

2009

West Virginia Department of Agriculture
Cooperative Forest Health Protection
Survey Summaries



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Forest Service, Northeastern Area, State & Private Forestry and
Forest Health Protection.

***Phytophthora ramorum* Provisional Laboratory Approval Program**

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The USDA-APHIS-PPQ *Phytophthora ramorum* Provisional Approval Program was started in 2004. This became necessary after three nurseries and one mail order nursery firm operating out of California and Oregon sent *P. ramorum*-infected plants and potentially infected plant material to multiple locations around the country. These plant shipments were tracked down and placed under a hold order until it could be determined whether or not they were safe to release for distribution.

At the time, only two laboratories were officially sanctioned by USDA-APHIS-PPQ to confirm the presence of *P. ramorum* in plant samples using PCR. Even though many other diagnostic laboratories were utilizing PCR analyses, to avoid false positives only the two officially sanctioned labs were given the responsibility of making the final determination. When a diagnostic lab reported a possible *P. ramorum*-positive sample, they had to send the DNA of that sample to either of the two accredited labs. This resulted in a flood of positive samples showing up in laboratories from nurseries all over the country. As a result, these two USDA-APHIS-PPQ-certified labs had months of backlogged samples to process. The results were slow in getting back to the various state departments of agriculture, which were in turn under pressure from the nurseries waiting to get their plants released. No plant material was allowed to be sold until final testing results were confirmed.

The West Virginia Department of Agriculture, Plant Industries Division PCR Laboratory began the approval process in the summer of 2005. The laboratory was inspected by personnel from the USDA-APHIS-PPQ-Center for Plant Science and Technology (CPHST) to determine if the facility and equipment met their standards to perform official diagnostics. The laboratory passed inspection by having the required equipment and facilities to maintain a contamination-free environment necessary to performing these diagnostics accurately.

The laboratory personnel had to receive standardized training and perform a proficiency panel test. The proficiency panel is used to determine whether or not the laboratory personnel can reproduce the correct PCR test results. The laboratory personnel from the Plant Industries Division PCR Laboratory went through the training in February 2007 and administered their first test panel. Each year since then personnel have continued to be approved to perform validated diagnostic tests for *Phytophthora ramorum*, the causal agent of sudden oak death (SOD), on behalf of the United States Department of Agriculture-Animal Plant Health Inspection Service-Plant Protection Quarantine (USDA-APHIS-PPQ) Programs.

2009 *Phytophthora ramorum* Early Detection Survey for Forests

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This was the fourth year of stream baiting for early detection of *Phytophthora ramorum*, and other *Phytophthora* species in a stream environment using bait leaves. The USDA Forest Service (USDA-FS) launched this program with a pilot survey in 2006. This approach to detecting *P. ramorum* from streams has been highly successful in California, Oregon and Washington, particularly down stream from nurseries that have infected stock. The stream sampling for *P. ramorum* detection included a survey for other *Phytophthora* species as well due to research that was conducted by the USDA-Forest Service and Clemson University. They had completed several sampling periods during which various species of *Phytophthora* were recovered from bait leaves and filtering techniques.

Four streams were chosen for this survey. Two of the four streams were in the same watershed as an official Trace Forward Nursery (in West Virginia's case, these were nurseries that may have received infected stock, but any suspect plant material sampled from previous years using nested PCR analyses did not reveal a presence of *P. ramorum*). One stream was in a watershed adjacent to another that contained an official Trace Forward Nursery. The fourth stream was in the same watershed as an unofficial Trace Forward nursery (nurseries where Monrovia stock is commonly shipped but the stock was not in original shipments of the 2004 infected Monrovia stock). All stream baiting locations were downstream from these nurseries.

Six baiting periods were completed. Three baiting periods (back-to-back) were completed in the spring and the other three baiting periods (back-to-back) were completed in the fall when water temperatures had dropped below 22 C. Baiting was discontinued in one stream after three baiting periods due to a local report that MRSA was detected in the water.

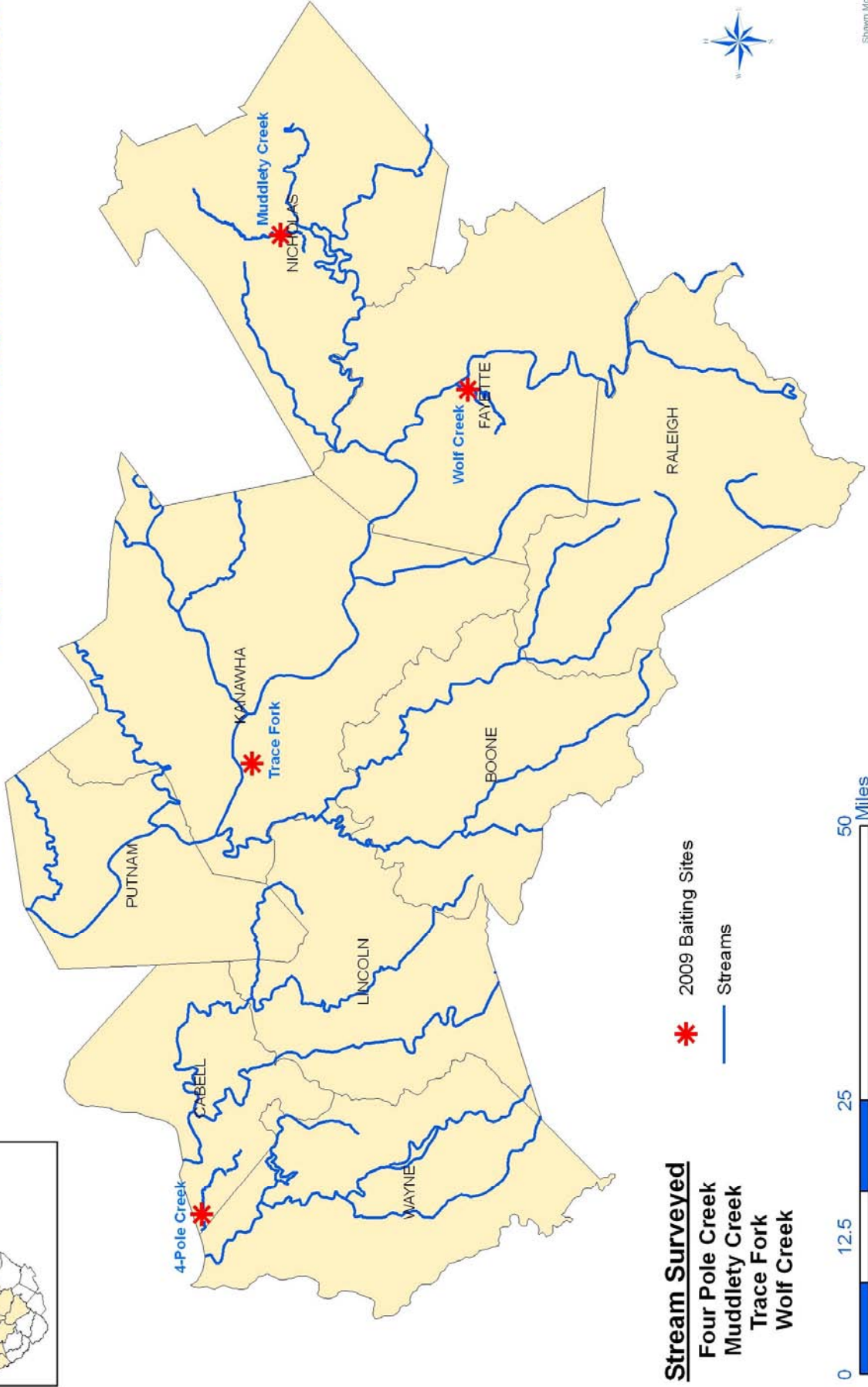
Native rhododendron was used for the purposes of this survey. The leaves were chosen at one location throughout the duration of the survey. The leaves were unwounded, and displayed no lesions or insect activity. Last year's leaves were used until this year's leaves were sufficiently hardened off.

Culturing (WVDA) and Real-Time PCR (Mississippi State University) were used for detection of *P. ramorum*. Culturing (WVDA) was used for detection of general *Phytophthora* species and ELISA was used to corroborate culturing results. *P. ramorum* was not detected in any of the bait leaves sampled or cultured. *Phytophthora* species were recovered from samples in each of the baiting periods.



West Virginia Department of Agriculture Cooperative Forest Health Protection 2009 Phytophthora ramorum Early Detection Survey for Forests

Phytophthora ramorum Early Detection Survey for Forests



- Stream Surveyed**
 Four Pole Creek
 Muddlety Creek
 Trace Fork
 Wolf Creek

- *** 2009 Baiting Sites
 — Streams



2009 Christmas Tree Disease and Insect Survey

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The West Virginia Christmas tree industry, while small by some states' standards, is important to the economy at both a local and statewide level. Currently there are approximately 400 growers in the State with about 5,000 acres of land planted with Christmas trees. Annual sales exceed \$2.7 million.

A survey of Christmas tree diseases and insects was conducted on 14 Christmas tree farms across West Virginia. A total of 29 diseases, insects or abiotic problems were noted. All detected disease and insect problems were restricted to a small percentage of the trees in any given plantation and caused relatively little economic loss. Certain problems could easily build to damaging levels over a wide area during a single or several growing seasons. Top disease and insect problems included *Diplodia* tip blight, *Phytophthora cinnamomi*, white pine root decline, *Rhizosphaera* needle cast and Eastern spruce gall adelgid.

2009 Healthy/Resistant Beech and Beech Scale Survey

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Beech bark disease (BBD) results from attack by the beech scale insect, *Cryptococcus fagisuga*, followed by one of two fungi, *Neonectria coccinea* var. *faginata* or *Neonectria galligena*. In 1981, when beech scale was first detected in West Virginia, the scale insect was found infesting beech over 70,000 acres of timberland in Randolph and Pocahontas Counties. Since then, beech scale encompasses over 3,712,335 acres in 17 counties and beech mortality from beech bark disease encompasses over 1,390,298 acres in 9 counties.

The WVDA, under an initiative of the USDA Forest Service, is currently surveying for disease-free beech in areas of heavy scale and mortality. Once candidate trees have been deemed scale-free, plant material will be sent to the USDA Forest Service which has been working on developing resistant varieties of American beech in hopes of determining how this resistance to the beech scale may be inherited.

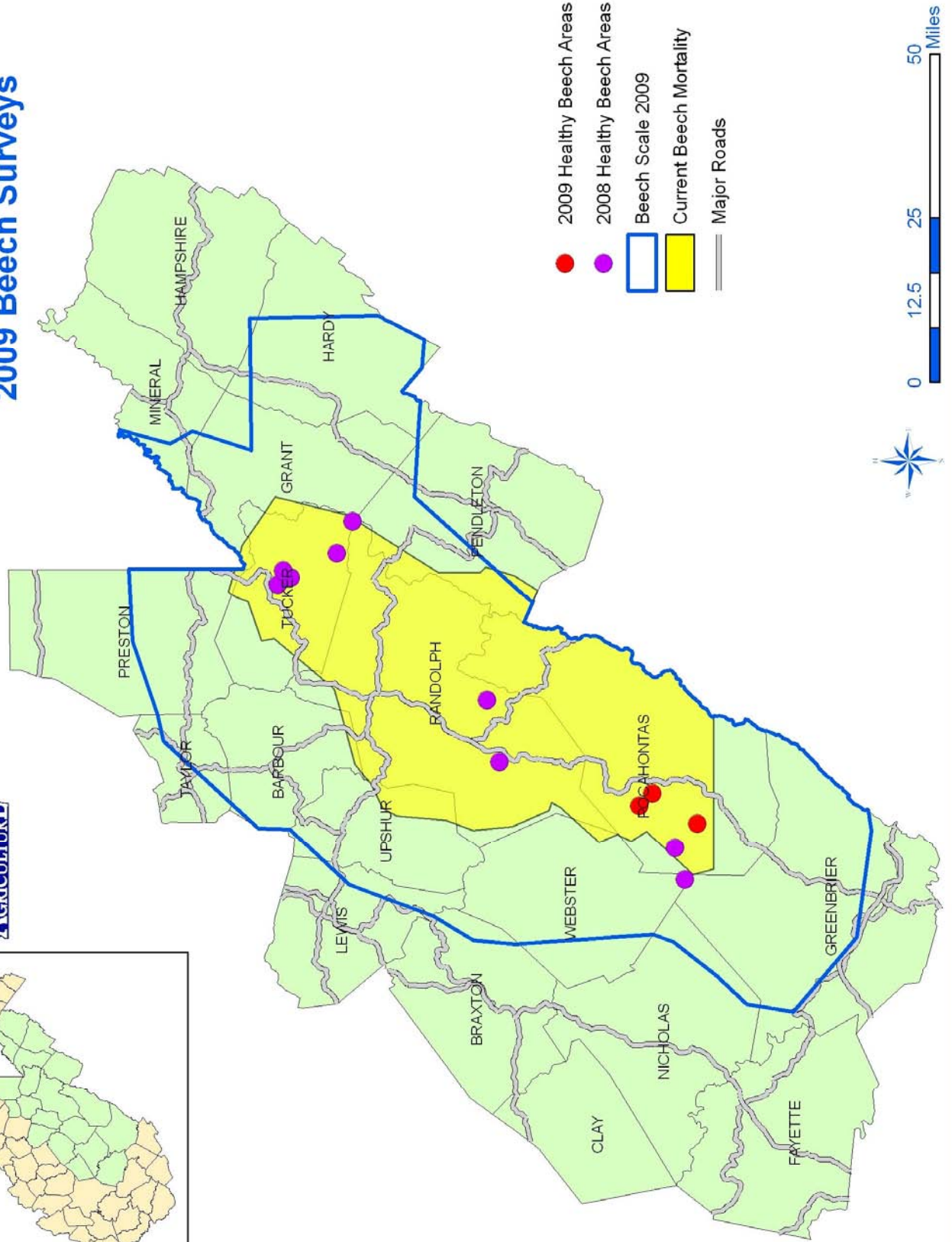
The WVDA continued surveying what beech remain scale free and healthy in high mortality areas resulting from beech bark disease (BBD) complex and what beech still remain scale free in heavily scale-infested/high mortality areas. A handful of areas were chosen in the killing front. Data such as diameter at breast height (DBH), scale presence/absence, tree conditions (healthy/unhealthy), beech component of area (percentage of beech stems), condition of beech in area (scales only, scale and *Neonectria* cankers, BBD induced decline), and distance to nearest heavy BBD beech were collected.

The trees that seem to have potential resistance have characteristics such as smooth, gray bark, full crowns with no decline or very minimal decline, no yellowing of the leaves, and a DBH that is 10 cm or greater. These same beech trees will be evaluated next year to determine if they have remained scale free. If so, they can be considered candidate resistant trees.

A beech scale survey was also conducted to monitor the spread of the scale since 2006. This makes it possible to determine the current distribution so a timeline can be established from time of scale infestation to tree mortality. This information will be valuable for when the areas will be revisited after the killing front is established and surveys for disease-free beech begin. Beech scale now encompasses 3,712,335 acres in West Virginia. That number increased by 58,377 acres from the scale survey that was done in 2006.



West Virginia Department of Agriculture Cooperative Forest Health Protection 2009 Beech Surveys



2009 Bacterial Leaf Scorch Survey

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Bacterial leaf scorch (BLS) is an infectious, chronic disease caused by the bacterium *Xylella fastidiosa* which colonizes and clogs the tree's xylem. It is transmitted by xylem-feeding insects such as leafhoppers and sharpshooters. Water transport becomes disrupted in roots, branches and leaves due to large amounts of multiplying bacteria. Hosts include oak, maple, mulberry, sweetgum, elm, sycamore, and ash.

Bacterial leaf scorch was first found in 1992 in Middleway, Jefferson County on red oak. In 2008, a BLS survey was conducted starting in Jefferson County. Samples collected were sent to Rutgers for processing. In the 2008 survey, BLS was found in 5 new counties (Berkeley, Morgan, Wood, Cabell, and Kanawha) and on 5 new hosts (oak, elm, sweetgum, red maple, black oak, and pin oak).

In 2009, BLS was found in 5 new counties. These counties were: Jackson, Putnam, Mason, Summers and Webster Counties. BLS was detected in two new hosts as well: scarlet oak and boxelder. At this time, BLS is found in 11 counties in West Virginia and on a total of 8 hosts. Prior to 2008, BLS had only been detected in one county (Jefferson). Samples were processed by the WVDA Plant Pathology Lab using ELISA.

2009 Hemlock Woolly Adelgid Survey

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Hemlock woolly adelgid (HWA), *Adelges tsugae*, is an exotic insect pest that sap-feeds at the bases of hemlock needles. In the Eastern United States it causes foliage loss, branch dieback and death of eastern and Carolina hemlocks (*Tsuga canadensis* and *Tsuga caroliniana*, respectively). Thousands of trees in West Virginia have already been killed and HWA continues to spread across the state.

The WVDA HWA program, funded in part by the USDA-FS, has four main areas; (1) detection surveys are conducted to determine the extent and severity of HWA infestations, (2) permanent plots are monitored yearly, (3) predatory beetles are released and monitored and (4) high profile and high value infested hemlocks on state lands are treated with a systemic insecticide.

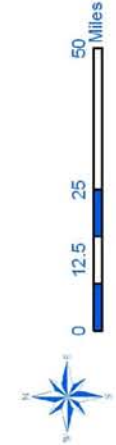
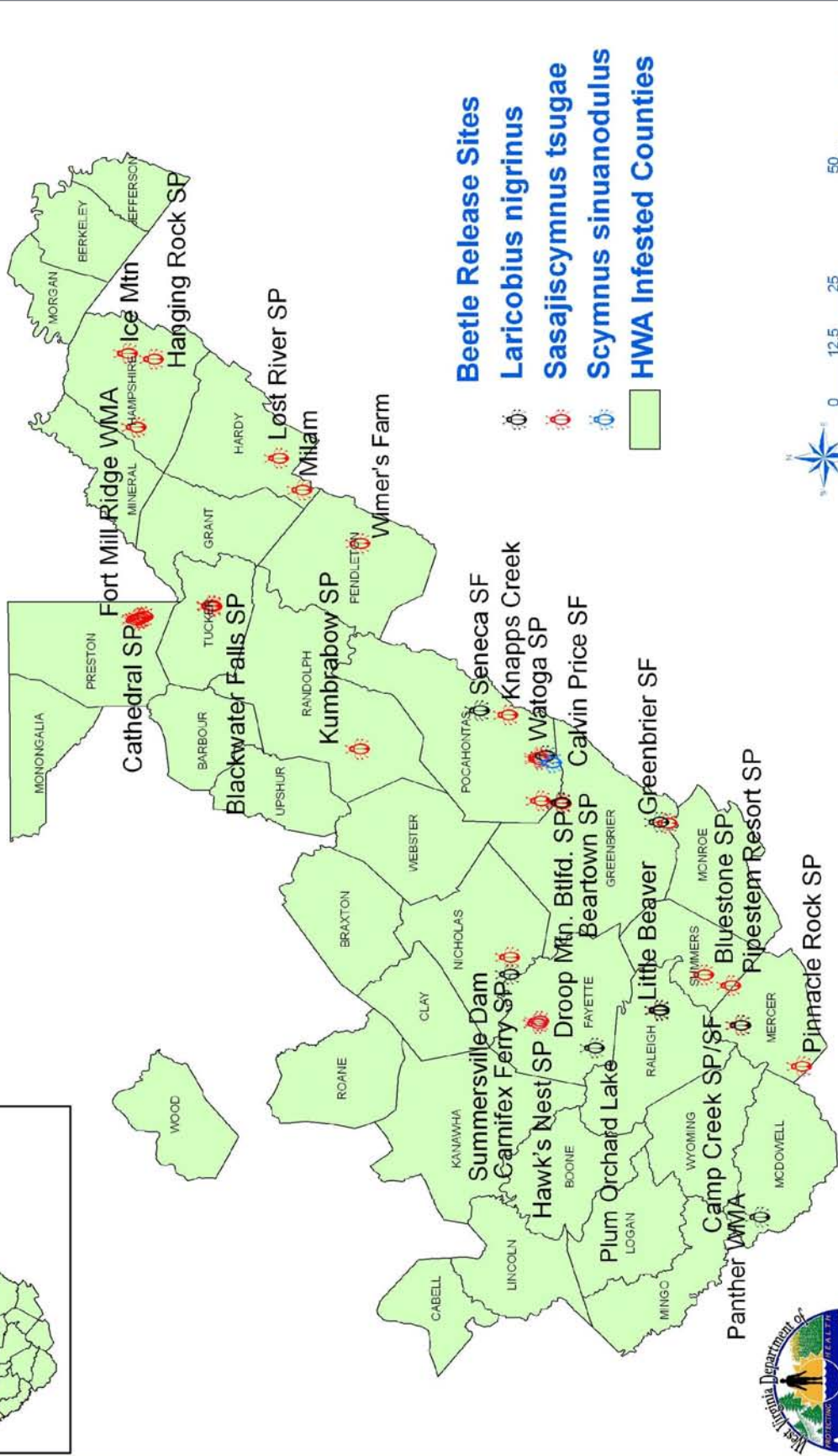
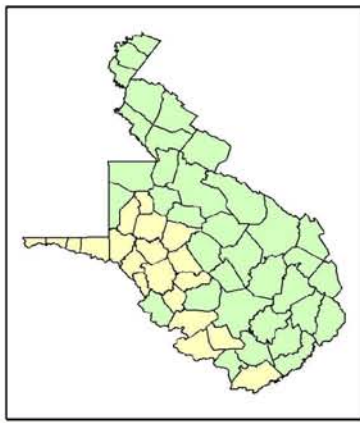
The presence of HWA was confirmed in West Virginia for the first time during the summer of 1992, with positive finds in Grant, Hardy, Hampshire and Pendleton Counties. Subsequent surveys found HWA in the following counties: Mineral, Morgan, and Pocahontas (1993); Berkeley and Jefferson (1997); Greenbrier and Monroe (1998); Mercer and Summers (2000); Randolph, Raleigh, and Tucker (2001); Fayette, Nicholas and Preston (2002); Webster County (2003); Monongalia and McDowell (2004); Upshur and Wyoming (2005); Barbour, Boone, Braxton, Clay and Kanawha (2006); Logan, Marion and Roane (2007); Wood, Cabell and Mingo Counties (2008); Lincoln (2009).

HWA permanent study plots at Greenland Gap in Grant County, Cathedral State Park in Preston County, and Blackwater Falls State Park in Tucker County were visited by WVDA field agents in June of 2009. Crews evaluated individual hemlocks in terms of tree condition and severity of adelgid infestation.

Laricobius nigrinus predatory beetles (1500) were released in the fall at Little Beaver State Park (500 adults), Plum Orchard Lake Wildlife Management Area (500 adults) and Panther Wildlife Management Areas (500 adults). Previous release sites of *L. nigrinus* and *S. sinuanodulus* were monitored for predator survival and impact on HWA.

The HWA chemical suppression program was continued in 2009. Infested hemlocks were treated with imidacloprid via soil and stem injection, depending on soil conditions and proximity to water sources. Merit 75WSP was injected into the soil around infested trees with a Kioritz soil injector. Coretect tablets were also used in treatment this year. During spring and fall treatments, a total of 1,022 (18,399.4" DBH) trees were treated at 13 sites: Beartown State Park, Berwind Lake WMA, Blackwater Falls State Park, Camp Creek State Park, Canaan Valley Resort State Park, Carnifex Ferry Battlefield State Park, Cathedral State Park, Coopers Rock State Forest, Droop Mountain Battlefield State Park, Holly River State Park, Kumbrabow State Forest, Panther WMA, and Seneca State Forest.

West Virginia Department of Agriculture Hemlock Woolly Adelgid Suppression Program Beetle Release Sites 1999-2009



Shawn McCauley
WVDA-PIG

2009 Early Detection and Rapid Response (EDRR)

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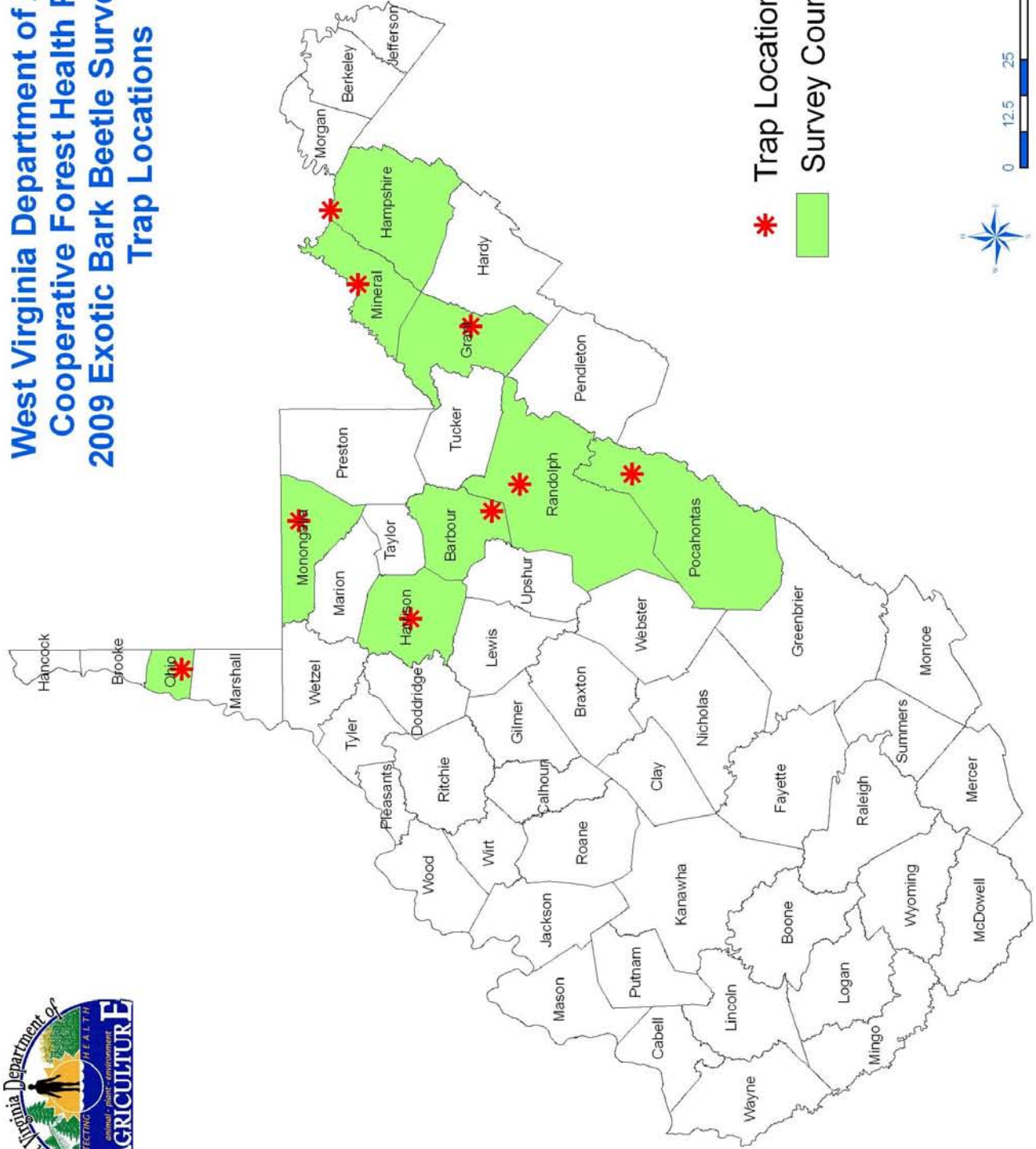
The Early Detection and Rapid Response (EDRR) pilot project was initiated in 2001 by the USDA-FS and APHIS to establish a monitoring and response system for exotic insects. A team consisting of Forest Service, APHIS, university and state representatives developed a framework for implementing a national, interagency detection, monitoring, and response system for these insects. This framework involves the cooperation of state partners, regional taxonomists and regional Forest Service staff. Participating states are responsible for following project protocols with funding from the Forest Service. In 2009, as part of this project, the WVDA was included in a multi-state survey to detect non-native bark and ambrosia beetles.

Lindgren funnel trapping was conducted by WVDA personnel at 9 locations in high-risk industrial, urban and forested settings in Barbour, Grant, Hampshire, Harrison, Mineral, Monongalia, Ohio, Pocahontas, and Randolph Counties.

Trapping at these sites resulted in a total of 232 samples that were submitted to the taxonomist under contract, Dr. E. Richard Hoebeke at Cornell University. Dr. Hoebeke identified, counted and recorded all bark and ambrosia beetles. In these samples, one species was found that is new to the State: *Xyleborus californicus*. In addition, one target species was found: *Tomicus piniperda*.



West Virginia Department of Agriculture Cooperative Forest Health Protection 2009 Exotic Bark Beetle Survey (EDRR) Trap Locations



2009 Miscellaneous Problems

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A number of miscellaneous Christmas tree, ornamental, and forest pest problems were encountered during the 2009 season. As part of our informational and educational responsibilities, we generated and mailed the 2010 CFHP Calendar, prepared timely forest health articles for *The Market Bulletin*, generated news releases, developed an informational/educational display on invasive pests for use at the State Fair, West Virginia Invasive Species Working Group, Forest Festival and Agriculture Day at the State Capitol. The majority of forest insect and disease surveys were conducted by CFHP field scouts Ryan Thorn, Matthew Abbot, Nathan Morales, and Glenda Offenberg. Field assistant/lab technicians Kristen Carrington and Jeanette Gooch assisted the field scouts on various surveys. Their efforts were greatly appreciated and generated the following reports.

Hazard Tree Rating – Each year we receive requests to examine trees to determine whether or not they present a hazard to life and property. We provide the service to help make people more aware of the liability of hazard trees. Several of these trees become hazard trees due to residential construction, insect and disease attack and poor growth form, i.e., narrow crotch formation, poor pruning, mechanical injury, etc. Landowners generally have an idea the tree is hazardous, but just like to have it confirmed.

Cultural Problems – Probably our most common problem with homeowner trees is directly due to cultural problems. Every year we see trees that have been buried instead of planted, pruned incorrectly or not at all, planted too close to other ornamentals or buildings and/or damaged by mowing, wires, fencing, signs and construction.

Miscellaneous Insects –The emerald ash borer was found in two additional counties in 2009: Morgan and Roane.

Miscellaneous Defoliators – The larger elm leaf beetle (*Monocesta coryli*) was heavy in Grant County, particularly in the area just south of Petersburg. Locust leafminer, *Odontota dorsalis*, was moderate to heavy in most counties. Bronzing was obvious by late June.

Miscellaneous Diseases – Oak decline, ash decline and other hardwood decline was prevalent statewide. Anthracnose was prevalent this year due to wet conditions in the spring.