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## Vermont Forest Health Update

### Late Spring Frost Injury

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*Reported by the Vermont Department of Forests, Parks, and Recreation*

Tree damage from late-spring frost is widespread in Vermont, due to below-freezing temperatures throughout the state during the week of May 9<sup>th</sup>, particularly the morning of May 11<sup>th</sup>. In some locations, there were several “killing frosts” over the course of that week.

Where is the damage? Damage has been reported in all corners of the state, from Bennington and Windham Counties in the south to Essex and Franklin Counties in the north. Large areas of damage are noticeable throughout the Green Mountains.



*Heavy frost injury to sugar maples.*

What species are affected? In the mountains and northern areas, the most notable damage is to sugar maple. There is also substantial damage to white and yellow birch, poplar, red maple, and beech. In southern valleys, there is more damage to species that break bud later, such as oak, sycamore, and black locust.

Some balsam fir Christmas tree growers have reported damage to new shoots.

Susceptibility to frost depends on the tree species and the stage of leaf development. The early warm weather in the spring may have contributed to this year's damage. Sugar maple leaf development was about two weeks ahead of normal, and budbreak was early on many other species.

What does the damage look like? Frost may damage just the foliage, or entire shoots. Shoots and leaves may wilt, and then turn brown or black. With lighter damage, leaves may have brown edges, and be cupped or tattered. Damaged leaves are shed, so you may see lots of small, shriveled leaves on the forest floor.

*From left to right:  
sugar maple shoot  
injury, light  
damage to beech  
leaves, scattered  
damage to red oak.*



What will happen to the trees? Frost damage looks alarming, but most forest trees with heavy damage are expected to recover quickly. Generally, leaves were not fully expanded when the freezing temperatures occurred, so energy reserves remain for growing new replacement foliage. This refoilation was well underway within two weeks of the damage. Trees should be in full-leaf again by mid-June, and will be photosynthesizing throughout the summer. However, since replacement foliage may develop from buds away from shoot tips, the ends of branches may look twiggy or tufted.

Most lightly damaged foliage will remain on the tree all summer.

Tree health may be more seriously affected if the summer of 2010 turns out to be a dry one, or if other stressful conditions occur.



*Refoilation beginning on a heavily damaged sugar maple shoot.*



*Widespread frost injury in the northern Green Mountains, as seen during aerial surveys.*

What are we doing in Vermont?

The Department of Forests, Parks, and Recreation is conducting aerial surveys to determine the extent of damage in the state. Follow-up monitoring will also be conducted to ensure that trees are recovering.

Recommendations

Landowners, and others concerned about damaged trees should watch them closely. They should be back in full leaf within three or four weeks. If refoilation does not occur, look for other sources of tree stress that might be delaying normal recovery.

For more information

**For more information, contact the Forest Biology Laboratory at 802-241-3606 or:**

Windsor & Windham Counties.....	Springfield (802) 885-8855
Bennington & Rutland Counties.....	Rutland (802) 786-3851
Addison, Chittenden & 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

