



NYS DEC

Forest Health Aerial Survey 2010 Report



Summary

The 2010 *Forest Health Aerial Survey Report* is a narrative for the aerial observations from the 2010 general forest health aerial surveys conducted for New York State, associated ground crew observations, and other forest health related information. The aerial surveys were conducted by the aerial sketchmapper and region foresters from New York State Department of Environmental Conservation (NYSDEC) in cooperation with the USDA Forest Service.

*In cases where multiple causal agents occupy the same area, the total polygon area was applied to each individual casual agent. This resulted in causal acreage totals being higher than overall acreage totals.

A total of approximately 23.3 million acres of New York State was surveyed and approximately 1.5 million acres of biotic and abiotic damage was detected.

Frost damage was severe and widespread, observed from the air in 34 of 62 counties and covered approximately 1.2 million acres. Counties hardest hit by frost include, Allegany, Cattaraugus, Cayuga, Cortland, Chenango, Delaware, Madison, Onondaga, Otsego, Sullivan and Ulster. Many of the areas affected from frost were located in the higher elevations with the lower elevations showing little to no damage.

Forest tent caterpillar (FTC), *Malacosoma disstria*, as with previous years, caused the majority of biotic damage. There was approximately 514,204 acres of recorded FTC damage statewide with a greater part of the observed damage contained in Allegany, Cattaraugus, Cortland, Chenango, Delaware, Sullivan and Ulster counties. There was a decrease of approximately 13,000 acres from 2009 survey.

The remaining areas of defoliation were classified with the more general defoliator coding, due to lack of ground verification or polygon association. The total acreage for unconfirmed defoliators was 180,753 acres.

Frost and FTC damage shared much of the same host area resulting in damage causal agent (DCA) acreages being counted twice for the same area.

The gypsy moth caterpillar, *Lymantria dispar*, accounted for approximately 18,000 acres of recorded forest damage in 2009, concentrated in Orange and Sullivan counties, a decrease of the statewide 65,000 acres of gypsy moth damage from 2008. In 2010, the gypsy moth population showed no observed damage from the air and no reports from ground observations. Spring frost may have

contributed to mortality in gypsy moth egg and larvae populations, as well as concealing less apparent defoliation.

Inundation was less significant this year than previous years with approximately 6,000 acres of flooding/high water, a decrease of 8,000 acres from 2009. The Standardized Precipitation Index (SPI) for March-August 2010 shows normal overall moisture conditions for New York ¹ (Figure 1).

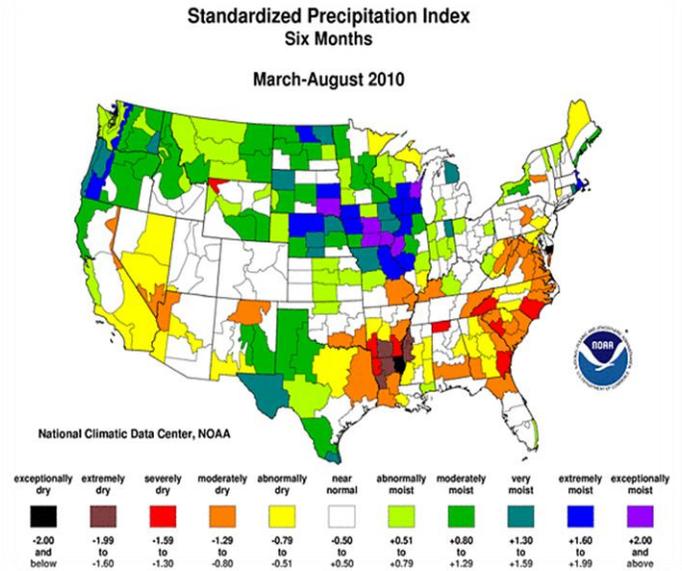


Figure 1. Standard precipitation Index June-August 2009 National Oceanic and Atmospheric Administration

Mortality was also detected from the air and accounted for approximately 200,000 acres of total damage statewide. This figure accounts for unconfirmed mortality (observed from the air but not ground verified) and confirmed mortality (observed from the air and ground verified). The acreage totals are 115,000 acres and 85,000 acres, respectively.

Other DCA observations include: hemlock woolly adelgid (HWA), *Adelges tsugae*, with 3,457 acres concentrated in Sullivan and Ulster counties, and eastern tent caterpillar, *Malacosoma americanum*, with 5,228 acres concentrated in Chenango County.

*Remaining DCAs can be referenced in Appendix 1, Table 1.

¹The SPI compares the actual cumulative precipitation from a 6-month time period to the mean precipitation for that time period. The mean precipitation is calculated using data gathered 1951 to present. A negative SPI indicates a drought is occurring, an SPI of 0 indicates average precipitation, and a positive SPI indicates wetter than normal conditions. The more negative or positive the SPI is, the more severe the condition (National Oceanic and Atmospheric Administration).

Introduction

The aerial survey conducted in New York State is in cooperation with USDA Forest Service and their national forest health aerial survey agenda. The principal objective is the acquisition of general forest health conditions for dissemination to NYSDEC region foresters for management and monitoring, as well as tracking other causal agents on a national level.

The aerial survey identifies possible threats to forest health over large areas, and in a short period of time. The resulting data should be viewed as a general overview of forest health conditions.

Methods

A delay of four to eight weeks from initial exfoliation must be applied before detecting forest damage caused by early season defoliators. This time period allows trees to reach maximum flush and also provides defoliating agents enough time to cause sufficient damage for detection from aircraft. Other factors that determine the survey schedule are: latitude, elevation, temperature and precipitation, vegetation biology, office and airport locations, regional boundary divisions, and airspace restrictions.

The flight lines are planned in an east to west pattern beginning in Newburgh the second week of June and are planned for completion in Plattsburgh by the second week of August. General bioclimatic effects are considered along with associated growing degree days (GDD), dictating the beginning of flights in southern latitudes and lower elevations first (Figure 2). This allows for variations in GDD and subsequent differences in exfoliation of tree canopy.

The flights are normally planned to begin in southern New York, Orange County, and move north toward Albany. The survey is then flown in the southern tier and shifted north toward Lake Ontario. The higher elevations of the Adirondacks and higher latitudes of Franklin and Clinton counties are surveyed last (Figure 3).

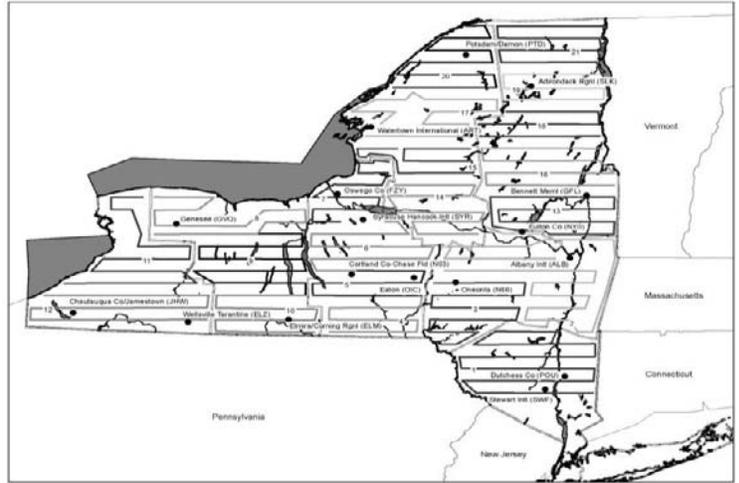


Figure 3. Aerial flight lines.

The flights are flown using a Cessna 206, Cessna 172 or a Partenavia P-68 Observer, depending on pilot qualifications, aircraft availability and terrain type. The surveys are flown at approximately 1,000ft AGL and the visibility is variable, ranging from two to six miles. The flight line is spaced at four mile intervals (Figure 3) and the flown/not-flown area is based on an average visibility distance of four miles. It can be seen that there are blocks of the state, which were not flown and this can be attributed to weather or airspace restrictions (Figure 4).

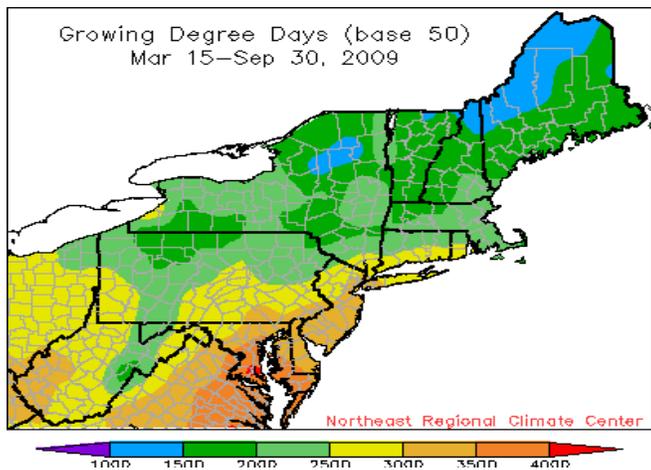


Figure 2. Growing Degree Days Accumulation. Cornell University Atmospheric Sciences and Turf Team 2009.

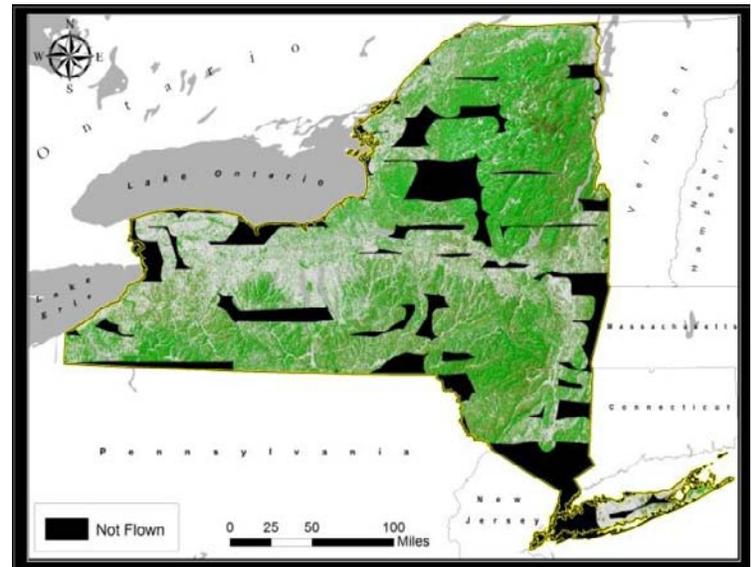


Figure 4. Flown/Not Flown

The observer used a Global Positioning System (GPS) receiver equipped laptop with a touch screen tablet and a Digital Orthographic Quarter Quadrangle (DOQQ) base- map layer for reference. The data was later reviewed and the polygons were altered in the lab using heads-up digitizing techniques based on 1:24,000 DOQQs. These polygons were then distributed to region foresters for management and monitoring purposes. The data was also given to ground crews and these point locations were visited within the sketched polygon area for ground verification and further categorization.

Post-processing/Editing/Digitization

During the process of data collection many of the polygons created were adjusted for accuracy of forest area delineation. The purpose of removing parts of the sketched polygons delineated from the aircraft was to create a more conservative and accurate representation of actual damaged forest. In many instances the areas of damage were widespread and across a heterogeneous landscape. Due to aerial time constraints and the severity of damage in certain regions, a geographically significant part of the landscape was included within the sketched polygons. Because non-forest land cover types cannot be included in damage area calculations, they were removed (Figure5).

In previous years, the data was modified using a classification based on Landsat TM satellite data. This process removed non-forest areas that were included in the initial polygon creation but did not allow for human interpretation, which degraded the accuracy of these edits. It has proven to be more effective to eliminate non-forest areas by human made edit decisions using heads up digitalizing techniques. The editing process involves layering a base map 1:24,000 DOQQ with the forest damage polygon data and systematically rearranging and removing portions of the polygon to best fit the underlying base map layer. This manual technique is more time consuming but yields a more accurate representation of the actual observed damage.

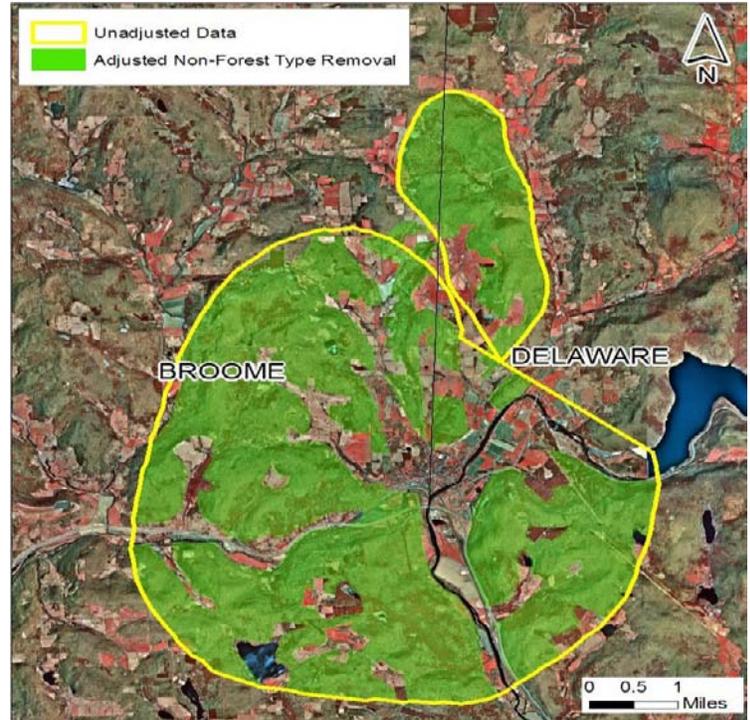


Figure 5. Removed non-forest areas.

Causal Agent Categorization/Ground Verification

The original aerial sketched polygons created from the aircraft were divided into three broad categories, mortality, defoliation and discoloration. These were then given to the ground crews for further categorization. Due to the high volume of data collected and the window period for ground verification, a limited percentage of actual polygons were visited. For those polygons visited and for those polygons with a correlated spatial relationship, further categorization was applied (Appendix, Table 3).

For those polygons which had damage causal agents that could not be verified with reasonable accuracy were either named with the three broad aerial categories, or left at a level of detail that could be gathered from on-the-ground evidence. In total, 164 of the 565 polygons were visited and categorized, which accounted for 569,441 acres of the total 1,543,928 acres, respectively. In addition, 275 polygons were further categorized from spatial correlation, which accounted for approximately 771,589 acres. In total, 1,341,030 acres of damage were either categorized based upon ground observations or spatial correlation (Appendix, Table 3). All damage causal agent categories were taken from the *Aerial Survey Geographic Information System Handbook*, provided by the Forest Health Monitoring Program, US Forest Service.

Regional Overview

***All acreages are approximations based on polygon area calculations.**

Region 1

The survey was conducted by Central Pine Barrens in conjunction with Civil Air Patrol (CAP), as a cooperative effort with NYSDEC. They began the survey in Southampton heading west in a north/south grid pattern across Brookhaven, ending in Head of Harbor. The flight was 3 hours in duration and covered approximately 400 sq. miles. The flight showed 189 acres of mortality, 2,288 acres of defoliation and 38 acres of human caused fire. Units affected include 4.4 acres of mortality intersecting Suffolk 51 and a 248 acre patch of defoliation intersecting Suffolk 1. Brookhaven State Park showed 125 acres of defoliation occurring north and south of the Long Pond Rd and Tarkhill Trl intersection, Connetquot River showed two polygons of defoliation totaling 109 acres, and Bayard Cutting Arboretum with 181 acres of defoliation north of State Highway 27. Another large area of defoliation totaling 1,768 acres occurred on and in proximity to Robert Cushman Murphy County Park.

* The remaining damage polygons can be viewed on the Region 1 map.

Region 2

Due to restrictions on helicopter usage, surveys were not flown in Region 2.

Region 3

The survey was conducted on June 15th and flown in an east/ west pattern beginning in northern Orange and Putnam counties and ending in northern Ulster and Dutchess counties. The flight covered approximately 3,500 sq. miles and revealed 93,582 acres of defoliation, 29,229 acres of mortality, and 111,700 acres of discoloration. The majority of the damage was concentrated in the Catskill Park Preserve (northern Ulster and Sullivan counties).

State lands affected by defoliation include: Balsam Lake Mountain, Big Indian, Indian Head, Overlook Mtn., Slide Mountain, Sundown, and Willowemoc. The largest of these affected areas occurred on Big Indian, Sundown and Slide Mountain. Mortality was observed on Mongaup Valley WMA, Balsam Lake Mountain, Beaverkill campground, Big Indian, Bluestone, Delaware, Dutchess 4, Phoenicia, Sullivan 6, Sundown, and Willowemoc.

Other significant damage observed included: 210,181 acres of frost damage concentrated in northern Sullivan and Ulster counties and 63,581 acres of Forest Tent Caterpillar (FTC) concentrated in Sullivan County, southwest of the Catskill Park. Frost damage on state lands included: Little Beaver fishing access, Balsam Lake Mountain, Beaverkill campground, Belleayre, Big Indian, Delaware, Dry Brook Ridge, Hunter-West Kill Mountain, Indian Head, Middle Mountain, Overlook Mtn. Phoenicia, Shandaken, Slide Mountain, Sundown, and Willowemoc. FTC was observed on Balsam Lake Mountain, Big Indian, Slide Mountain, Sundown, and Willowemoc.

The survey showed no gypsy moth, *Lymantria dispar*, damage as with previous years. The decrease in population, in part, may be due to mortality from frost and/or frost damage masking gypsy moth defoliation. It can also be seen that gypsy moth in the last couple of years was showing a trend toward lower population levels and a decrease in damage, down 62,000 acres from 2008 to 2009.

The survey revealed 3,408 acres of hemlock woolly adelgid (HWA), *Adelges tsugae*, mortality, located in Sullivan and Ulster counties.

*Other DCAs can be referenced in the appendix.

Region 4

The first flight was conducted on June 17th in the: southern Albany, northern Columbia, Schenectady, and Montgomery counties (covering approximately 3,500 sq. miles). The second flight for Region 4 was conducted on June 18th in Delaware, Otsego, and Schoharie counties (covering approximately 1,500 sq. miles). The survey for Region 4 produced 154 polygons and of those polygons, 19 were ground checked, 113 were spatially correlated and 22 remained unchecked (Appendix, Table 3).

The majority of the damage was observed in Delaware, Otsego and Schoharie counties, with a total of 468,371 acres of damage observed for the Region. Frost was the most pervasive totaling 322,179 acres, divided between damage types of discoloration and defoliation. Frost was concentrated in Delaware and Otsego counties. There was 113,454 acres of damage caused by FTC, of which 104,674 acres was classified as defoliation and 8,781 acres classified as mortality. Delaware County contained

all mortality associated with confirmed FTC, which may be attributed to consecutive years of defoliation. The remaining mortality was unconfirmed and accounted for 19,938 acres, concentrated in Delaware County with other small patches occurring in Greene, Columbia, Otsego, Schoharie, Schenectady, and Montgomery counties. Unconfirmed defoliation comprised 11,466 acres and was distributed in Schoharie and Otsego counties.

Schenectady, Albany, Rensselaer, Columbia, and Schoharie counties like most survey years showed minimal damage. The small areas of mortality observed averaged 70 acres in size and were a mix of softwood and hardwood type.

State forest units affected by frost include: Tompkins detached parcel, Catskill Creek fishing access, Middletown detached parcel, Albany 1 and 2, Albany Schoharie 1 and 2, Balsam Lake Mountain, Delaware, Delaware 1,10,12,13, Dry Brook Ridge, Elm Ridge, Halcott Mountain, Hunter-West Kill Mountain, Middle Mountain, Montgomery 1, Otsego 1-3, 7, 9, 12, 13, 15, 16, 19, Otsego-Schoharie 1, Phoenicia, Schoharie 4, 6, 7, 9, 14, 17, 21, Shandaken, and Windham Blackhead Range.

State areas affected by defoliation include: Hancock detached parcel, Davenport detached parcel, Delaware, Delaware 13, Delaware-Otsego 1, Elm Ridge, Indian Head, Otsego 2, 10, 17, 90, 91, Schoharie 7, 8, 11, 18, and Windham Blackhead Range.

State forests areas affected by mortality include: Stockport Flats tidal wetland, Delaware, Delaware 14, Indian Head, Montgomery 1, and Windham Blackhead Range.

An oak wilt aerial survey was completed in Glenville, NY and showed no detectable oak mortality.

Region 5

The first flight began on July 22nd in the Sacandaga region with flights continuing on August 4th near Indian Lake and Lake George, and August 10th over the high peaks and Plattsburgh, covering approximately 7,800 sq. miles.

As with previous years most of Region 5 remained unaffected from major outbreaks of insects, with most damage occurring from frost, inundation, and mortality, which affected spruce fir and birch populations.

There was 28,475 acres of hardwood mortality, of which 9,503 acres affected white birch. This occurred just west of Black Mountain in the town of Wells and south of Lyons Mountain in Saranac, probably due to storm damage. The remaining hardwood mortality was scattered throughout Region 5 and totaled 18,974. The areas of unknown hardwood mortality intersecting forest preserve include: High Peaks, Saranac Lakes, Taylor Pond, West Canada Lake, William C. Whitney and Wilmington. The remaining unknown DCA hardwood mortality areas were on private lands.

The only area of observed defoliation occurred on Chazy Highlands Wild Forest, caused by frost, as report by ground crews.

Region 6

The survey began on August 12th in Jefferson County, with flights continuing on August 17th and 18th in the Potsdam and Rome areas, covering approximately 6,100 sq. miles. Fort Drum and southwestern portion of Region 6 were not surveyed due to air space restrictions and poor weather conditions.

There was 13,550 acres of total mortality, of which 1,200 acres were attributed to flooding/ high water, 100 acres of beaver damage, 61 acres of Dutch elm disease, *Ceratocystis ulmi*, and the remaining 12,086 acres labeled as unconfirmed mortality. State lands affected by mortality include: Black River, Ferris Lake, Herkimer 1, Independence River, Jefferson 3, Jefferson 109, and Lewis 11, 29, 38, and 40.

There were 52,500 acres of defoliation and 211,478 acres of discoloration, which were split among general defoliators (99,021 acres), frost (114,884 acres) and flooding/high water (3,466 acres). Defoliation and discoloration intersected state lands on: Aldrich Pond, Black River Cranberry Lake, Ferris Lake, Five Ponds, Herkimer 4 and 6, Independence River, Jefferson 5 and 97, Lewis 30, Lot-44, Oneida 4, 6, 13, 17, 18, 20, Oswego 2 and 93, St. Lawrence 92, and Watson East Triangle.

Region 7

The survey began on June 22th in the northern area, north of Syracuse, and completed on June 24th in the southern area, south of the Syracuse, covering approximately 5,000 sq. mi. There was a dramatic decrease in FTC defoliation in central Region 7 from the previous 2009 season, which included Madison, Chenango, Cortland, Onondaga, and Cayuga counties.

This year showed 58,778 acres of hardwood defoliation caused by FTC (mainly on hilltops), which was a decrease of 157,607 acres from the previous 2009 season. State forest units affected by FTC defoliation include: Broome 1, Chenango 5, 8 and 24, Cortland 3, 5, and 9, Onondaga 39, Tioga 5, and Tompkins 3.

Frost damage was severe and pervasive in Region 7 with observations close to 238,459 acres. The extent of damage included every county with the hardest hit areas in Cayuga, Chenango, Cortland, Madison, and Onondaga.

Mortality was observed on 11,205 acres caused by frost, FTC, inundation, and other unconfirmed agents. FTC mortality totaled 300 acres north of Tompkins 2. Unconfirmed mortality (probably due to subsequent years of FTC defoliation) accounted for 7,500 acres affecting Chenango 19, Madison 10 and 92, and Onondaga 1. Inundation mortality accounted for 58 acres, which occurred on multiple private landowners.

Region 8

The survey began on July 1st in central Region 8, Finger Lakes area, and on July 5th in southern Region 8, covering approximately 4,700 sq. mi.

In total, defoliation accounted for 49,978 acres, with 40,534 acres caused by FTC, 8,433 acres caused by frost and 9,444 acres recorded as defoliation from the air but not confirmed on the ground. FTC defoliation occurred on Livingston-Ontario 1, Ontario 91, and Steuben 12, unconfirmed defoliation occurred on Ontario 90, Schuyler 2 and 4, and Yates 1 and frost defoliation affected Steuben 12.

Mortality for Region 8 totaled 7,408 acres of which FTC accounted for 5,483 acres, frost with 5,483 acres, inundation with 202 acres and 1,723 of mortality recorded from the air but not confirmed on the ground. Mortality affected Steuben 8, west of the Sanford Lake Rd and Round Lake Rd intersection.

The northern areas of Orleans, Monroe and Wayne counties were not surveyed.

Region 9

The survey began on July 13th in northern Region 9, Buffalo area and completed July 20th in Allegany Plateau near Jamestown, covering approximately 3,500 sq. mi.

The majority of the damage occurred in southern Region 9, Cattaraugus and Allegany counties with minor damage occurring in Wyoming and Chautauqua counties.

Frost like most of the state was pervasive and affected the southern part of Region 9 along with FTC.

Defoliation accounted for 224,396 acres and was split between frost and FTC (221,414 acres) with 2,983 acres for unconfirmed defoliation. In all cases of defoliation, ground verifications revealed frost and FTC. Defoliation affected Alma Pond, and Cattaraugus 1, 4, 6, 13, 16, 19, and 20 -22.

Discoloration accounted for 1,008 acres and was also split between frost and FTC. Discoloration affected Cattaraugus 4.

Mortality accounted for 11,826 acres of which 9,950 acres was frost and FTC, 21 acres was caused by inundation and 1,854 acres was recorded from the air but not confirmed on the ground. Mortality affected Chautauqua 11, east of Stebbins Rd, softwood, white spruce.

Acknowledgements:

NYSDEC Region Staff
NYS Police Aviation Unit
Division of Lands and Forests - Forest Health Unit
USDA Forest Service

For more information contact:

Division of Lands and Forests
Forest Health Section
625 Broadway, 5th FL
Albany, NY 12233-4253
518-402-9425

Appendix

	Region 1	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Total
Damage Causal Agent (DCA)									
Armillaria Root Disease		10,009							10,009
Beaver		303			103				406
Beech Bark Disease		13,399							13,399
Defoliators(Not Ground Checked)	2,289	1,089	11,466	2,190	99,021	52,271	9,444	2,983	180,753
Dieback		895							895
Dutch Elm Disease					62				62
Eastern Spruce Gall Adelgid		22							22
Eastern Tent Caterpillar		136				5,092			5,228
Fire		1,104							1,104
Flooding/High Water		858	616	721	3,466	58	202	21	5,942
Foliage Discoloration				126	229		703		1,058
Forest Tent Caterpillar		63,581	113,454			58,778	46,018	232,373	514,204
Frost		210,818	322,179	26,813	114,884	238,459	28,888	232,373	1,174,414
Hemlock Woolly Adelgid		3,408	49						3,457
Human Caused Fire	38								38
Logging Damage		659	241						900
Mortality(Not Ground Checked)	949	21,056	19,938	48,549	12,099	9,686	1,723	1,854	115,854
Mud-Landslide			187						187
Unknown							323		323
Vine Damage			241						241
Total DCA Area	3,276	327,337	468,371	78,399	229,864	364,344	87,301	469,604	2,028,496
Total Area	3,207	234,511	434,475	76,054	211,600	273,467	73,384	237,230	1,543,928

In cases where multiple causal agents occupy the same area, the total polygon area was applied to each individual casual agent. This measurement represents the polygon area on the ground where the causal agent was found to exist and is not representative of severity of damage or number of trees affected.

Table 1. DCA per Region (acres)

	Region 1	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Total
Damage Type									
Defoliation 1	538	93,582	116,091	2,190	52,500	50,784	49,978	224,396	590,059
Mortality 2	2,631	29,229	31,000	49,131	13,500	11,205	7,408	11,826	115,930
Discoloration 3	38	111,700	287,384	24,733	145,600	211,478	15,998	1,008	797,939
Total Area	3,207	234,511	434,475	76,054	211,600	273,467	73,384	237,230	1,543,928

Table 2. Damage Type per Region (acres)

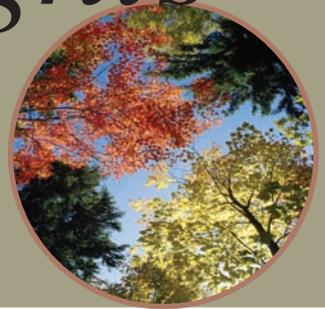
Region	Polygons Checked On Ground	Acres	Correlated Polygons	Acres	Uncorrelated Polygons Not Checked on Ground	Acres	Total Polygons	Total Acres
1	0	0	0	0	23	3,207	23	3,207
3	68	230,871	5	3,613	2	27	75	234,511
4	19	44,120	113	359,509	22	30,846	154	434,475
5	0	0	0	0	31	76,054	31	76,054
6	18	58,929	18	86,351	23	66,320	59	211,600
7	37	157,387	82	105,937	7	101,143	126	273,467
8	11	13,211	23	48,719	12	11,454	46	73,384
9	11	64,923	34	167,460	6	4,847	51	237,230
Total	164	569,441	275	771,589	126	293,898	565	1,543,928

Table 3. Ground Truth Matrix (acres)

2010

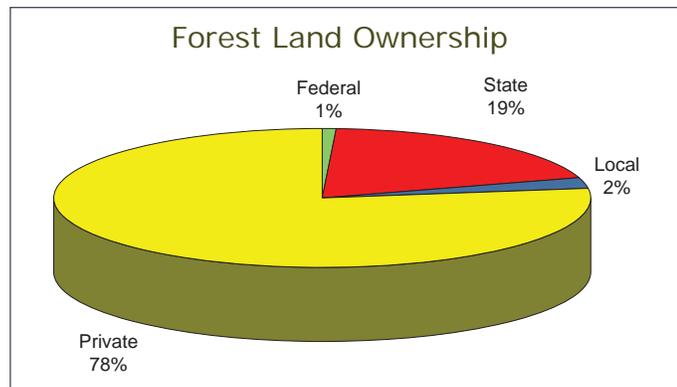
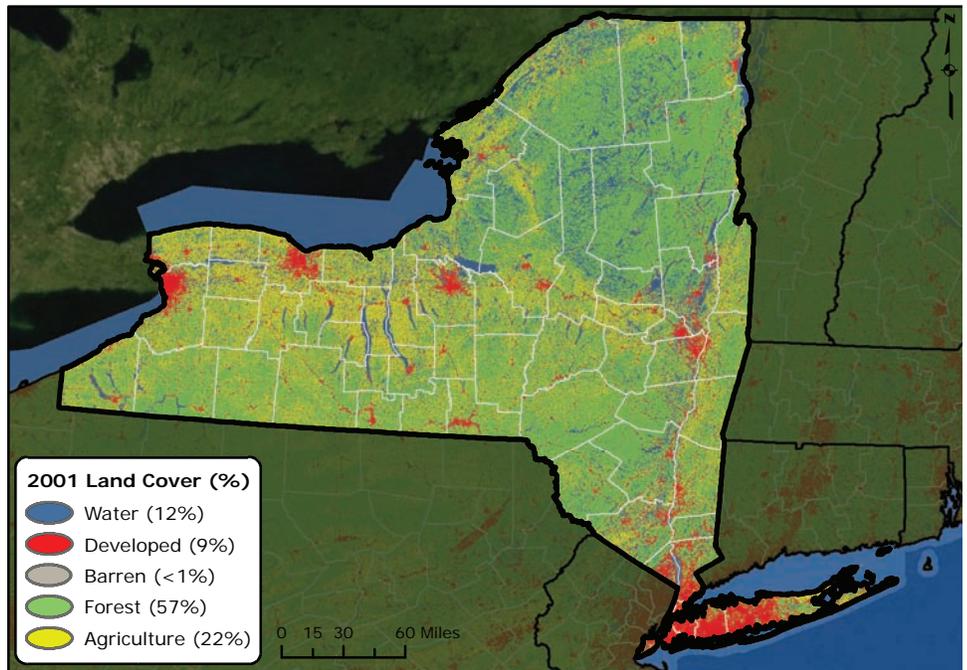
Forest Health *highlights*

NEW YORK



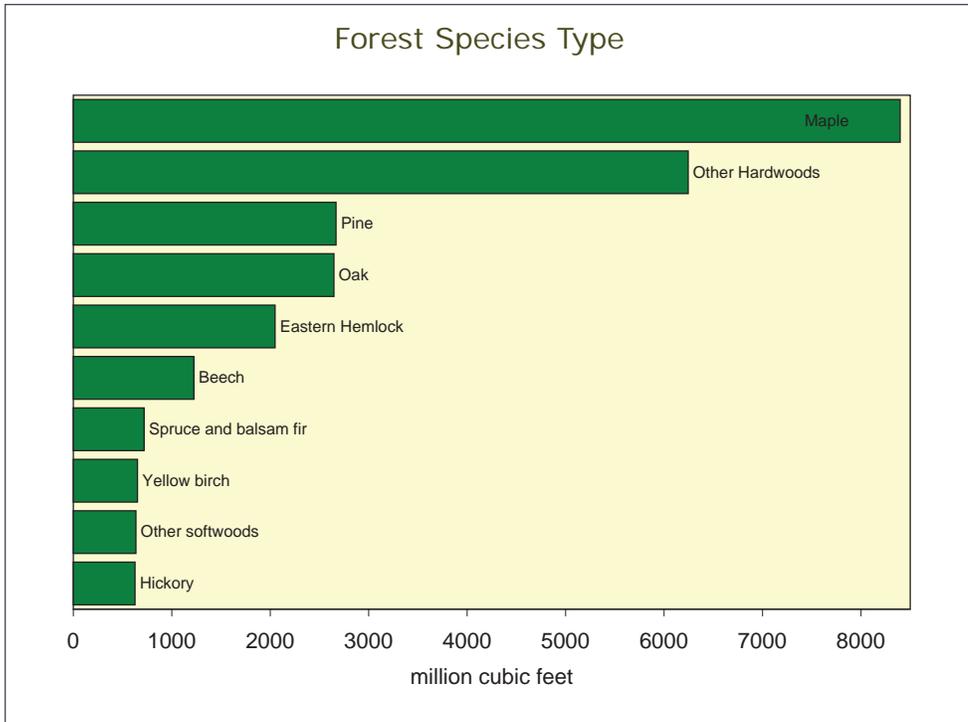
Forest Resource Summary

New York's forests are 78 percent privately owned. The State owns 19 percent of the land, which mostly encompasses the Adirondack Park. These forest lands provide a recreational base for millions of residents and others visiting the State's scenic regions. New York's forests also produce timber, providing employment to 2 percent of the State's workforce. The manufacture of wood products provides \$2.4 billion annually to the State's economy. The latest New York forest inventory estimates that 57 percent of the State is forested—approximately 18.7 million acres—with 22 percent in agriculture. The forest resource is made up of a variety of forest types, mostly maple and other hardwoods, along with pine, oak, and eastern hemlock.



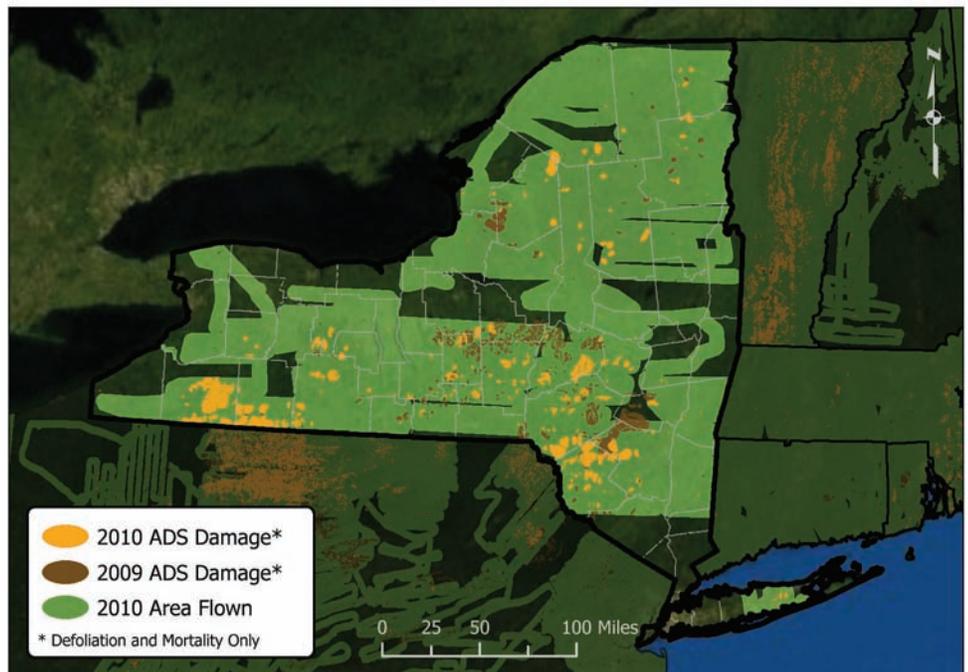
Forest Health Programs in the Northeast

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.



Aerial Surveys

In New York, over 1.5 million acres of damage were mapped, mostly attributed to discoloration and defoliation with lesser amounts of mortality. Almost all of the damage was caused by late spring frost and forest tent caterpillar defoliation. Additional damage was observed from other hardwood defoliators and hemlock woolly adelgid.



This map delineates aerial detection survey (ADS) results for New York in 2009 and 2010.

Forest Damage

Forest tent caterpillar was again the most significant defoliator in New York in 2010. Approximately 297,000 acres were confirmed as defoliated, with damage occurring in the Catskills and west throughout the central part of the State. Heavy defoliation occurred in the Allegany region of western New York.

There were no reports of **gypsy moth** in 2010, and no gypsy moth defoliation was observed during the annual aerial survey. In addition, no significant defoliation by **spruce budworm** was observed and moth trap counts were generally low. **Winter moth** is present on eastern Long Island; however, there were no new reports of damage from this insect in 2010.

Locust leafminer caused patches of moderate discoloration and defoliation on black locust over portions of eastern New York, especially the lower to mid-Hudson River Valley along I-87 and Route 9. Damage has been starting earlier in the season each year for the past few years.

There are several invasive insects of concern in New York. Currently, the most significant invasive insect species is the **emerald ash borer**. In 2010, this insect was positively confirmed in six new counties: Monroe, Genesee, Livingston, Steuben, Ulster, and Greene. Emerald ash borers in all infested counties, with the exception of Greene, were found in purple prism trap catches. Delimitation of the Ulster County infestation led to the discovery of the Greene County infested site. Research activities and efforts to slow ash mortality (SLAM) are being conducted in all infested areas in New York.



Emerald ash borer galleries (U.S. Forest Service photo)

Cooperative efforts to eradicate **Asian longhorned beetle** from the quarantined areas in New York City and Long Island are ongoing, but progress is slow. No new infestations were found in the area in 2010.

Hemlock woolly adelgid continues to cause damage and mortality to native forest and ornamental eastern hemlock trees. The New York State Department of Agriculture and

Markets removed infested trees in Rensselaer County in the city of Troy. New hemlock woolly adelgid infestations were found in Tioga, Steuben, and Broome Counties, and some new towns in the Finger Lakes region. Damage is most severe in areas that have been infested for several years in the Catskills and southern part of the State. In some areas, a majority of the trees are infested, and many of those are in declining health or dead.

Elongate hemlock scale is common in approximately the same range as hemlock woolly adelgid and is often, but not always, found in the same stands. Damage from the scale is hard to separate from damage by the adelgid at times, but both have caused significant decline and mortality of hemlocks.

It is assumed that much of the State is likely infested with **Sirex woodwasp**, although no new affected counties were detected in New York in 2010. Within the known infestation, much of the worst damage is found on State-owned pine plantations, many of which are overstocked and in declining health. There were no new counties infested with *Tomicus piniperda*, the **common European pine shoot beetle**, in 2010.

Beech bark disease can be found readily throughout New York State, and symptoms of **Dutch elm disease** are conspicuous statewide. Many of the trees now succumbing to Dutch elm disease are mature trees in urban and suburban settings that survived the initial wave of the disease throughout the region.

Butternut canker is common in New York wherever butternut is found. It is rare to see a symptom-free butternut tree. The New York State Department of Environmental Conservation (DEC) has begun archiving locations of healthy butternut when found or reported. **Dogwood anthracnose** continues

to affect understory and ornamental flowering dogwood across the State. This disease was not reported from any new areas in 2010.

Oak wilt was detected in New York for the first time in 2008 in Schenectady County in the town of Glenville, where at least six oaks had been killed. In 2009, 73 infested or likely to become infested trees were destroyed. No new infested trees have been found in the infested area, and no new infested sites have been found elsewhere in the State.



Oak wilt eradication (New York DEC photo)

No new surveys were conducted for *Phytophthora ramorum*, the causal agent of **sudden oak death**, known to cause oak mortality in California and Oregon. This pathogen was recently transported on nursery stock to the Eastern United States.

While surveying for emerald ash borer, personnel recorded a variety of symptoms of **ash decline** in many stands. Native ash borers were often present in these stands, and a few instances of ash yellows were found in these sites as well. No surveys for **bacterial leaf scorch** were conducted in 2010. There were previous positive finds in Westchester County, Rockland County, and in Brooklyn in Kings County.

A severe late **frost** occurred in May 2010 that caused discoloration, leaf deformities, and tree mortality. Moderate to heavy damage occurred in many areas across the State. Approximately 1.1 million acres of damage were observed.

Giant hogweed, a noxious invasive plant that causes a severe skin reaction, is present in 35 counties in the State. There are approximately 800 known populations of the plant, with the largest and densest of these found in the western half of the State. This was the third year of manual eradication and the second year of herbicide use. While more hogweed sites are being found, mostly due to better outreach and education, eradication efforts are having a noticeable effect on the size of the affected areas.



Giant hogweed eradication (New York DEC photo)

In 2010, eradication work began on the **kudzu** infestation in Rockland in southeastern New York. Vine removal and root cutting were performed by hand on about half of the site. Plans for spring 2011 include more hand work and the application of herbicide.



Forest Health Protection
USDA Forest Service
271 Mast Rd.
Durham, NH 03824
603-868-7708
<http://www.na.fs.fed.us>



New York Department of
Environmental Conservation
Division of Lands & Forests
625 Broadway, 5th Floor
Albany, NY 12233-4253
518-402-9425
<http://www.dec.ny.gov/>

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