



FOREST HEALTH REVIEW

May 2010



Hemlock woolly adelgid at James River State Park, Buckingham County, VA.

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GREETINGS

I've never been so glad to see the arrival of spring since I left Syracuse, NY, in 1996 for Georgia. This year, Charlottesville received record snowfall, which exceeded total winter accumulations in Syracuse and Buffalo, NY. We managed, but it was not fun. I'm not sure what implications this long, cold, snowy winter will have on forest health – but I have no doubt there will be something unusual going on this year. At least the gypsy moth activity looks to be the lowest we've seen since 2004 – egg mass counts from various locations throughout the state are very low; and the Virginia Department of Agriculture (VDACS) has no suppression projects planned for this year. Speaking of gypsy moth, I've been thinking a lot about its long-term ecological impacts lately, in conjunction with oak decline – see the opening article below. A major trapping effort for emerald ash borer will continue as last year – I'll be surprised, once again, if no new finds turn up beyond Fairfax County. I'm about to begin spring trapping for southern pine beetle as I write this, and am holding my breath that it will be another quiet year in that regard. As always, I expect this coming season we'll see the usual balance between the expected and the unexpected. I hope you find this issue helpful and informative.

Chris Asaro, forest health specialist



OAK DECLINE AND THE GYPSY MOTH

Periodic buildups of gypsy moth populations have resulted in significant defoliation in Virginia since 1984. Currently, the gypsy moth is found across most of the Commonwealth, with the exception of the extreme southwest. The most severe defoliation events over the last 25 years have occurred in the mountainous western portion of the state, particularly in the northwest corner where outbreak populations have been present the longest (Figure 1). A large proportion of the hardest hit areas are on federal lands, including much of the George Washington National Forest and Shenandoah National Park. Compared with the Piedmont and Coastal Plain, the mountains bear the brunt of the impacts from gypsy moth

for a number of reasons: 1) large areas of contiguous forest that are unbroken for many miles, allowing for easy dispersal and high survival of gypsy moth; 2) a high concentration of preferred host types, particularly chestnut oak and red oaks, and 3) poor site and soil conditions, including many xeric ridges with low nutrients and poor moisture-holding capacity. Trees, such as chestnut oak, that grow competitively on these sites are none-the-less under greater stress, particularly during drought conditions. During such times, tree resistance to insects and diseases is considerably less than what one would see in a more fertile cove or bottomland. While gypsy moth outbreaks generally begin in such habitats, they are also fully capable of spreading well into lowland areas and affecting those forests and tree species.

This brings us to the concept of tree decline, which is defined as a gradual failure in the health of a tree or stand of trees, eventually resulting in death from a combination of abiotic and biotic factors. The key point with any decline syndrome is that no single agent

"The mind is but a barren soil; a soil which is soon exhausted, and will produce no crop, or only one, unless it becomes continually fertilized and enriched with foreign matter."

Joshuah Reynolds, 1774

OAK DECLINE AND THE GYPSY MOTH, CONTINUED

is responsible. Decline may be thought of simply as a mechanism of forest succession since, more often than not, it affects older, senescent trees. Oak decline is the most common type of tree decline seen across Virginia's forests. The tree decline concept, developed by forest pathologists decades ago, is usually divided into three stages with various factors leading to tree mortality that operate in succession: predisposing factors, inciting factors and contributing factors.

Predisposing factors are often abiotic and usually have to do with the underlying conditions of the site. These include things like poor soils, exposure, old age or urban environments. Over time, these predisposing

factors weaken trees to the point where they can become more susceptible to insects, diseases and severe weather. Inciting factors can include one-time or recurring events that injure trees in some way. These include things like drought, insect defoliation or a late frost. Rarely do inciting factors kill trees outright. Rather, it can often take multiple events over a number of years before we see significant tree mortality. Finally, contributing factors are those agents that typically 'do the tree in.' In the case of oaks, there are pathogens associated with decline, such as *Armillaria* (root rot) and hypoxylon canker, as well as insects like the two-lined chestnut borer. The presence of contributing factors usually portends that death is

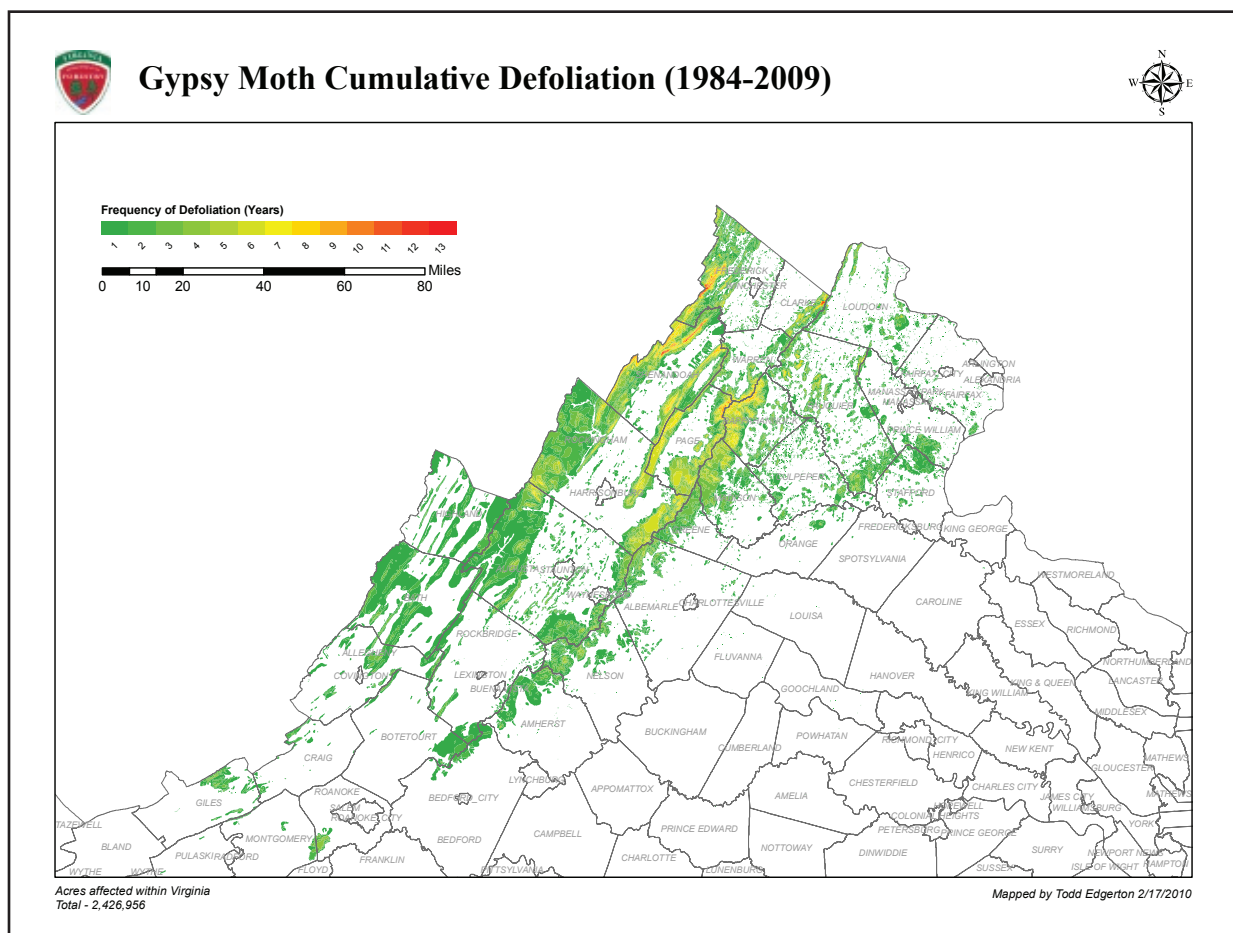


Figure 1. Cumulative gypsy moth defoliation based on aerial detection surveys conducted from 1984 to 2009. The darkest green indicates areas defoliated only once in that time interval. Lighter greens and yellows indicate five to seven years of defoliation, while orange to red indicate 10+ years of defoliation. Some areas have been defoliated 13 out of 25 years during this time interval.

*“The limits of my language mean
the limits of my world.”*

Ludwig Wittgenstein, 1922

OAK DECLINE AND THE GYPSY MOTH, CONTINUED



*Mature locust commonly succumb to competition and ultimately are killed by the heart rot fungus *Phellinus robiniae*.*

imminent, and for this reason, these factors often take the blame for a tree's death. However, it should be pointed out that most native insects and diseases, such as these, are found everywhere in the forest and usually do not pose much of a threat to 'healthy' trees. However, once trees are weakened by predisposing or inciting factors, they are less able to invest energy in defensive chemicals that would normally ward off these latter contributing factors. Therefore, if asked why a particular oak tree died, it might be more instructive or truthful to blame old age (predisposing) or drought (inciting) than two-lined chestnut borer (contributing), which would not have been an issue but for the previous two conditions.

Oak decline is a natural process and would be occurring with or without the presence of gypsy moth. This is especially true since many oaks are entering an older age cohort across Virginia after filling in the forest gaps left by the demise of American

chestnut over the last century. However, it is fair to say that with gypsy moth operating as a significant and recurring inciting factor, it is greatly speeding up the process of oak decline. This decline will continue to worsen and expand farther into southwest Virginia as defoliating populations of gypsy moth spread into those areas over the next 10 to 20 years.

What is the future of oaks in our forests, especially in the mountainous west? Data from the USDA Forest Service Forest Inventory and Analysis (FIA) plot system suggest that statewide, species, such as tulip poplar, loblolly pine and red maple, are increasing dramatically in volume. While six oak species are ranked in the top 20 by volume, none are showing a significant change in volume, but some show a decline in overall percentage of forest volume during the last 15 years (Figure 2). A more revealing statistic from the FIA data is the number of overall stems for each species, which is an indicator of regeneration potential. Once again, the top three species in terms of number of stems include red maple, loblolly pine and tulip poplar. White oak and chestnut oak are ranked number seven and nine, respectively; scarlet oak is number 20, and northern red, southern red and black oaks are out of the top 20 altogether (Figure 3). This suggests that, over time, oaks will likely show a notable drop in overall volume as well.

Silviculturally, oaks are at a competitive disadvantage because of their intermediate shade tolerance: poplars



Dead oaks along Briery Branch Road in southern Rockingham County, VA, within the George Washington National Forest.

“Television has made dictatorship impossible, but democracy unbearable.”

Shimon Peres, 1995

OAK DECLINE AND THE GYPSY MOTH, CONTINUED

out-compete them in full sunlight and maples out-compete them in full shade. Fire exclusion and heavy deer browsing have taken a heavy toll on oaks as well. Silvicultural prescriptions, such as group selection or shelterwood cuts and prescribed fire that favor oaks, are rarely applied. Even if these efforts are employed, their success at restoring a viable oak component is further complicated by non-native invasive plants. Most invasive plants quickly exploit gaps and often benefit from fire, so if these silvicultural prescriptions are applied when these invasives are in the vicinity, they may benefit more than the oak regeneration. Oak restoration, if attempted, can therefore become quite a complex task and will likely be attempted only locally and in high-priority areas, such as federal lands. Unfortunately, the decline of oak will result in less forest diversity, fewer high-value crop trees and less-viable wildlife habitat due to a considerable loss of mast. While these problems are not insurmountable, these trends will require a considerable amount of effort and coordination to reverse.

Figure 3. Top 20 trees species in Virginia ranked in order of most to least number of stems statewide. Data from the last FIA survey only is shown. Only three species of oak are in the top 20, and are ranked numbers 7, 9 and 20.

Virginia's Top 20 Trees Species by % Volume Across 3 FIA Surveys

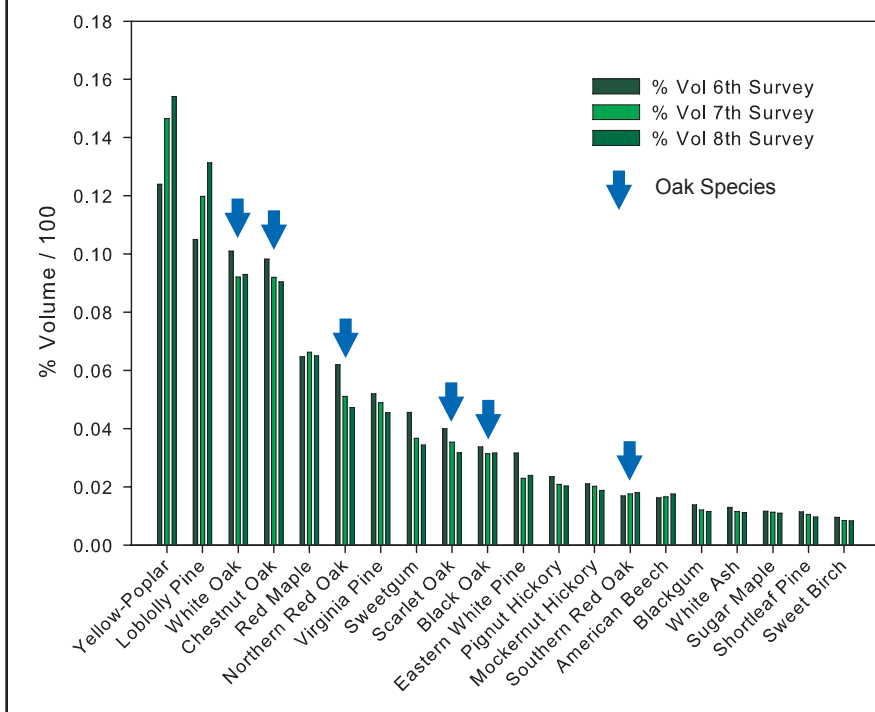
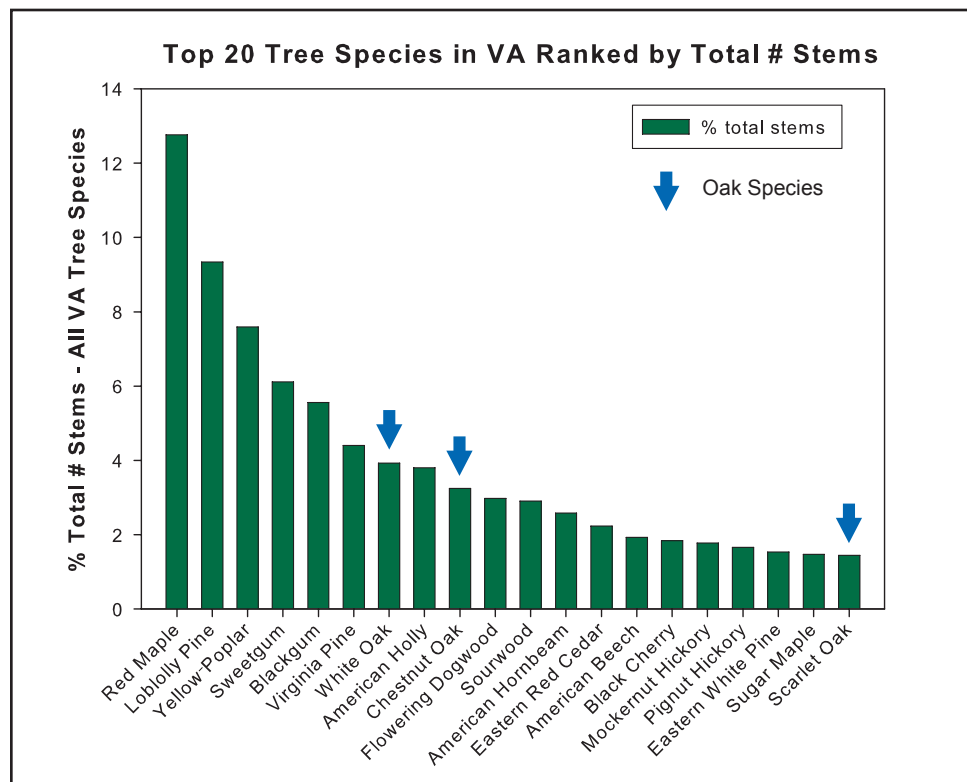


Figure 2. Top 20 tree species in Virginia ranked in order of most to least volume as a percentage of all tree species statewide. For each species, trends are shown across three consecutive FIA surveys from 1992 to 2007. Six oak species are in the top 20 and are ranked numbers 3,4, 6, 9, 10 and 14.



“Nothing comes harder than original thought.” Edward O. Wilson, 1984

UPDATES

WEATHER

November got off to a rough start with a tropical system named Ida, which stalled out over the Atlantic Ocean, slowly fizzled and then rematerialized into a nor'easter informally referred to as 'Norida.' It blanketed most of the Commonwealth with heavy, sustained downpours leading to localized flooding and exceeding average monthly rainfall totals in only a few days. That was followed by three major snowfall events, one during December and two during February that greatly impacted much of Virginia and led to a state of emergency declaration on two occasions. Unusually cold winter temperatures held fast throughout most of February, allowing the snow accumulation to linger for weeks on end. The worst winter weather in years kind of gets lost in these numbers, but here it goes.

Table 1 presents the percent of normal monthly precipitation and average degrees above (+) or below

Table 1

	SW	CW	NW	NP	CP	SP	NCP	SCP	ES
NOV. Precip	50 to 150%	50 to 200%	70 to 200%	90 to 200 %	150 to 250%	200 to 300+%	200 to 300+%	200 to 300+%	200 to 300%
NOV. Temp	0 to +4	+2 to +6	+2 to +4	+2 to +6	+2 to +6	+2 to +6	+2 to +4	+2 to +4	+2 to +4
DEC. Precip	110 to 200%	200 to 300%	150 to 200%	150 to 200%	200 to 300%	150 to 300%	150 to 300%	150 to 300%	150 to 300%
DEC. Temp	-4 to 0	-4 to 0	-6 to 0	-4 to 0	-2 to +2	-4 to 0	-4 to 0	-2 to 0	-2 to 0
JAN. Precip	100 to 300%	100 to 150%	100 to 130%	50 to 110%	70 to 150%	70 to 150%	50 to 90%	50 to 110%	50 to 90%
JAN. Temp	0 to -6	0 to -4	-2 to +2	0 to +2	-2 to +4	-2 to +4	-2 to 0	-4 to 0	-2 to 0
FEB. Precip	70 to 150%	90 to 110%	110 to 200%	70 to 200%	70 to 150%	70 to 130%	110 to 130%	90 to 150%	50 to 150%
FEB. Temp	-10 to -4	-8 to -6	-10 to -4	-6 to -4	-8 to -4	-10 to -4	-8 to -4	-8 to -4	-8 to -6
MAR. Precip	50 to 130%	50 to 130%	100 to 200%	70 to 200%	90 to 200%	70 to 200%	70 to 200%	70 to 150%	70 to 150%
MAR. Temp	-4 to 0	0 to +2	0 to +4	+2 to +6	+2 to +4	0 to +4	0 to +2	0 to +2	0 to +2

SW = Southwest (Cumberland gap to Abingdon to Blacksburg and Galax)

CW = Central West (Roanoke to Staunton)

NW = Northwest (Staunton to Winchester)

NP = Northern Piedmont (Loudoun/DC to Greene/Spotsylvania)

CP = Central Piedmont (Albemarle/Goochland to Bedford/Nottoway)

SP = Southern Piedmont (Campbell/Lunenburg to Henry/Mecklenburg)

NCP = North Coastal Plain (King George/Northumberland to Chesterfield/Newport News)

SCP = South Coastal Plan (Dinwiddie/Brunswick to Virginia Beach)

ES = Eastern Shore



(-) monthly average temperature for each of nine geographic regions in Virginia (defined below). For monthly temperatures, a '0' indicates average.

Winter storm damage to forests was widespread but most went unreported or undocumented. Most damage was typical given the amount of snowfall – bent and fallen trees along with broken branches

“The aim of science is not to open the door to infinite wisdom, but to set a limit to infinite error.”

Bertolt Brecht, 1939

and tops, particularly among edge and roadside trees. Smaller pine seedlings were covered in snow for weeks and many were significantly bent over. This could very well lead to some mortality in young pine regeneration if stem breakage occurred. A summary of damage reporting related to this winter's snow storms since December is shown in Table 2:

Table 2

County Reporting	Host(s) Affected	Acreage Affected	Type of Damage
Appomattox	Loblolly Pine	34	Broken tops
Carroll	Oak	10 trees	Broken limbs and tops
Fauquier - Conway Robinson State Forest	Virginia Pine	30	Toppled trees
Franklin	Loblolly Pine	20	Broken limbs and tops
Orange	Loblolly Pine	150	1-year seedlings bent over or flattened
Russell	Yellow Poplar, Chestnut Oak	13	Broken limbs and tops
Wise	Poplar, Oak, Beech, Hemlock, Eastern White Pine	167	Scattered damage of all kinds

GYPSY MOTH

After the soaking wet spring we had last year and the resurgence of *Entomophaga maimaiga*, gypsy moth populations took a beating. Projections this year based on egg mass surveys are that defoliation will be minimal in most locations. In fact, VDACS has planned



Dead oaks following two years of a severe gypsy moth outbreak in southern Rockingham County.

no suppression projects this year, allowing them to focus efforts on the Slow-the-Spread Program, which involves the use of mating disruption via pheromone flakes along the leading edge of the infestation. Areas severely impacted over the last few years can still expect to see additional decline and mortality of hardwoods, mainly oaks. Such areas include parts of the George Washington National Forest in Augusta and Rockingham counties, the Jefferson National Forest in Giles and Craig counties, and the Poor Mountain area near Roanoke, the latter of which has experienced severe defoliation five years in a row.

SOUTHERN PINE BEETLE

The southern pine beetle has been at historically low levels across Virginia and most of the South for quite some time now. Virginia's last significant outbreak occurred in the early 1990s. A spillover outbreak from Tennessee and Kentucky occurred in southwestern Virginia from 1999 to 2002, which affected a lot of natural pine in the mountains, but this was an ecologically unusual event and only impacted a limited area in Virginia. Very little loblolly pine in the traditionally impacted pine belt of the coastal plain and southern piedmont was affected during that time. So, we're looking at approximately 15 years now since an outbreak has materialized on a regional scale in Virginia, while some states, such as Texas, have seen extremely low activity to the point where they can barely catch a southern pine beetle in a pheromone-baited funnel trap. There are a number of hypotheses being examined to try to explain what is going on and why. But I won't go into them here, and I wouldn't look for any clear answers to this mystery anytime soon. Population dynamics of bark beetles are very complex and dependant on so many variables that perhaps we may never be able to predict outbreaks far in advance – any more than we can predict the weather far in advance or the precise time and location of an earthquake.

“Be nice to people on your way up because you’ll meet them on your way down.”

Wilson Mizner, 1953

UPDATES

feel this is necessary to keep applications from being idle too long and holding up funds that could be used more expeditiously by other folks.

SOUTHERN PINE BEETLE PREVENTION PROGRAM

Late last year, we began diminishing our funds from the SPB Prevention Program for the first time since its inception in 2004. Therefore, we were temporarily forced to suspend new applications for pre-commercial thinnings (PCT) until new funding arrived in spring 2010. This caught us off-guard a bit for two main reasons: 1) we almost doubled our rate of spending during the last year compared with previous years, and 2) we had more than \$150,000 of funds committed to uncompleted PCT applications that were more than a year old – some more than two years old. Although a number of these jobs ended up being cancelled for one reason or another, at the time, we had to assume we would need to eventually meet these payments. At the point at which we suspended new PCT applications, we were at the break-even point as far as our committed funds and needed to act immediately to avoid over-committing.

Thankfully, this did not happen, and with a new \$700,000 grant coming in, we can open the PCT application process once again. One minor change will be that there will now be a one-year time limit for all PCT applications from the date they are signed by me. Once that one-year limit is reached, we will send letters to the landowners (and copy the appropriate county foresters) along with a form allowing them to request a six-month extension. If we receive the forms in a timely manner (three to four weeks), the extensions will be granted. If not, the applications will be cancelled. The landowners would still be entitled to reapply, but they would have to get back in line, so to speak. We



A properly-thinned stand of loblolly pine, such as this one at Prince Edward State Forest, can help prevent outbreaks of the southern pine beetle.

LOGGER INCENTIVE PROGRAM

Our relatively new logger incentive program, which began last July, has been a success based on the number of applications received and the committal of over half our funding. The goal of the program is to provide loggers with a flat payment of \$2,000 for each first commercial pine thinning they perform on tracts between 10 and 40 acres. Quite often, these tracts are too small for a logging outfit to profitably move its equipment to and, therefore, needed forestry operations on these smaller tracts can be difficult to obtain. Such smaller tracts are becoming more widespread with increasing trend towards parcelization and fragmentation of forestland. While this program is technically part of our SPB Prevention Program, few people realize that the funding source for this effort is separate from the other aspects of the Prevention Program, such as PCT and longleaf restoration. It comes from a federal redesign grant, which is applied for on a competitive basis and not guaranteed year to year. Based on the number of applications received through

“The most striking thing about modern industry is that it requires so much and accomplishes so little.”

E.F. Schumacher, 1973

March of this year, we will likely run out of funding for the logger incentive some time this year. I tried to apply for some additional money last year to keep the continuity of the logger incentive program going, but redesign funding was limited. I will apply again this year and, hopefully, we will be able to resume the program some time in 2011.

PEST ALERT! THOUSAND CANKERS DISEASE (TCD) OF WALNUT

Yet another significant insect/disease threat is emerging – thousand cankers disease of black walnut. This disease is caused by a fungus that is spread via an insect – the walnut twig beetle. Right now, it is restricted to the western United States as far as we know, but that could change quickly with one accidental importation. In a number of cities across the west, most recently in Colorado and Oregon, most of the black walnut trees have died as a result of this disease. In Virginia, black walnut represents only 0.4 percent of the forested volume and is not a high-value tree here like it is in other locales, such as the Mid-West. However, it is commonly used as a landscape or urban tree and, along with hemlock, ash and butternut, it represents yet another tree species potentially facing significant decline or even local elimination. Therefore, we certainly would like to keep this disease out of Virginia and the eastern U.S. Here is a link to a Pest Alert for TCD with more information and images.

<http://www.ppd.l.purdue.edu/PPDL/pubs/walnutthousandcankersdisease.pdf>

EMERALD ASH BORER (EAB)

I was a bit surprised that no new emerald ash borer discoveries were made in Virginia last year outside of Fairfax County, considering how many traps were placed across the Commonwealth by VDACS, APHIS, and the USDA Forest Service. I will be even more surprised if no new finds are discovered this year. West Virginia recently lifted its county-level quarantines, forcing APHIS to quarantine the entire state. What this means is that, now, un-inspected or uncertified wood products and firewood

cannot legally move out of West Virginia. On the other hand, people can now legally move firewood and other commodities from anywhere within the state to another part of the state without restriction. The likely result will be that EAB spreads faster within West Virginia. Given our extensive border with West Virginia, it also likely means that EAB is probably going to spread into VA from the west that much quicker, despite the statewide quarantine. County-level quarantines are generally thought to be more effective at limiting movement of infested materials, especially when the number of quarantined counties are few or clumped together, but sometimes states lack the resources to enforce them.

VIRGINIA STREET TREE SURVEY

With the discovery of the emerald ash borer in northern Virginia in 2008 and the additional threats posed by a multitude of other invasive tree pests, many municipalities should be concerned about the potential damages and costs incurred when these pests arrive. Street trees that are killed by invasive pests must be removed promptly due to the hazards they pose. The costs of removal and replacement of trees can be substantial, particularly with very large trees. Cash-strapped governments at the municipal, county and state level could have a difficult time dealing with a new invasive pest if it is capable of killing a large number of street trees. Therefore, having a good tree inventory is an essential first step in planning for the arrival of an invasive pest. For example, a municipality with only one percent of its street trees being ash of mostly small diameter classes has a lot less to be concerned about from emerald ash borer compared to another whose population of trees is five percent ash of mostly larger diameter classes. The former scenario might cost a few thousand dollars for removal and replacement costs while the latter might run into the hundreds of thousands.

“Good breeding consists of concealing how much we think of ourselves and how little we think of the other person.”

Mark Twain, 1935

UPDATES

Surprisingly, many cities in Virginia, large and small, lack street tree inventories and, for those that do have them, it is often difficult to obtain the information for public use and to apply to statewide planning efforts. Using a USDA Forest Service grant, I am funding Prof. Eric Wiseman from Virginia Tech's forestry department to address this problem. Eric and his graduate student, Tyler Wright, are continuing a statewide street tree survey, which Eric began two years ago. They are compiling pre-existing inventory data from as many cities as they can get their hands on, and conducting their own surveys in cities that lack an inventory. The software tool I-Tree Streets, developed by the USDA Forest Service, is being utilized to select random street segments for each municipality that results in a five to 10 percent sample. Then they go out and survey each tree within those randomly selected street segments, collecting data such as species, height, diameter and condition. This data, once it is available, will provide an essential planning tool that can be used at the municipal, county or state level to anticipate economic damages caused by emerald ash borer, Asian longhorned beetle, thousand cankers disease of walnut and other threats. If a municipality seems to have too much of one vulnerable tree species, it can use the inventory to determine how much losing and replacing these trees will cost. In addition to the direct monetary value of trees, I-Tree Streets can also calculate a tree's value towards various ecosystem services, such as storm water mitigation, CO₂ sequestration, air pollution control and energy conservation.

While almost every tree species has potential problems, the overall message should be to diversify the urban

“Work is of two kinds: first, altering the position of matter at or near the earth’s surface relative to other such matter; second, telling other people to do so. The first kind is unpleasant and ill paid; the second is pleasant and highly paid.”

Bertrand Russell, 1932

forest as much as possible to maintain its resilience from invasive pests. For example, when Dutch elm disease took out most of the American elms from many cities in the Mid-West and East during the last century, they were invariably replaced by species of ash and maple. There are now so many cities with a heavy emphasis on ash and maple that they face a potentially catastrophic one-two punch with the looming threat of emerald ash borer and Asian longhorned beetle, respectively. Urban forest planners should learn from this and not repeat these mistakes. While highly diverse urban forests are more difficult to maintain, in the long term, they are a much lower risk and worth the time and investment.

HEMLOCK WOOLLY ADELGID (HWA) AT JAMES RIVER STATE PARK

In past issues, I discussed the impact of HWA on an isolated population of hemlocks at James River State Park in the presence of a biological control agent. The predatory beetle and HWA specialist, *Laricobius nigrinus*, was released in the fall of 2005 with the hope that it would control the adelgid and reduce the impact to the hemlocks over time. This release was done in cooperation with Scott Salom at Virginia Tech, whose lab is responsible for much of the rearing and release of *Laricobius nigrinus* in the region and is supported by funding from the USDA Forest Service, Forest Health Protection. I'm happy to report that, for the most part and after almost five years, most of the hemlocks seem to be in healthy or fair condition. Some trees even seem to have recovered a bit. Whether or not this is due to *Laricobius* is impossible to say right now, although it is clear that *Laricobius* has established itself here because we're still finding adults, albeit not very many of them on any given day. Often we have not found any after two hours of beat sampling, but on a few occasions we have found one, two, or as many as five. While this does not seem impressive, keep in mind that these beetles are pretty tiny, and one beetle can consume hundreds of adelgids and their eggs in its lifetime. Many similar releases of *Laricobius* have

NATIONAL FIREWOOD TASK FORCE

This past fall and winter, I served on a National Firewood Taskforce that was formed by the Animal & Plant Health Inspection Service (APHIS), the federal agency tasked with regulating the importation and movement of invasive species via commerce. The task force was formed in response to the growing concerns regarding firewood acting as a major pathway for the movement of many invasive pests, most notably the emerald ash borer. The goal was to produce a white paper in 2010 that would outline proposed steps for a consistent, nationally recognized approach to dealing with the firewood issue. The task force was divided into three subcommittees, which focused on regulatory, outreach and voluntary strategies, respectively, to deal with this complex issue and address concerns with large commercial firewood vendors, small commercial vendors and the public.

While a majority of the participants were APHIS employees, the task force also included a representative of the National Association of State Foresters (NASF) and one representative from each of the three NASF regions. I was asked by the Southern Group of State Foresters (SGSF) to represent their interests on the task force. Note that NASF has already published a position paper on this issue, which can be accessed here: <http://www.stateforesters.org/files/2009-5-NASF-Firewood-Policy-Statement.pdf>

After numerous conference calls and one face to face meeting, the task force was able to agree on a series of strategies and proposed actions this spring. The white paper outlining these efforts is now available at: http://nationalplantboard.org/docs/NFTF_Recommendations_Final_March_2010_1.doc

“Common sense is the best-distributed commodity in the world, for every man is convinced that he is well supplied with it.”

Rene Descartes, 1637



Hemlocks at James River State Park



occurred throughout the range of HWA and it is pretty typical to only recover a few beetles at a time during a re-survey. The essential question – is biocontrol ‘working’, is it having an impact? I cannot answer this question here and now – some say yes, some say no, some say it depends on the circumstances and what you mean by ‘working.’ In all likelihood, additional biocontrol species will need to be released to augment the impact of *L. nigrinus* and provide truly effective, long-term control. Research and monitoring of release sites continue in order to address these questions – but in the mean time, we can be hopeful when we see hemlocks that maintain relatively good health over an extended period in spite of the presence of HWA.

UPDATES

Here is a quick summary:

APHIS is emphasizing a voluntary approach to firewood regulation by industry and the states in the short term while recommending firewood 'best management practices' that will be listed in the task force document. Through outreach and voluntary efforts, it is hoped that all states will eventually agree to adopt these BMPs on their own, without the onus of a national regulation being pushed upon them overnight. APHIS would like to move towards a national regulation requiring firewood labeling and, eventually, heat treatment. This process, however, is time consuming and could take five to 10 years before it becomes law. In the mean time, it is hoped many states will adopt these practices prior to the law being invoked. The outreach strategies will, hopefully, allow both the commercial vendors and the public to become familiar with the issues and more accepting of the regulations before they become mandatory. While regulations are important, they cannot be successful without some level of understanding and cooperation by industry and the public. It is generally believed that if most people understand the reasoning behind the regulations, they will be more likely to accept them and comply with them. This is essential since there will never be enough resources to inspect everything



Firewood for sale at the entrance to Virginia State Parks encourages the public to use local sources rather than moving firewood long distances and risking transport of invasive pests.

that moves across state lines. Stay tuned for more information on this topic.



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