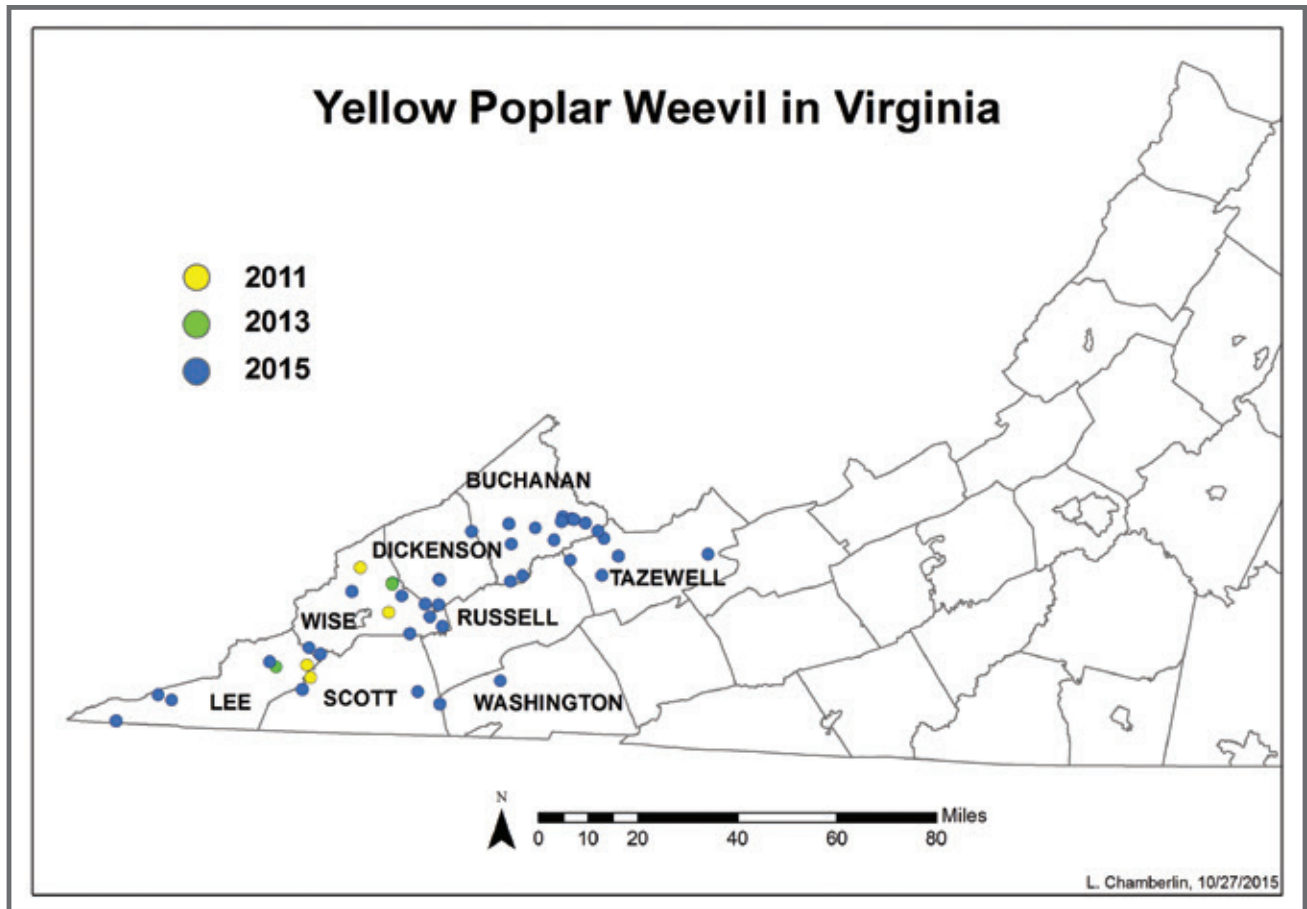
Yellow poplar weevil. Photo by Robert Jerome.

Damaged yellow poplar trees have a scorched appearance and may drop leaves prematurely. Outbreaks tend to be patchy, but can span very large areas. VDOF personnel have documented six yellow poplar weevil outbreaks in the last 25 years, all concentrated in southwest Virginia. This summer, VDOF foresters reported 38 spots and 13,443 acres of widespread patchy damage in eight counties (Lee, Scott, Wise, Washington, Russell, Dickenson, Buchanan and Tazewell) in southwestern Virginia. Yellow poplar weevil outbreaks were also detected in neighboring states of West Virginia and North Carolina. The damage is mostly aesthetic and generally does not affect the overall health of the tree. Promoting general tree health is the best strategy. In areas of severe infestations, landowners may choose to treat residential trees with a foliar insecticide. In addition to the damage this weevil causes, it is also a nuisance pest. In large populations, you may see them crawling on top of vehicles or falling on people walking by. They are often mistaken for ticks, but don't worry, this weevil doesn't harm humans. Outbreaks usually don't last more than a year or two. Natural predators that prey on the yellow poplar weevil eventually cause weevil outbreaks to crash.



Damage to a young yellow poplar tree. Photo by Robert Jerome.

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SOUTHERN PINE BEETLE

This was the 13th year of relatively little southern pine beetle (SPB) activity in Virginia. The only active spots of significant size are found in Virginia Beach (approximately 60 acres of old pine) and Chincoteague Island on the Eastern Shore of Virginia. Chincoteague has been experiencing southern pine beetle activity for the last three years. This island is seven miles long and has many mature loblolly pines growing on difficult soils and exposed to salt spray and saltwater intrusion. Many of these pine trees are approaching the end of their natural lifespan, and would not have lived that much longer in the best conditions. Throw in abiotic (wind and salt) and biotic (bark beetles) stressors, and they are in for a quick demise. In addition, most of the island is developed with residential areas and campgrounds that receive a lot of vehicle traffic, soil disturbance and compaction.

The southern pine beetle infestation on Chincoteague Island has been growing for the last few years, and the island is seeking advice from fire mitigation specialists regarding the risk of an increased number of standing dead pines on the island. Housing structures are scattered over the island, mixed in with a thickening ground cover, marshy areas, phragmites grass stands, large patches of pine snags and poor access for fire equipment. VDOF, along with other state and federal agencies, has been working with Chincoteague Island residents and town officials to educate the community about southern pine beetle infestations and how to deal with the aftermath. The success of wildfire preparedness on Chincoteague is dependent on landowners understanding what can be done as individuals and as a community. Since Chincoteague has such a large tourist population, public information and education materials are necessary. The southern pine beetle is a native insect that you would expect to see attacking old, stressed trees, such as those on Chincoteague Island. The beetle outbreak will run its course, causing pine tree mortality throughout the island. A big change in habitat is taking place, but it's not necessarily all for the worst. Open canopies will allow other species to grow, and, with management, this could result in a more diverse forest. In the meantime, standing dead pines can benefit wildlife by attracting beneficial insects and providing habitat for birds, such as woodpeckers

The following is an interview with Robbie Lewis, senior area forester of the Maritime Region, who has first-hand experience with the SPB outbreak on Chincoteague Island. We



Pine mortality due to southern pine beetle on Assateague Island across from Chincoteague.

appreciate him taking the time to share his knowledge and experience with us.

Lori: What is the history of the southern pine beetle on Chincoteague Island?

Robbie: Apparently, it's been a problem for some time. I remember when a sanitation cut was done on Assateague in the Refuge, on the far side of the three-mile loop. I think that was in the mid 1980s. We've been called to Chincoteague many times by individual homeowners who would have one or two trees killed by soil compaction or lightning damage to trees in their yards. Sometimes, there would be some secondary Ips [beetle] sign or some SPB sign there that the homeowners would notice, thinking that they had an infestation that was the cause of mortality. Quite often the trees were killed by grading or driveway construction. They would usually ask us what killed the couple of trees; how to stop it; whether or not the dead trees could be safety hazards; who to call to remove them, etc. In 2012, the number of SPB-killed trees seemed to increase. The Chincoteague Town Council and administration, and some homeowners associations, began to call us to come up and take a look. SPB-kill areas seemed to be rapidly expanding. That's when Chris Asaro got involved by doing a presentation for the town one evening in November of 2012 – to get the word out about the beetle, its life cycle, what signs to look for, etc.

Lori: How have the residents of Chincoteague responded to the recent outbreak?

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SOUTHERN PINE BEETLE, CONTINUED

Robbie: Seems like most of the residents are primarily disappointed in the fact that their properties, and the landscape in general, are starting to change into something unattractive. Most of them will say that having those tall loblollies in their yards, and seeing them across the island landscape, is one of the reasons they come to Chincoteague. Many homeowners have told us about the large amount of money they have spent (or will soon spend) to remove the dead loblollies. Most of them are large lobs, around 80 years old. It's a lot of material to remove safely from around someone's home. The tree work guys are very specialized to handle these kinds of situations, and charge prices that, to most folks, are rather high.

Lori: What issues/problems are being caused by the SPB outbreak?

Robbie: Development on Chincoteague has fanned out from the old, main part of the town. In most cases, these residences are built in an old pine woods, next to a marsh edge or tidal gut, and on or near low ground. Salt water influence starts the problem by severely stressing the very mature loblollies. Once that level of stress is reached and maintained, the entire forest stand is very appealing to SPB. Now that large areas of timber are being killed, quite a few of these residences are surrounded by very large heavy snags. I've been told that 60 percent of the island residents are seasonal, so some time will pass between visits. Imagine the shock of making the trip to your summer house to find it surrounded by large snags that could cause catastrophic damage during a wind event. Aside from the safety issue caused by the snags, the absence of the canopy of the mature stand has allowed sunlight to reach the ground, causing the ground cover to thicken. Under the old canopy, a patchy cover of greenbrier could be found, interspersed with patches of open ground covered with pine shats (leaf litter). Now that the canopy is gone in some areas, the density and height of the greenbrier cover is increasing. Mixed in with the greenbrier is southern bayberry, marsh elder and phragmites patches, which tend to thrive in low-ground, marshy conditions. All of these species can turn into waxy, easily dried, flashy, fast-burning fuels. We're seeing this ground cover layer beginning to creep in from the marsh edges toward all these residences. It's common to see some of these structures with stands of this dangerous ground cover touching the walls. Some of the structures are up on pilings to keep from being flooded, and we've seen phragmites and greenbrier practically growing under these buildings. The potential danger caused by this ground fuel buildup is being addressed by the Department [of Forestry]. We're in the very early stages with Firewise Coordinator Jim Funk in getting a Firewise program started on Chincoteague to raise awareness about what could happen should a wildfire start during a dry period, how to deal

with fuels, establishing defensible space, etc.

Lori: What are the next steps for the Island of Chincoteague?

Robbie: We're hoping the Firewise program will take off for the island. Safety in dealing with snags and fuel buildup is going to be an issue for quite some time.



Pine mortality due to SPB near residential structures on Chincoteague Island.



Pine mortality due to SPB in a campground on Chincoteague Island.

PINE BARK BEETLE PREVENTION PROGRAM

In general, the southern pine resource in central and southeast Virginia remains healthy and productive. Federal funds from the USDA Forest Service, Forest Health Protection, support our Pine Bark Beetle Prevention cost-share programs with landowners and loggers for thinning of pine stands. This summer, we brought back the logger incentive program, which provides cost-share assistance to loggers who agree

to perform first commercial thinning on small tracts of non-industrial private forestland. To date, Virginia has thinned more than 48,000 acres of pine (mostly pre-commercial) through the cost-share programs. Overstocked pine stands are more vulnerable to bark beetle outbreaks, and thinning is the best method of reducing this threat. Please contact your area forester for more information.

WHITE PINE SCALE/PATHOGEN COMPLEX

If you drove along Route 250 west of Staunton this past summer, you may have noticed stands of white pines with an alarming amount of orange needles. VDOF has been monitoring white pines in Bath, Highland and Alleghany counties for the past four years, and, this year, the dieback was rather shocking. Symptoms, such as branch flagging and canker formation, were first observed on white pines in Virginia in 2007. Since then, other states in the southern Appalachian region have observed similar symptoms and decline of white pines. VDOF is collaborating with the University of Georgia and a handful of other state and federal agencies to diagnose the problem.

Michelle Cram from USDA Forest Service - Forest Health Program in Athens, GA, and Dr. Kamal Gandhi's lab at the University of Georgia revealed the cause of this white pine decline to be a scale insect in combination with pathogen(s). The scale insect has been identified as *Matsucoccus macrocitrices*, the Canadian pine scale, which was previously unknown to inhabit the southern Appalachians. Scale insects lay eggs in bark crevices, and, when the eggs hatch, the young scales immediately search for a suitable site on the plant to settle and feed. They spend the rest of their life feeding in that one spot, taking nutrients from the plant. Feeding by the Canadian pine scale causes damage to white pines, but the story does not end there. The scale may be the main culprit, but there are definitely one or more pathogens at work as well. *Caliciopsis pinea* in particular has been found on many symptomatic white pines. At this point, we are fairly certain that the symptoms we are seeing on white pine are a result of both the Canadian pine scale and the pathogen(s), but which is the driving force? What comes first, fungus or scale? It is possible that the pathogens are all secondary and non-aggressive; they are opportunistic and enter the plant through wounds created by the scale. If the scale infests the tree first, and

pathogens are simply exploiting the weakened tree, then the scale would be the driving force. This is currently only a hypothesis, however, and there is still much research to be done.



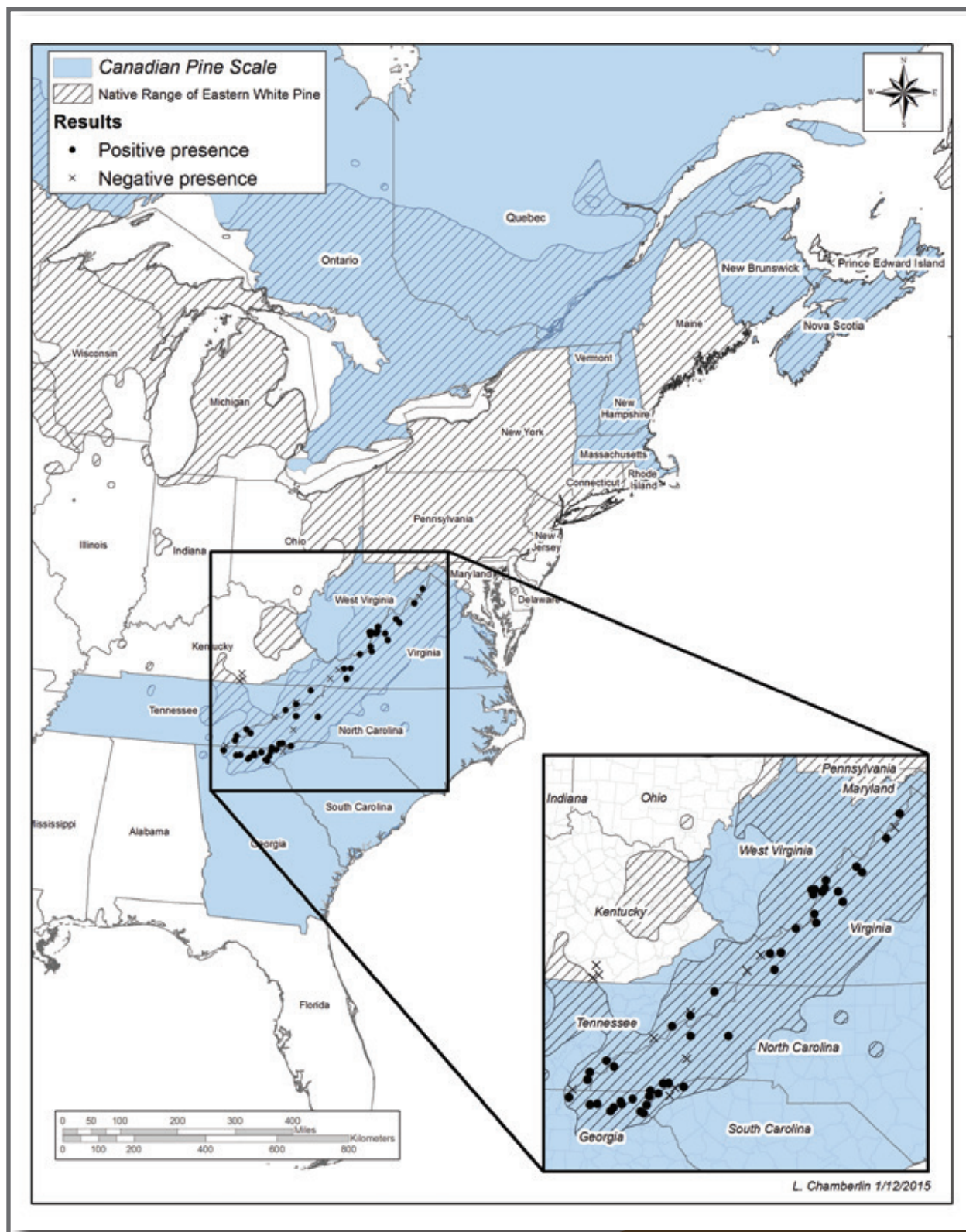
White pines in decline along Route 250 in Augusta County, VA.



White pine mortality in Highland County, VA.

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WHITE PINE SCALE/PATHOGEN COMPLEX,
CONTINUED



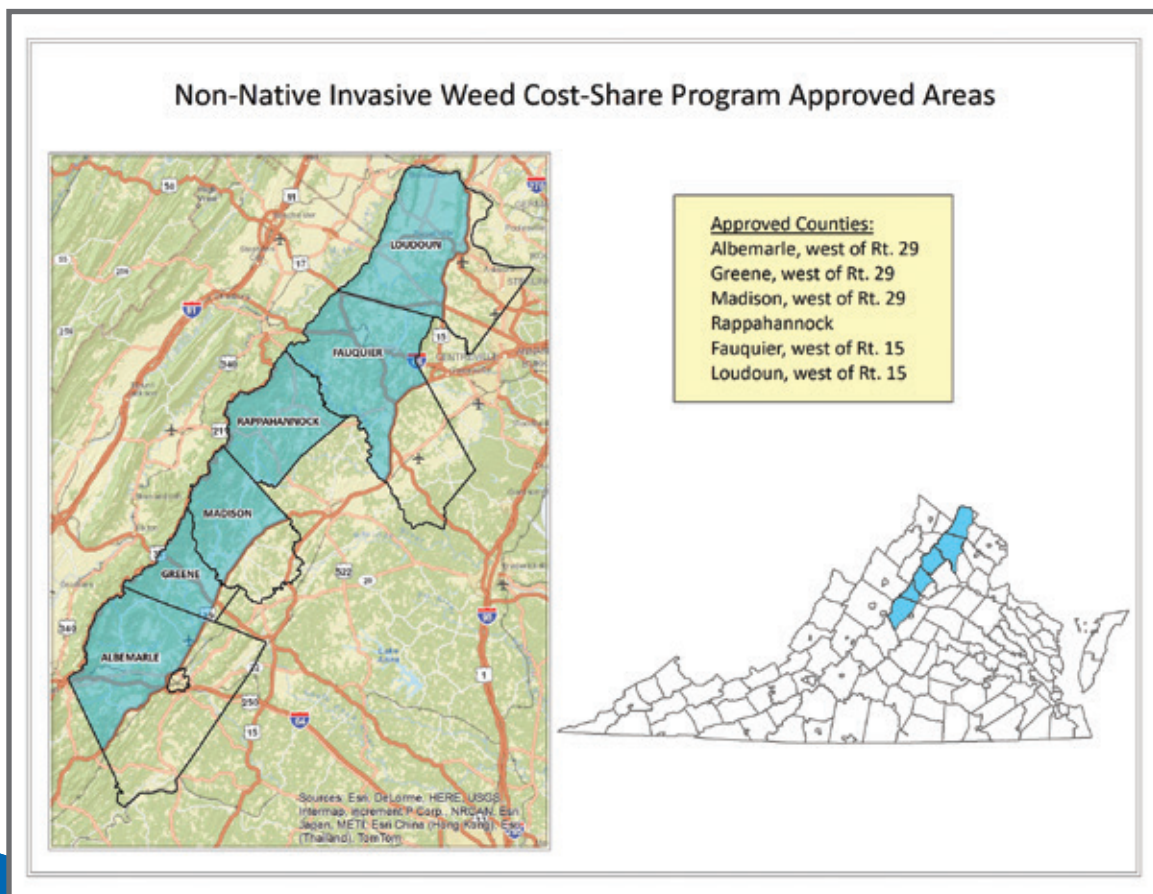
NON-NATIVE INVASIVE WEED COST-SHARE

VDOF rolled out a new cost-share program in 2015 in an effort to incentivize weed control on private property. To date, there has been limited funding to help landowners with non-native invasive plant control and mitigation as part of a broader forest management strategy. However, non-native invasive plants are becoming more widespread and aggressively invade forest habitats where they outcompete native flora. This is of particular concern after a thinning or harvest operation when light is introduced to the forest floor causing the release of invasive plants that were slowly building up in the understory. When this happens, forest management becomes much more difficult.

The non-native invasive weed cost-share program reimburses landowners 50 percent of direct project costs for weed control, such as costs associated with herbicide, prescribed burnings, or other equipment and labor. Landowners are eligible for two consecutive years of funding, with annual

reimbursements not to exceed \$5,000. Since this cost-share is a pilot program, only a small geographic region in the Blue Ridge is eligible. Approved areas include portions of Albemarle, Greene and Madison counties west of Route 29, Rappahannock County and portions of Fauquier and Loudoun counties west of Route 15.

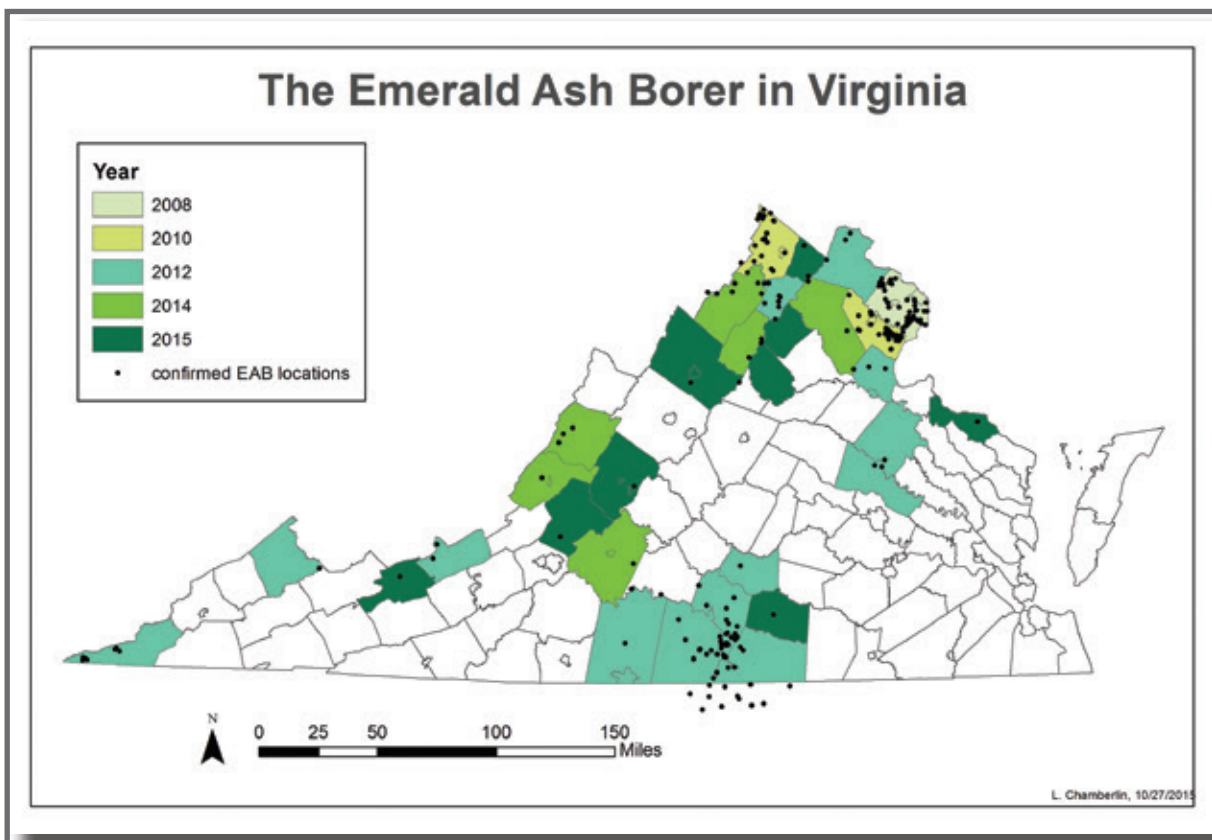
Year one of the program wrapped up in September 2015. Eleven landowners participated and a total of 495 acres of land were treated. Year two began in October with returning and new participants. Our hope is that each project results in major improvements of the environmental conditions or conservation value of selected sites. As the non-native invasive weed cost-share program continues, we hope to obtain more data on what it costs to restore sites overcome with invasive plants to a more acceptable and manageable condition. Weed control needs to become part of the overall management scheme of forested stands



EMERALD ASH BORER

The emerald ash borer was first found to be established in Virginia in 2008 in Fairfax County, and has since been found in 31 counties, including nine new counties (Clarke, Rappahannock, Madison, Rockingham, Rockbridge, Botetourt, Bland, Lunenburg and Westmoreland) in 2015. 2012 was a breakout year for EAB in Virginia, with infestations found in 13 counties. Most of the finds in 2012 were from APHIS-trapping surveys, but several new infestations killing thousands of trees, especially in Southside Virginia, were discovered separately. In 2013, no new counties were added to the list, but new infestations were discovered in and around the extensive area of infestation in Southside Virginia along

the Staunton River. In addition, Shenandoah National Park reported their first positive EAB find at the park's northern end. In the past two years, many new areas of infestation have been discovered and reported. With the cessation of widespread trapping efforts (except for federal lands), most new EAB discoveries are found after investigating ash that are declining or dying. In most cases, these infestations are three to five years old. This year, 48 new spots totaling more than 600 acres of EAB damage were reported. Given that ash mortality is now widespread in many counties, the reported acreage surely underestimates actual damage.



HEMLOCK WOOLLY ADELGID

Significant hemlock decline continues in many areas due to the hemlock woolly adelgid. The hemlock woolly adelgid is an invasive insect that was first detected in eastern North America in Richmond, VA, in 1951. Since then, it has spread throughout most of the range of eastern hemlock. After infestation, a tree will start to lose needles, experience branch dieback and die within four to 10 years. Many Virginia forests that contained large, majestic hemlocks are now littered with fallen

dead trunks and opportunistic young saplings. Virginia Tech conducts an annual hemlock woolly adelgid survey, and 74 sites were surveyed this year in

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HEMLOCK WOOLLY ADELGID, CONTINUED

western and southwestern Virginia from Bath and Rockbridge counties southwest to Lee County. Mean percent mortality of hemlock at these sites is 30 percent, which is a three percent increase from last year. As percent mortality continues to increase, stand health index is decreasing. However, the percentage of infested branches this year is the lowest it has been in the last 18 years. This could be the result of recent cold winters and multiple cycles of the 'polar vortex' causing short-term crashes in adelgid populations. While this is good news for hemlocks in Virginia, it is most likely just temporary; adelgid populations may recover quickly.

While landscape trees can be protected with chemical treatments, this is not always practical in a larger-scale forest environment. In this setting, biological control may be a better option. Many biological control agents have been tested and released in eastern North America, including predator beetles native to Asia and northwestern North America. In 2005, *Laricobius nigrinus* beetles were released at James River State Park. This is a unique area that has an isolated population of eastern hemlock situated east of the species' major range. The hemlock trees at James River State Park are infested with the hemlock woolly adelgid, but many trees still appear healthy. In November of 2005, 300 *L. nigrinus* predator beetles were released in the park in hopes of regulating the adelgid population there. Post-release surveys have been conducted over the past 10 years, and we have consistently recovered adult beetles. This means that the

beetle population is surviving by feeding on hemlock woolly adelgids within James River State Park. It is unclear whether this biological control will be effective long term, but it is promising that some hemlocks in Virginia are infested with HWA but appear generally healthy.



***Laricobius nigrinus* predator beetle. Photo by Ashley Lamb.**

Hemlock branch infested with HWA.

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