

2009

Forest Health

VERMONT

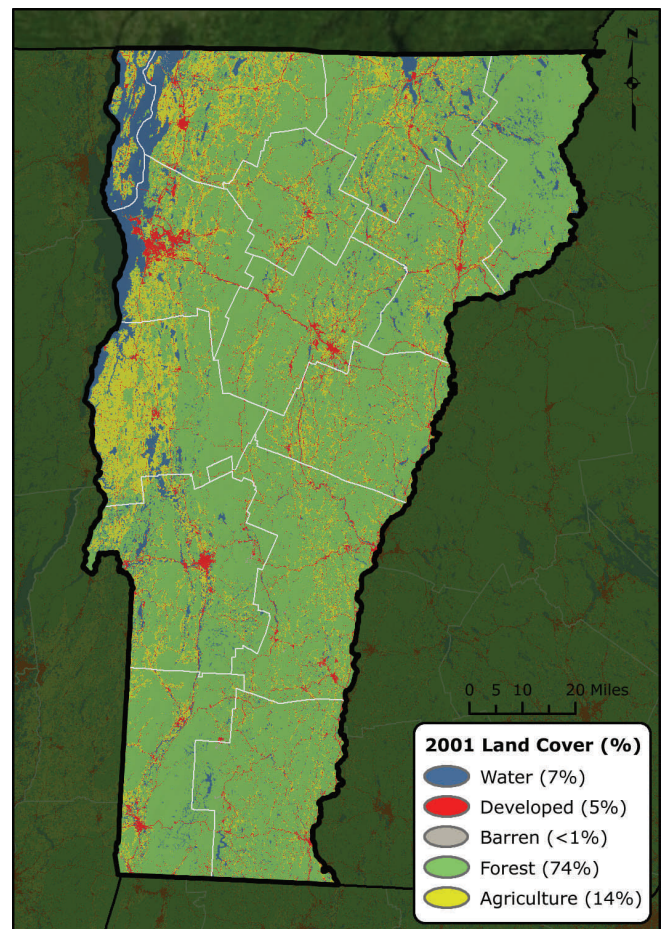
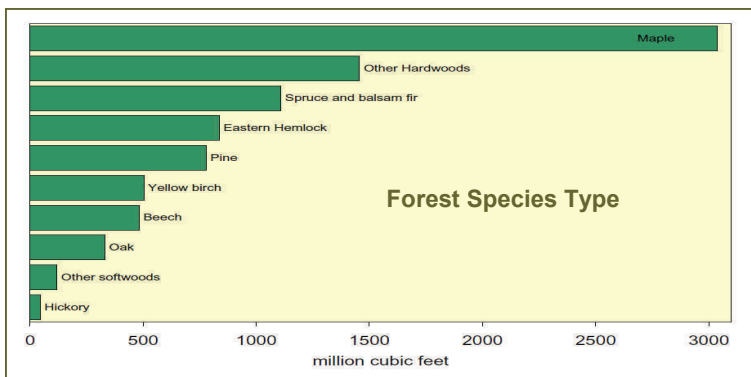
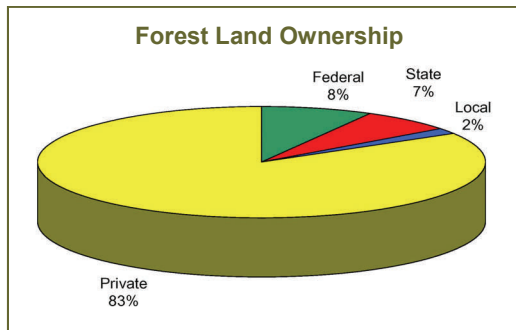
highlights



These highlights summarize information from the Vermont Department of Forests, Parks, and Recreation report on Forest Insect and Disease Conditions in Vermont 2009. The complete annual report, as well as other Vermont forest health information, is posted on-line at <http://www.vtfrp.org/protection/idfrontpage.cfm>. Contact Forest Resource Protection personnel, or your County Forester, to receive a copy by mail or for assistance in identifying pests, diagnosing forest health problems, and to obtain defoliation maps or additional literature. They can also provide on-site evaluations, insect population sampling, management recommendations, and information if you wish to participate in invasive pest citizen monitoring.

Forest Resource Summary

Forests cover 78% of Vermont. Sugar and red maple remain the most common species. However, the percentage of beech, spruce and fir are increasing, while sugar maple and white pine are decreasing. Over 83% of the state's forest land is privately owned.



Data from US Forest Service, Forest Inventory and Analysis

Forest Health Programs in the Northeast
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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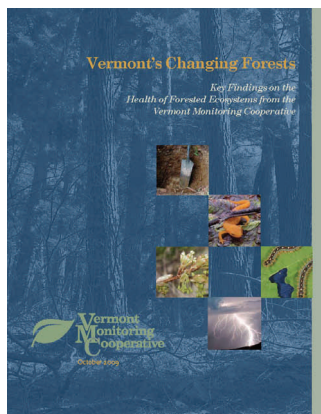
Forest Health Program Highlights

In 2009, Vermont celebrated the centennial of the state's Forestry Division, with the theme "Get into the Forest". Information on centennial activities can be found at http://www.vtfpr.org/hm/for_cen_home.cfm.

The Forestry Division is updating the Vermont Forest Resource Plan, to be completed in 2010. This will include a state forest assessment and outline resource strategies to address new and emerging issues.

Vermont forests play a major role in reducing carbon dioxide and mitigating climate change. A Vermont-specific website on climate change and forests can be found at http://www.vtfpr.org/hm/for_climatechange.cfm.

The Vermont Monitoring Cooperative, Vermont's intensive forest ecosystem monitoring and research program, completed a report synthesizing 18 years of ecosystem monitoring. The report, "Vermont's Changing Forests: key findings on the health of forested ecosystems from the Vermont Monitoring Cooperative," is posted at <http://sal.snrvvm.edu/vmc/>.



The report, Vermont's Changing Forests, is available on the Vermont Monitoring Cooperative website.

2009 Forest health initiatives include:

- An ongoing effort to discourage long-distance firewood movement
- Expanding our citizen monitoring program for forest invasives
- Projects to detect emerald ash borer and Asian longhorned beetle through public awareness, biosurveillance, trapping and targeting high-risk sites
- A multi-state project to slow the spread of hemlock woolly adelgid

- An investigation into causes for tree mortality in Vermont and adjacent states
- A project to conserve germplasm of disease resistant butternut
- A trap survey for non-native bark beetles
- A survey for new exotic pests of oak
- Planning for a public campground invasive species survey, control, and outreach project in collaboration with the Green Mountain National Forest

We continue to provide diagnostic services at the Forest Biology Lab, assist the Vermont Department of Health in monitoring tick populations, and participate in programs with Vermont's Climate Change Collaborative and the Vermont Invasive and Exotic Plant Committee.

2009 Forest Damage

The Vermont Department of Forests, Parks and Recreation conducts aerial and ground surveys to detect forest damage. In addition, monitoring plots are visited to evaluate forest health.

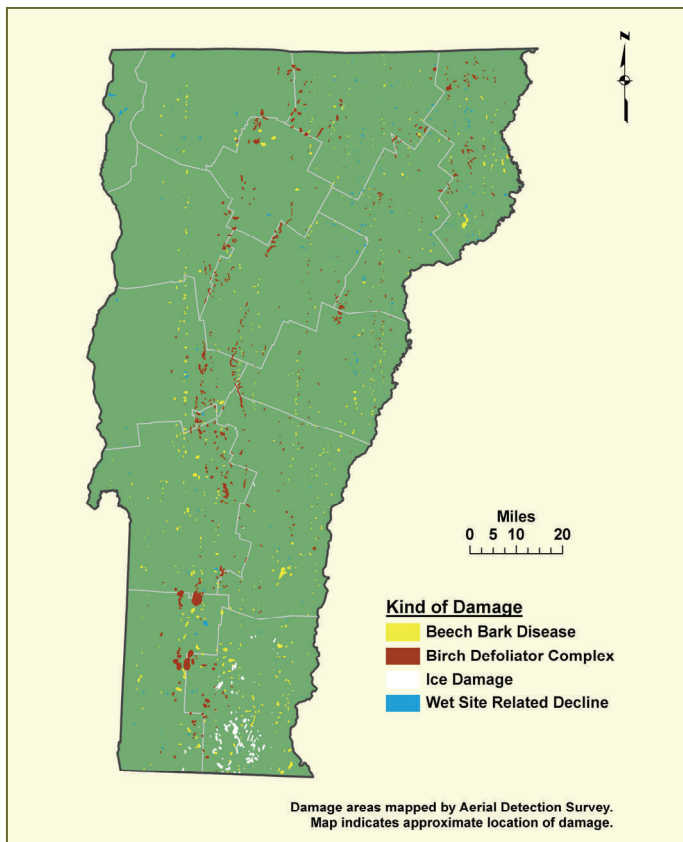
Tree health was generally good in 2009 following several years with adequate moisture and low pest activity. With wet conditions early in the season, fungus diseases remained common.

Nearly half of the damage detected during aerial surveys was **Birch Defoliation**, which was mapped on 46,150 acres. This was a substantial increase from the 4,287 acres in 2008. Over 15% of the birch forestland in the state was brown by late summer. Most of this was a result of Septoria leaf spot on paper birch, with birch leafmining sawflies also causing some damage.



Birch defoliation was widespread at upper elevations.

As far as we know, the fungus that causes Septoria leafspot is native. Persistent cloud moisture at upper elevation sites created ideal conditions for fungus growth during the past few summers. *The impact on commercial forests should be minor because mountain-top birch stands were the most likely to be defoliated.* However, at higher elevations, defoliation may contribute to **Birch Decline and Mortality**, which otherwise appears to be stable with 1,743 acres, of mostly old mortality, mapped this year compared to 1,736 acres in 2008.



Beech Bark Disease was the primary cause of dieback and mortality on 25,469 acres. We've had a recent spike in the disease because dry fall conditions early in the decade allowed levels of beech scale to increase. When beech scale increases, the Nectria fungus that kills the bark is never far behind. A recent increase in beech scale, observed in parts of the state, suggests that heavy beech mortality will continue.

Although we associate diagnostic bark symptoms with this disease, trees and branches which die quickly may not have any defects. The sunken patches only develop when diseased trees survive long enough to grow around dead areas

in the bark. While a smooth-barked dead tree may have died from this disease, trees which are smooth-barked and healthy may be genetically resistant. Leaving these trees, while removing susceptible beech, will increase the proportion of seedlings resistant to beech bark disease.

Beech trees which die quickly from beech bark disease may not have diagnostic stem defects.



Severe Storms caused scattered damage. Trees in southeastern Vermont are recovering from the December 12, 2008 ice storm. Breakage from that storm was mapped on 10,282 acres. A windstorm on December 10, 2009 caused damage in Addison County. *Most trees damaged over the winter recover quickly if at least half the crown is intact, and most with one-quarter remaining are expected to survive.* The exception is paper birch, which is at risk even if three-quarters of the crown remains.

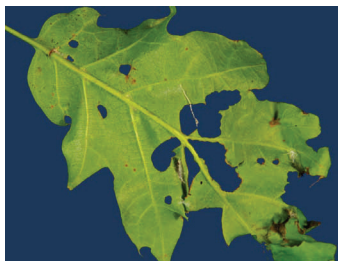
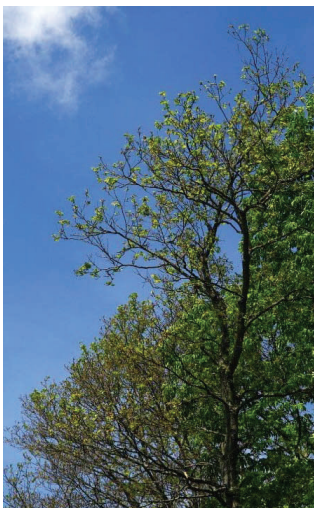
Damaging summer storms included the May 9th tornado/hailstorm in central and southern Vermont, a May 31st windstorm from Addison County through northeastern Vermont, and a July 16th tornado, hail and thunderstorm event in central Vermont.



Trees damaged from the December 2008 ice storm are expected to survive if 25% of the branches remain.

Hardwood Defoliation, caused by leaf-feeding insects and anthracnose, was mapped on a total of 7,474 acres. Although there was some re-foliation in affected stands, the damage remained noticeable throughout the growing season. At least 3,344 of these acres were **Oak Defoliation** by a complex of leaf rollers and other caterpillars. Damage by these insects was also reported from other states in the region.

It was the second year of oak defoliation in some of the affected areas. Similar damage in the 1980s led to mortality in New Hampshire and Massachusetts. *Keep an eye out for oak defoliators at leaf-out in May, 2010.* They may be feeding inside rolled up leaves, or inside leaves they tie together with webbing. Continue to monitor tree condition in defoliated stands.



Look for oak leaf roller damage when leaves expand in May.

Forest Tent Caterpillar caused no noticeable defoliation, although occasional larvae were observed. Areas of mortality, primarily red oak and sugar maple, are still noticeable in the Taconic range. *Although the outbreak is fading from memory, don't forget to consider forest tent caterpillar defoliation history if you encounter hardwood dieback or mortality.* You can request defoliation records to determine whether damage was mapped in the area.

Brown Spot Needle Blight was heavy again on white pine, and other pine species, for the 5th consecutive year. Previous year needles turned brown in early spring. By mid-summer, when new growth emerged and brown needles had been cast, trees looked green, but thin. *Because damage from this fungus disease is heaviest in moist, low-lying areas, it may accelerate white pine decline in marginally wet sites.*

Populations of **Balsam Woolly Adelgid** increased in the Northeast Kingdom, with light levels commonly observed. This exotic insect has been here for a century. In south central Vermont, new mortality was common in stands previously affected by the insect.

Like its cousin on hemlock, balsam woolly adelgid is sensitive to extremely cold winters, so populations fluctuate with the weather. *With no extreme cold in the winter of 2009-10, we expect damage from this insect to increase.* Look for white wool on fir trunks as well as twigs.



Fir mortality is occurring in some stands where balsam woolly adelgid was previously heavy, but may no longer be noticeable.

Balsam fir may continue to decline in existing mortality areas. With root rots and bark beetles established in those areas, harvesting should be done in large groups, patch clearcuts, or other non-selective methods.



Previous year needles on white pine killed by brown spot needle blight are shed by mid-summer.

Damage from **Wet Site Conditions** was mapped on 8,904 acres.

Gypsy Moth egg mass counts have been low, but decreased further, indicating continued low populations for 2010.

Hardwood Chlorosis, mostly on sugar maple in low-lying areas and at the base of slopes, was evident again, especially in northern Vermont.

Larch Decline was mapped on 1,027 acres, a level similar to previous years, with some new mortality in pockets of previously dead trees.

Poplar Defoliation by a complex of leaf rollers was noticeable in scattered locations.

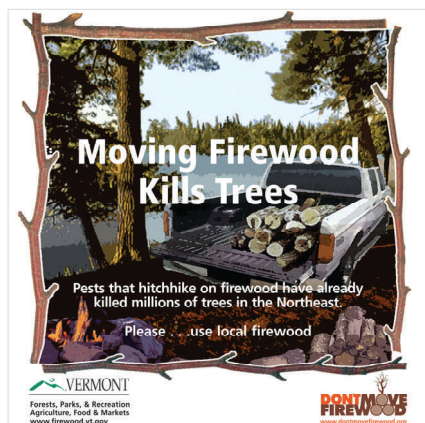
Spruce-Fir Decline remains stable at high elevations with 1,702 acres mapped.

Heavy Seed Production on Ash compromised leaf size and therefore tree productivity.

Fall Webworm populations were high across the State, with scattered patches of heavy defoliation.

Exotic Pest Update

Restrictions on long-distance firewood movement were implemented to prevent new introductions. Firewood may not be brought to State Parks from over fifty miles away. Out-of-state firewood may not be brought to the Green Mountain National Forest. A Federal quarantine on the movement of firewood across the U.S. border is now in effect. In addition, Vermont has an active program to alert the public about transporting pests when moving firewood. Details are available at <http://www.firewood.vt.gov>.



Volunteers are increasingly important to our exotic pest program, and *we welcome new volunteers to participate in our surveys*. Volunteers assist with hemlock woolly adelgid monitoring, surveys for emerald ash borer and Asian longhorned beetle, and don't-move-firewood efforts. With UVM Extension and the Nature Conservancy, we are participating in a project to develop best practices and tools for a citizen monitoring program for invasives in urban forests.

With the Agency of Agriculture, Food and Markets, we are actively surveying for possible introductions or expansions of a number of non-native forest pests. The Vermont Invasive Forest Pest Action Plan has been updated, identifying agency roles and prioritizing actions if a new pest is detected. The Agency of Natural Resources has recently completed a Report on Invasive Species in response to a 2009 directive from the Vermont legislature.

Vermont participated in the regional Northeast Forest Pest Outreach and Survey Project. The objective of this project was to promote early detection of Asian longhorned beetle and emerald ash borer through increased public awareness and targeted surveys. Twenty-five state and private campgrounds were surveyed for these pests. Targeted surveys were also conducted in large areas of Brattleboro and Burlington.



Campground surveys targeted State Parks which had been frequently visited by residents of Asian longhorned beetle infested areas of Massachusetts.

Surveys for non-native bark and ambrosia beetles were conducted in cooperation with the national Early Detection and Rapid Response (EDRR) program at eight sites in Vermont. A total of 46 species were collected, including two target species considered potential forest pests.

More information on exotic pests of interest to Vermont can be found at <http://www.vermontagriculture.com/ARMES/plantindustry/caps/forestPests/index.html>.

Asian Longhorned Beetle is not known to occur in Vermont and was not detected by public outreach or survey. Our campground surveys targeted State Parks with a history of heavy use by visitors from the Worcester area. In addition, a questionnaire was sent to the 198 Massachusetts residents from Asian longhorned beetle infested areas who own property in Vermont to determine if firewood may have been moved. To follow-up, trees and woodpiles were inspected on selected properties.



An Asian longhorned beetle collected in Worcester, MA.

We don't recommend any management adjustments in anticipation of this insect. Its infestations expand gradually, and mortality is not rapid. *However, early detection is especially important for Asian longhorned beetle.* If an infestation is found when it's still small, there's a realistic chance it can be eradicated. This has already happened in Chicago and at one of the infested locations in New Jersey. An excellent guide to Asian Longhorned Beetle Injury, covering diagnostic features and look-alikes, is at http://www.glfsc.forestry.ca/VLF/invasives/alhbdetecguide_e.pdf.

Butternut Canker levels remain stable, with most butternuts showing symptoms of the disease. We are participating in a multi-state project, coordinated in Vermont by Plant Technologies LLC, to conserve butternut germplasm as a first step in species restoration efforts. We will be establishing an orchard of butternuts grafted from trees which seem to have some disease resistance. *Please contact us if you know of a stand with healthy butternuts located close to cankered trees.*

The **Common Pine Shoot Beetle** was first detected in 1999 in northern Vermont. Since then, the beetles have been found in many counties. Tree damage in Vermont is difficult to find and is limited to new shoot injury. A federal quarantine is in place to limit the spread of this exotic insect, but pine material is free to move inside Vermont, and to most of the surrounding region. Quarantine details can be found at <http://www.anr.state.vt.us/fpr/vtfpr/protection/quarantine.cfm>.

Emerald Ash Borer is not known to occur in Vermont and was not detected by public outreach or survey. Purple traps were deployed at 143 campgrounds and other high risk sites in an effort led by the Agency of Agriculture, Food, and Markets. A trap tree survey was completed by examining ash from four locations in Grand Isle County that had been girdled in 2008. As part of the regional emerald ash borer biosurveillance program, 19 nest sites of *Cerceris fumipennis* were located. This wasp provisions its nests with metallic wood borers. We can look for emerald ash borer by examining beetles the wasps have collected.

For the trap tree survey, ash trees were girdled to attract any emerald ash borers that might be present in the area. Trees are then checked for emergence holes and galleries.



Government agencies are making a serious effort to slow the spread of the emerald ash borer infestation just east of Montreal. In addition to prohibiting the movement of ash out of the regulated area, some cutting has been done to reduce the reservoir of infested material, and research is being done on biological control.

The leaflet, "Preparing for Emerald Ash Borer: Recommendations to Reduce the Impact in Vermont", has been updated. *In stands with a high percentage of ash, particularly if it exceeds 25% of the basal area, consider treatments to enhance other species, but don't rush to remove all the ash.*

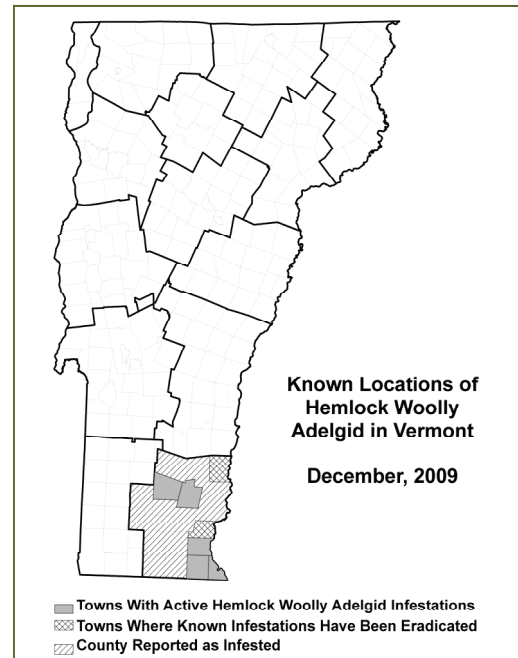
European Wood Wasp was not observed, although 140 traps were deployed by the Agency of Agriculture, Food, and Markets and USDA-APHIS. The survey included Lamoille County, where a single adult was trapped in 2007. This remains the only European wood wasp collected in Vermont. *There are no federal or state quarantines on this pest.*

Hemlock Woolly Adelgid detections increased in Windham County, but no new counties were reported as infested. This insect has now been detected in 30 locations in seven towns. Approximately 450 volunteers have been trained and are assisting with detection surveys. The Vermont Agency of Agriculture, Food, and Markets continues to monitor nurseries for possible introductions of hemlock woolly adelgid on imported trees.

Vermont is collaborating with the states of New Hampshire and Maine and with the US Forest Service to develop a regional approach to managing this insect. In cooperation with Dr. Dave Mausel from the University of Massachusetts, the predatory beetle, *Laricobius nigrinus*, was released at sites in Brattleboro and Vernon.

Hemlock products from Windham County are now subject to existing hemlock woolly adelgid quarantines. These vary from state to state. *Responsibility for quarantine compliance lies with sawmills, biomass plants, and other facilities that receive hemlock logs and chips.* Loggers and truckers may be asked to identify the town where hemlock was harvested. Facilities in Vermont may receive hemlock freely, as long as they have a compliance agreement. This requires

some recordkeeping and allows us to conduct tree inspections. Without a compliance agreement, quarantined products may not be moved into any Vermont county from an infested county. Known infestations are posted at <http://www.na.fs.fed.us/fhp/hwa/>.



These wood shavings contain Laricobius beetles, a natural enemy of hemlock woolly adelgid.

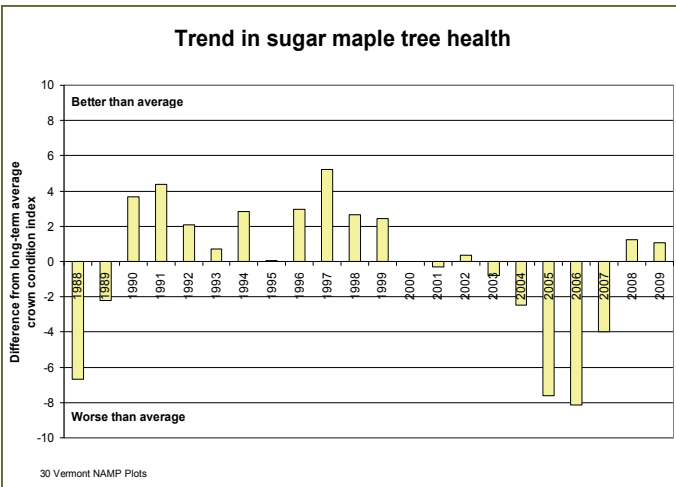
Non-native Invasive Plants continue to prevent regeneration of native species, especially in southern and central Vermont. In 2009, our activities related to invasive plants included: developing a protocol for use in the 2010 public campground surveys, compiling invasive plant detection records for the state resource assessment, and several control projects on state lands. Forest impacts were among the concerns addressed at the Invasive Plant Network Meeting organized by the Vermont Invasive Exotic Plant Committee. The Green Mountain National Forest has begun the process of seeking public input for its Forest-wide Non-native Invasive Plant Control Project.

Oak Wilt was not observed or known to occur in Vermont. We have increased our vigilance in looking for this disease since it was detected near Albany, NY. Samples were taken and cultured from one oak in Shaftsbury, but the oak wilt fungus was not recovered.

Monitoring Forest Health

Forest surveys help determine trends in sustainability indicators such as biodiversity, forest ecosystem health, climate change, carbon cycles, and soil and water conservation.

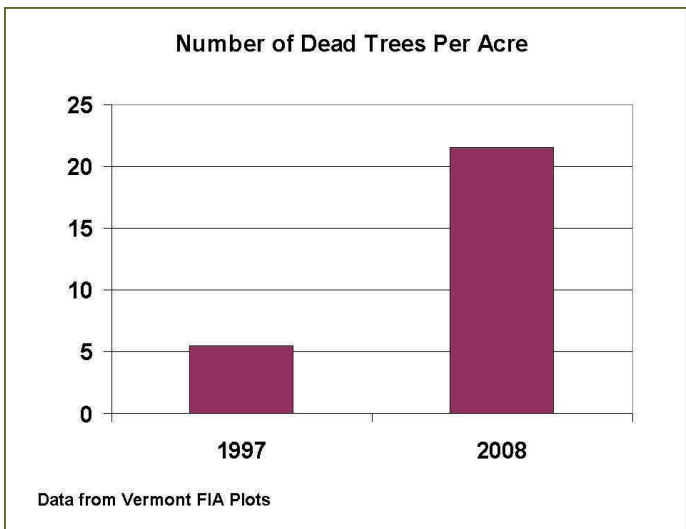
In Vermont’s **North American Maple Project** (NAMP) plots, 95% of the sugar maples were healthy in 2009. This represents better than normal tree health, especially considering major stress events during this decade: the 1999-2001 droughts and the 2003-2006 forest tent caterpillar outbreak. The crown condition index (reflecting twig dieback and foliage transparency) was also better than the long-term average. However, sugar maple mortality continued to be above normal (1.2% of canopy trees). In some areas, especially the Taconic region of southwestern Vermont, mortality lingers from past forest tent caterpillar defoliation.



Vermont cooperates with the U.S. Forest Service to assess forest resource trends through the **Forest Inventory and Analysis** (FIA) program. The current inventory of Vermont was completed

in 2008. Updated results are available at <http://fia.fs.fed.us/> and a comprehensive report is planned for 2010.

The 2008 Vermont FIA data showed a 28% increase in mortality of growing stock volume since the last inventory of 1996-1997, with the number of dead trees increasing from 5 trees per acre to 22 trees per acre statewide. New York, New Hampshire and Maine FIA data show a similar trend. A study has been initiated to investigate potential causes of this mortality and identify site conditions that may have contributed.



Evaluations of plant injury from ozone exposure have been collected on a subset of Vermont plots since 1994. Dramatic reductions in ozone-induced damage have been recorded over this time period. However, some sensitive plants, including white ash, black cherry, milkweed and blackberry, continue to have symptoms, especially in southern Vermont where ozone levels tend to be higher.

Additional forest health measurements have been collected on a some of the FIA (P3) plots. Descriptions and updates on additional monitoring measurements are available at <http://www.fia.fs.fed.us/program-features/indicators/>.

<p>For more information, contact the Vermont Department of Forests, Parks and Recreation:</p>	Windsor & Windham Counties.....	Springfield (802) 885-8845
	Bennington & Rutland Counties.....	Rutland (802) 786-3851
	Addison, Chittenden, Franklin, & Grand Isle Counties.....	Essex Junction (802) 879-6565
	Lamoille, Orange & Washington Counties.....	Barre (802) 476-0170
	Caledonia, Orleans & Essex Counties.....	St. Johnsbury (802) 751-0110