2007 Forest Health Highlights

Vermont

Sugar Maple

January 2008

The Resource

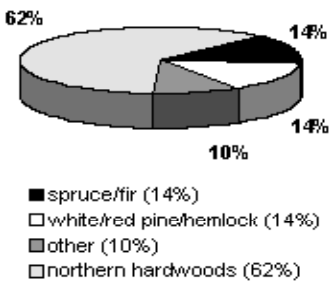
Vermont's forests are valuable ecologically, economically, and socially. Covering nearly 80 percent of the State, forests provide jobs, stability to the landscape, wildlife habitats, biological diversity, clear water, scenic vistas, and diverse recreational opportunities. While changes are always occurring to the forests, these are values that Vermonters want to maintain.

A Forest Resource Plan was developed to sustain the many values and meet the various demands on the forest resource. The vision states that, *In the future, the forests of Vermont will consist of healthy and sustainable ecosystems, with a prosperous and sustainable forest products industry, abundant recreational opportunities, and a combination of ownership patterns supporting a working forest landscape and undeveloped forest land.*

Today 78% of the State is forested (4,544,400 acres) compared to 63% in 1948. Out of the forested area:

- **97.3% timberland**
- **2.7% noncommercial or reserved forestland**

Major Forest Types



Special Issues

One of the most important factors affecting forest ecosystem health each year is rainfall. Plentiful rainfall soaks into forest soils, allowing trees and plants to grow abundant foliage and seeds to feed all the forest inhabitants. The growing season of 2007 produced abundant plant growth. Another favorable forest bonus was that insect defoliators, while always present to some extent, affected relatively small areas of forests with only light intensity.

Sugar maple maladies affected 102,551 acres of Vermont forests (Figure 1). Maple anthracnose, a leaf browning disease, was common late in the growing season. But most of the sugar maple foliage problems were caused by a complex of pest factors: an unusually high population of the maple trumpet skeletonizer, pear thrips, saddled prominent, maple leaf cutter, Septoria leaf spot and wind burn. The specific combination of factors varied with location. Most tree damage was light and is not expected to significantly affect long term tree health.

Sugar maple health benefited from a decline in populations of the forest tent caterpillar, which caused 539,841 acres of defoliation from 2004 to 2006. During those years, this native insect caused repeated defoliations in some forests. In 2007, dieback and mortality affected scattered areas, especially in southern counties, where 1,268 acres of decline were mapped during aerial surveys. Wet and dry sites, or areas recently thinned were most commonly subject to decline. Sugar maple monitoring plots showed that forest tent caterpillar defoliation resulted in the most significant health problem in the last 20 years (Figure 2).

Late season browning of birch was mostly attributed to a leaf disease, **Septoria leafspot**, and was mapped on 25,278 acres of forest. **Birch decline** from previous stress events was mapped on 3,563 acres. Most of the damage was at high elevations, in areas where mortality has been observed over the past few years. This wave of paper birch decline was initiated by recent drought years (1999 to 2001), successive years of defoliation, and in some locations, damage from the 1998 ice storm.

In 2006, wet weather created ideal conditions for the build up of fungi which cause leaf diseases. In 2007, many observations of ailing white and Scots pines were from **brown spot needle blight** where previous-year needles had been lost. White pines also saw heavy populations of **white pine needle adelgid**.

Intense **wind storms** on several dates resulted in 6,090 acres of damage to forests. Most notable was the April 16th wind storm that caused infrastructure damage to the city of Rutland. Other areas affected were in southern Vermont, and in the Northeast Kingdom townships.

Exotic Pests

The introduction of nonnative insects, diseases, and forest plants can lead to significant changes in Vermont forests. The natural controls that keep species in balance are not present, so these organisms out-compete native species for resources and space. Some potentially damaging exotics have not reached Vermont and are the subject of detection surveys. Other species are already in Vermont and are monitored for population changes and tree damage.

Vermont is actively surveying high risk forest areas for several new U.S. or North American introductions of serious forest pests. No evidence was found of the **Asian longhorned beetle, *Phytophthora ramorum* (sudden oak death), brown spruce longhorned beetle, oak splendor beetle,** or the **emerald ash borer.** The emerald ash borer is considered the most serious exotic pest threat, as it is killing millions of ash trees in the Midwest and continues to be found further east from the original infestation in Michigan. It is now present in parts of Pennsylvania, West Virginia, and western Ontario. Firewood transport from infested areas seems to be the main method of movement. More information on exotic pests of interest to Vermont can be found at www.vermontagriculture.com/ARMES/plantindustry/caps/forestPests/index.html **Hemlock woolly adelgid** was found for the first time in Vermont on mature native trees at two separate locations in Windham County. In each case, the infested hemlock trees were located adjacent to bird feeders or bird baths, suggesting that birds are transporting the insect from infested states to our south into Vermont. These new hemlock woolly adelgid populations were probably several years old, and because of our recent warm winters, have been able to survive. Infested trees were burned on site or treated with pesticides to eradicate these populations. Follow-up surveys surrounding adelgid infested trees did not find the insect in adjacent

The **Sirex woodwasp** was detected for the first time in Vermont by the Vermont Agency of Agriculture at one trap location in 2007. This insect can fly great distances and is detrimental to certain pine species, especially Scots and red pines. Additional surveys will be done to determine if this insect is truly established at the detected location.

The **pine shoot beetle** was first detected in Vermont in 1999 in northern Vermont. Since then surveys have found the beetles in many counties, including new detections in Rutland County in 2005. Observations in Vermont have been that tree damage 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 into non-affected states. Pine material is free to move inside Vermont. Quarantine details can be found at www.vtfpr.org/regulate/for_forres_regs_pestquar.cfm

Beech bark disease continues to cause tree decline on severely infested trees. The area of damage aerially mapped this year increased to 61,859 acres.

Gypsy moth larvae were occasionally observed but egg mass surveys indicate that populations of this defoliator of oak and associated species remain low.

Balsam woolly adelgid damage symptoms were visible on 2,321 acres in central and southern Vermont. Past damage contributed to 9,535 acres of decline mapped in spruce/fir stands.

Invasive nonnative plants such as glossy buckthorn, Japanese barberry, and Asian honeysuckles, continue to invade forests in Vermont, especially in southern counties.

Monitoring Forest Health

Although forest health is much more than tree health, trees represent a major component of forests and tree health will ultimately affect all the other forest ecosystem components. In Vermont we have a variety of surveys that are done annually or periodically that contribute to our understanding of trends in forest health. Results from these surveys assist the State in assessing trends in forest sustainability such as: biodiversity, forest ecosystem health and vitality, climate change and carbon cycles, and soil and water conservation.

Every year, the Vermont Department of Forests, Parks & Recreation conducts ground and aerial surveys to look at tree health and stress problems. In 2007, 4.7 million acres of forestland were evaluated from an airplane to map forest health conditions. In addition long-term tree health monitoring plots from a variety of programs were visited and tree health evaluated.

Ongoing monitoring of sugar maple forests showed that in 2006, for the first time in a decade, fewer than 90% of sugar maple trees on our plots were healthy. This survey of **North American Maple Project** plots in Vermont indicated that defoliation by the forest tent caterpillar had adversely affected tree health in some locations (Figure 2). In 2007, crown health improved, with more than 90% of sugar maples healthy once again.

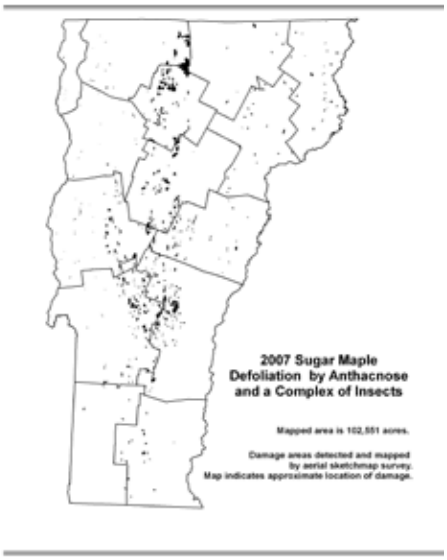
The Vermont Agency of Natural Resources' **"The Way Forward"** process, aimed at improving services and programs, resulted in two **Sustainable Forestry Task Force reports.** Each report presents significant steps that will improve health and sustainability of Vermont forests (http://www.anr.state.vt.us/site/cfm/TVWF/).

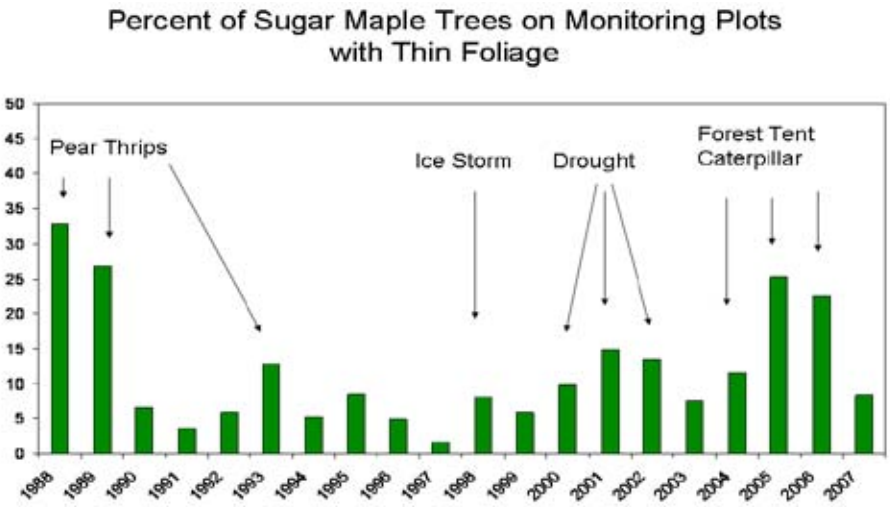
The **Vermont Monitoring Cooperative**, Vermont's intensive forest ecosystem monitoring and research program, made significant strides in bringing science to policy makers by cooperating with various scientists to complete mercury research projects; completed a mapping project of the New England Governor and Eastern Canadian Premiers Forest Sensitivity to Acid Deposition Mapping (http://www.ecosystems-research.com/fmi/2007-Forest-Mapping-Report.pdf); completed 15 years of monitoring forest health at Mount Mansfield; and have monitored spring and fall tree phenology monitoring since 1991, which is showing trends in the timing of spring leaf emergence and fall color and leaf drop in relation to changing climate (http://sal.snr.uvm.edu/vmc).

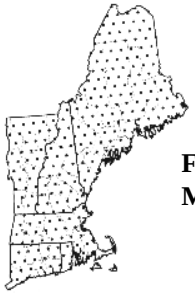
Vermont cooperates with the US Forest Service to inventory and assess trends in our forest resource through the **Forest Inventory and Analysis** (FIA) program. The current inventory of Vermont will be completed in 2008. Updated results are available at fia.fs.fed.us. Additional measurements are collected on a subset of these plots to provide a more holistic assessment of forest ecosystem health. Descriptions and updates on these measurements (P3 plots) are informative (www.fia.fs.fed.us/program-features/indicators/).

In the 2007 **Governor's Commission on Climate Change** report, forests were identified as a major asset in Vermont's strategy to mitigate carbon emissions. Forest uptake and storage of carbon are significantly reducing Vermont's carbon footprint. Future work to maintain our existing carbon reservoir in forest soils, trees and in wood harvested for use as durable wood products will include projects in urban and community forests, riparian areas, on conservation lands, and in working forests. www.anr.state.vt.us/air/Planning/htm/ClimateChange.htm

Figure 1.







Forest Health Monitoring Sites

For More Information

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