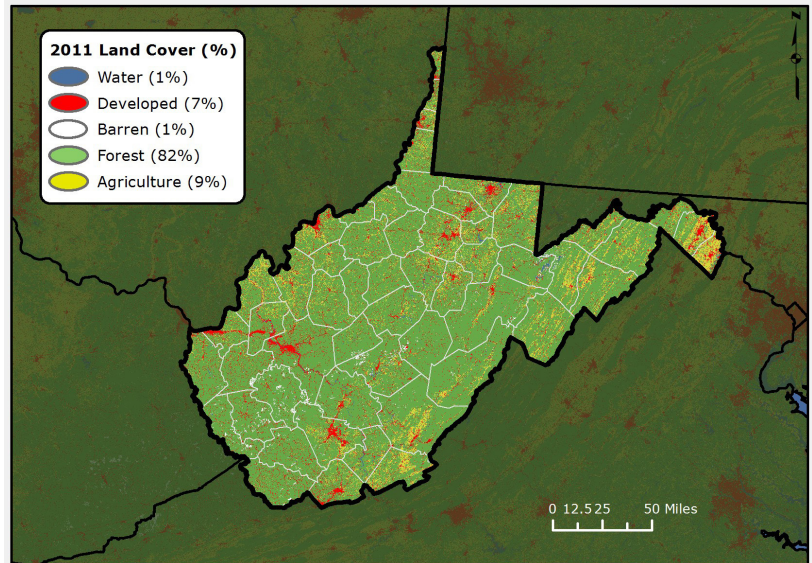




2015 Forest Health WEST VIRGINIA *highlights*

Forest Resource Summary

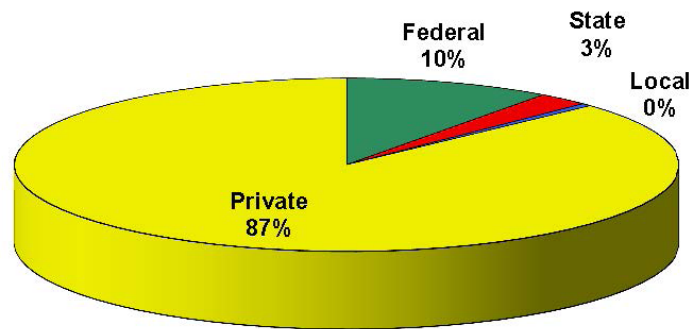
The West Virginia landscape is dominated by more than 11.8 million acres of forest. Due in large part to the State’s varied topography, the forest is a rich diversity of oaks, hickories, spruce, pines, and the West Virginia State Tree—sugar maple. Ninety percent of all forests in West Virginia are privately owned, but there are 8 State forests, 34 State parks, and 87 wildlife management areas that provide public enjoyment.



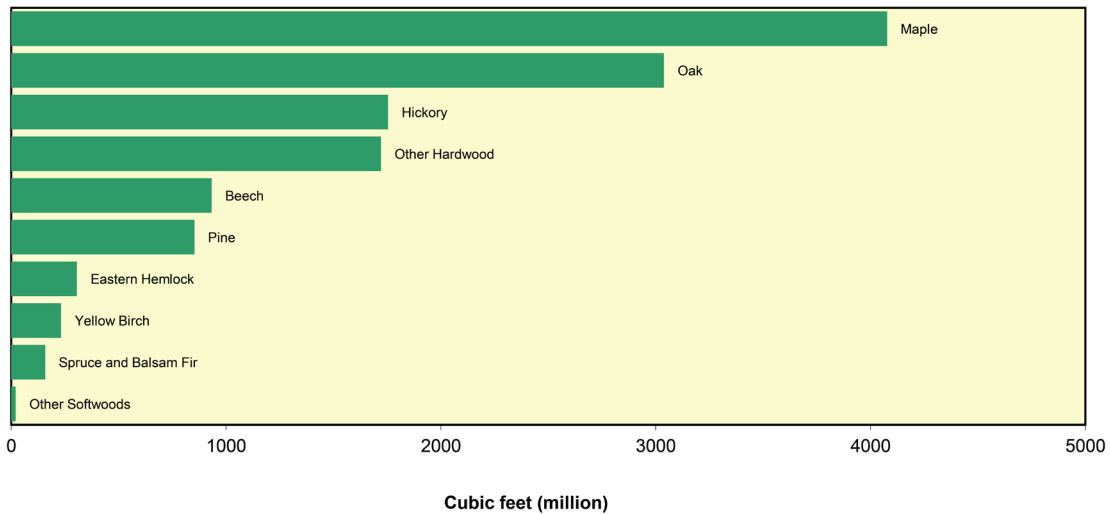
Forest Stewardship

The West Virginia Division of Forestry administers the Forest Management Program. The intent of the program is to help private, nonindustrial forest landowners improve their forests by managing them in a sound, scientific manner. Within this program, the Forest Stewardship Program offers a forest management plan written by a professional forester based on the landowner’s objectives. Other programs, EQIP and CREP, provide financial assistance for recreation, forest improvement, soil and water protection, wetlands protection, fisheries habitat

Forest Land Ownership in West Virginia, 2012



Net Volume of Growing Stock on Timberland by Species in West Virginia, 2012

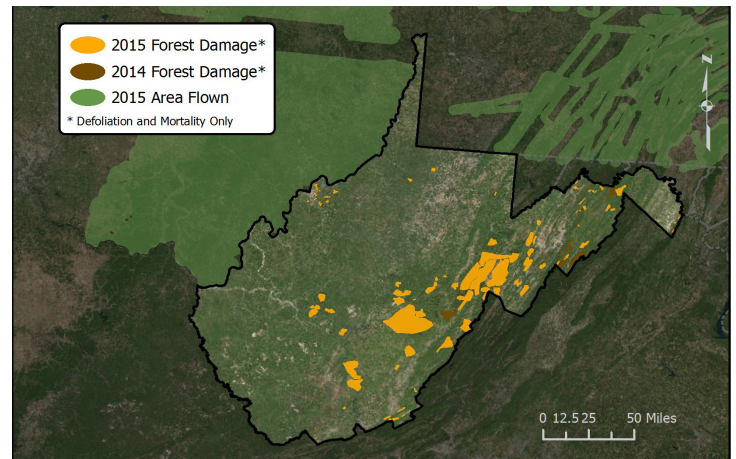


enhancement, wildlife habitat enhancement, tree planting, and improvement of forest roads. In FY2015, 74 stewardship plans were completed for a total of 9,367 acres. Currently 174,823 acres are managed under stewardship plans.

Forest Health Surveys

West Virginia forest health was surveyed in 2015 using the [Forest Disturbance Monitor](#) application and ground surveys.

In 2015, the yellow poplar weevil defoliated the greatest acreage (578,556.7 acres) in West Virginia. In descending order of acreage affected, hemlock woolly adelgid mortality was found on 436,087.2 acres, an unknown wilt damaged 399,018.6 acres of American beech, gypsy moth defoliated 100,168.2 acres, emerald ash borer mortality was found on 92,194.7 acres, beech bark disease mortality was found on 37,068.6 acres, loopers defoliated 24,420.3 acres, locust leafminer defoliated 15,831.4 acres, and emerald ash borer defoliated 5,082.6 acres.



Forest health survey observations in West Virginia in 2014 and 2015.

Special Issues

Gypsy Moth Program

The objectives of the West Virginia Department of Agriculture (WVDA) Gypsy Moth Programs are to continue to minimize the adverse impact on forest resources, preserve aesthetic values, protect people from the annoyance and health problems that can occur when in contact with large numbers of gypsy moth caterpillars, and slow the spread of gypsy moth by reducing populations in the advancing front.

The gypsy moth increased in abundance in 2015 in eastern West Virginia. Gypsy moth defoliated a total of 99,878 acres in Grant, Hardy, Pendleton, Pocahontas, and Summer Counties; the fungus *Entomophaga maimaiga* caused a moderate collapse in some of these areas. WVDA has quarantined 44 counties to prevent the movement of gypsy moth out of these counties. Staff visited 84 sites to investigate the movement of articles capable of transporting the gypsy moth into uninfested areas. Areas visited included Christmas tree sales lots, plant nurseries, mobile home dealers, campgrounds, firewood producers, interstate weigh stations, log yards, and sawmills. WVDA did not add any additional counties to the quarantine in 2015.

Larval insecticide treatments were conducted on 6,691 acres in the Cooperative State County Landowner Program. Mimic® and *Bacillus thuringiensis* (*Btk*) were used to treat the blocks in Grant, Hardy, Mineral, Pendleton, and Pocahontas Counties. A significant increase in qualifying acres has been determined for 2016 treatments.

WVDA continued trapping within the gypsy moth Slow the Spread (STS) area for 2015. Populations have stagnated and are low in the western portion of the STS program area. WVDA deployed a total of 3,777 traps across the STS area.

Forest Health Protection Programs

Diseases

Beech Scale Resistance Assays on the Monongahela National Forest

In the summer of 2012, Monongahela National Forest (MNF) personnel located putatively resistant American beech trees across the Forest in areas where either the scale and disease are currently causing decline and mortality (killing zone) or have passed through (aftermath zone). In order to focus the search for resistant trees, stand data maps were created showing the stands with the highest beech basal areas. As many of these stands with a high beech component as possible were surveyed. Beech trees that were greater than 9 inches d.b.h. and had no beech scale present were considered fully resistant and permanently located using GPS coordinates and flagging. Approximately 120 resistant beech trees have been identified thus far on the MNF. A shapefile and maps were created to help locate the trees in the future.

In 2014, WVDA staff located approximately half of the 120 trees and conducted 61 scale challenges of the putatively resistant trees plus susceptible control trees (figure 1).

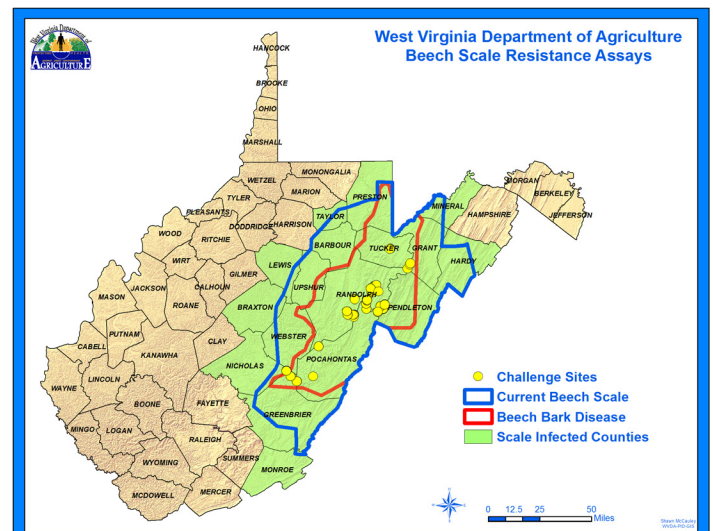


Figure 1.—Location of sites where 61 putatively resistant beech trees were challenged with beech scale in 2014.

In 2015, WVDA staff collected challenge pads from the 2014 challenges. Unfortunately, due to a clear cut and bear damage, only a fraction of the pads were able to be collected. The cold winter and very wet weather in 2014 and 2015 impeded scale colonization on the control trees, so we couldn't verify if those putatively resistant beech trees that we challenged were indeed field resistant to the scale insect; this work will be redone in 2016.

For the 2015 field scale challenges, WVDA staff conducted 43 scale challenges of the putatively resistant trees and challenged 14 susceptible control trees (figure 2). Barbed wire was added around the pads in an attempt to protect them from bear damage.

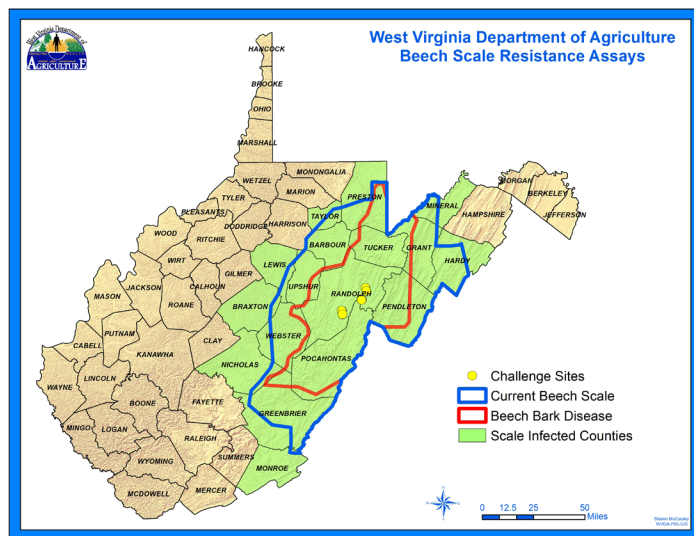


Figure 2.—Location of sites where 43 putatively resistant beech trees were challenged with beech scale in 2015.

Resistant beech scions that were previously challenged with scale were collected in February 2015 on the Monongahela National Forest (outside of Parsons, WV, and on the Dolly Sods National Recreation Area) and taken to the Oconto River Seed Orchard (ORSO) in White Lake, WI, for grafting.

In May, a resistant beech orchard was established at the U.S. Forest Service Timber and Watershed Laboratory in Parsons, WV (figure 3). Originally, 45 West Virginia beech grafts were held at ORSO, but due to grafting incompatibility and extreme winter

temperatures, only 18 surviving West Virginia grafts remained. Dr. Jennifer Koch (U.S. Forest Service Northern Research Station) retained two grafts of each genotype for installation in an archival plot at the research lab in Delaware, OH. Only 10 West Virginia grafts were available for planting consisting of four genotypes. The long-term goal is to establish between 200-300 trees that represent 25 to 30 genotypes at the Parsons orchard site.



Figure 3.—This aerial photo shows the location of the resistant beech orchard established in May 2015 in Parsons, WV.

Approximately 5,000 beech nuts were also collected around mid- to late September and sent to ORSO to establish West Virginia root stock for grafting purposes.

Walnut Twig Beetle Trapping

Spring and fall trapping for the walnut twig beetle, the vector of thousand cankers disease, was completed and samples screened. Thirty traps were deployed and monitored for 3 weeks in the spring (figure 4) and 59 traps were set and monitored for 4 weeks in the fall (figure 5). All trapping sites were focused around wood product industries, campgrounds, and parks. Traps were serviced every 1 to 2 weeks depending on the amount of rain that fell during the trapping period. The WVDA Forest Pathologist and the WVDA Cooperative Forest Health Protection Specialist

processed and screened the samples. All samples screened to date are negative for the walnut twig beetle.

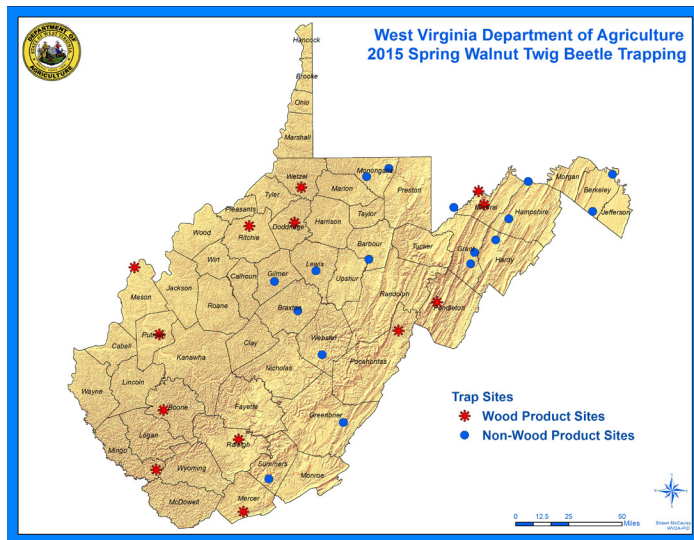


Figure 4.—Location of 30 walnut twig beetle traps in spring 2015.

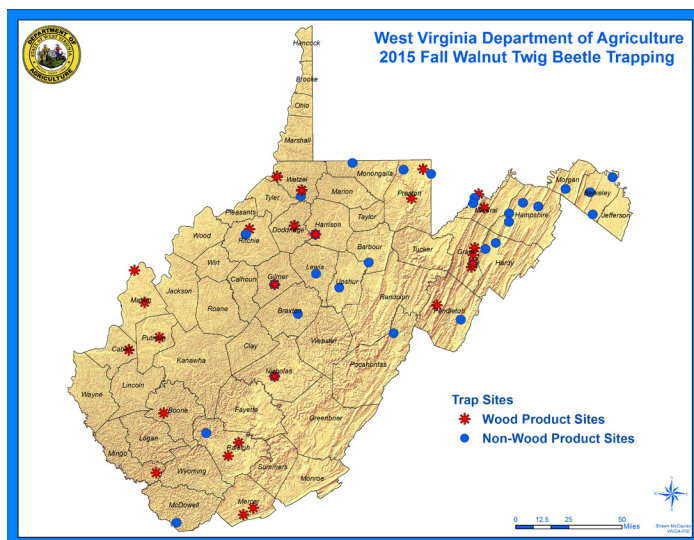


Figure 5.—Location of walnut twig beetle traps in fall 2015.

White Pine Monitoring

West Virginia continued to monitor white pine in four monitoring plots established across the State for the fourth year (figure 6). There was very little change in the overall data, but monitoring will continue for several more years before concluding anything about the *Matsucoccus scale/Caliciopsis* canker (insect/disease) complex. The objective of this project is to monitor changes in live versus dead

volume in white pine due to the presence of *Matsucoccus scale/Caliciopsis* canker and other secondary pathogens. The Brushy Fork Lake site showed signs of continual decline with increased flagging of needles. Few to no fruiting bodies were present, possibly due to the lack of smaller white pines that are more readily observable. The Watoga State Park plots showed signs of gradual decline, but no increased flagging on the larger trees. Storm damage seems to have increased throughout each plot and the surrounding forest. The Lost River State Park plots exhibited little change of overall symptoms. The majority of white pines in the plots showed very little overall decline; however, some decline was observed on single trees. The Sweet Springs site showed no signs of improvement or decline. Some storm damage was present, but has had no impact on the plots. White pine adelgid was also present at the Brushy Fork and Sweet Springs sites.

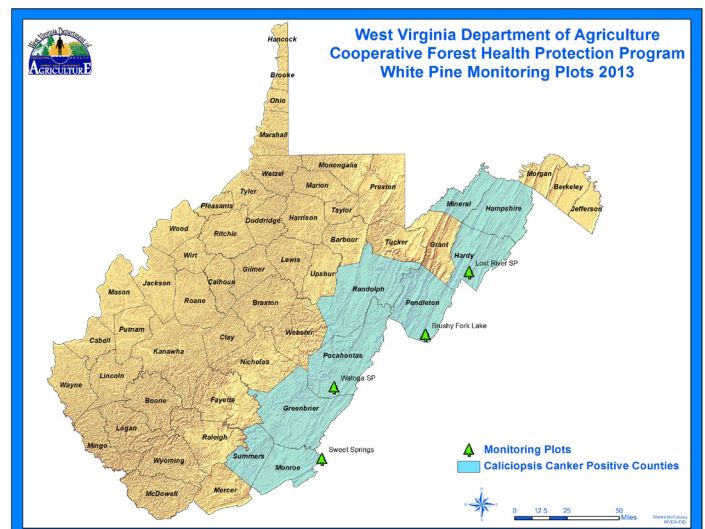


Figure 6.—Location of four white pine monitoring plots and West Virginia counties that have positive identifications of the *Caliciopsis* canker.

National Plant Protection Laboratory Accreditation Program

Personnel from the WVDA, Plant Industries Division, Plant Pathology Laboratory participated again in the National Plant Protection Laboratory Accreditation Program at the USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology. WVDA Plant Pathology Laboratory personnel were accredited in 2014 to perform validated diagnostic tests for *Phytophthora ramorum* (causal agent of sudden oak death).

Insects

Hemlock Woolly Adelgid

Hemlock woolly adelgid (HWA) can now be found in 48 West Virginia counties (figure 7). WVDA continued to treat high-value and high-visibility infested hemlocks with imidacloprid via soil injection with CoreTect™ tablets and trunk injections. In 2015, 1,544 hemlocks were treated on State lands and 724 trees were treated on private lands at six different sites in our Hemlock Woolly Adelgid Cooperative Program.

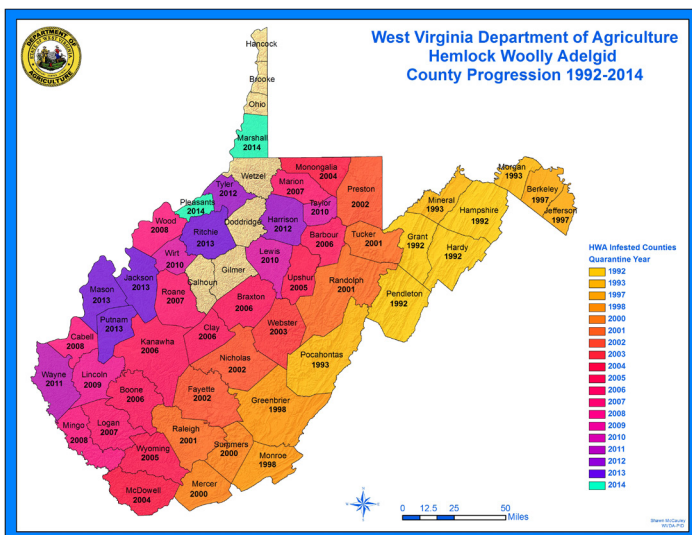


Figure 7.—Hemlock woolly adelgid progression from 1992-2014 by county.

Previous release sites of *Laricobius nigrinus* and *L. osakensis* were monitored for predator survival and impact on HWA. Due to the extreme winter temperatures in 2013 and 2014, no beetles were recovered.

Resistant Hemlock Planting

WVDA was one of nine agencies to receive hemlock saplings that are potentially resistant to HWA. These “Bullet Proof” hemlocks are from a stand of hemlocks in New Jersey that have been monitored for the past decade and appear to have a certain level of resistance to the invasive pest. This project is funded by the U.S. Forest Service and is a cooperative effort with other State agencies in the Northeastern United States. The 10 putatively resistant trees were planted at Kanawha State Forest in October and will be intensively monitored for the next few years.

Emerald Ash Borer

Twelve new emerald ash borer detections were made in 2015. To date, emerald ash borer is found in 49 counties in West Virginia (figure 8). WVDA forest health staff chemically treated 27 high-value ash trees in Marion County during the summer.

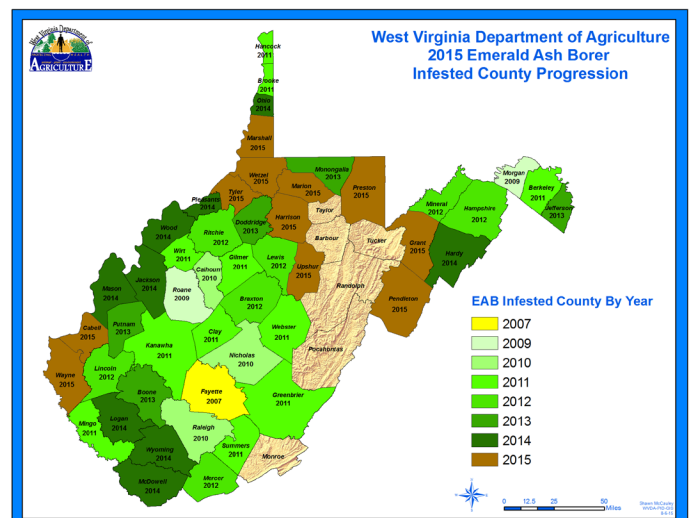


Figure 8.—Emerald ash borer infestation progression from 2007 and 2009-2015 by county.

References

Land Cover Map:

Jin, S.; Yang, L.; Danielson, P.; Homer, C.; Fry, J.; Xian, G. 2013. A comprehensive change detection method for updating the National Land Cover Database to circa 2011. *Remote Sensing of Environment*, 132: 159 – 175.

<http://www.sciencedirect.com/science/article/pii/S0034425713000242>. (1 March 2016).

Forest Land Ownership:

Oswalt, Sonja N.; Smith, W. Brad; Miles, Patrick D.; Pugh, Scott A. 2014. Forest resources of the United States, 2012: a technical document supporting the Forest Service update of the 2010 RPA Assessment. Gen. Tech. Rep. WO-91. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. Table 2.

http://www.fs.fed.us/sites/default/files/media/types/publication/field_pdf/GTR-WO-91.pdf. (1 March 2016).

Net Volume of Growing Stock on Timberland by Species:

Oswalt, Sonja N.; Smith, W. Brad; Miles, Patrick D.; Pugh, Scott A. 2014. Forest resources of the United States, 2012: a technical document supporting the Forest Service update of the 2010 RPA Assessment. Gen. Tech. Rep. WO-91. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. Tables 23 & 24.

http://www.fs.fed.us/sites/default/files/media/types/publication/field_pdf/GTR-WO-91.pdf. (1 March 2016).



Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

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