NYSDEC

Forest Health Aerial Survey 2009 Report

NYS DEC
Forest Health & Protection








Abstract
The *2009 Forest Health Aerial Survey Report* is a descriptive report pertaining to the aerial observations from the 2009 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).

A total of approximately 26,000,000 acres of New York State was surveyed and approximately 728,000 acres of forest damage was detected.

Forest tent caterpillar (FTC), *Malacosoma disstria,* as with previous years, caused the majority of damage. There was approximately 527,000 acres of recorded FTC damage statewide with a greater part of the observed damage contained in Cortland, Madison, Otsego, Delaware, Greene and Ulster counties. The remaining areas of defoliation were classified with the more general defoliation coding due to lack of ground verification or polygon association. The total acreage for unconfirmed defoliators is approximately 50,000 acres.

The gypsy moth caterpillar, *Lymantria dispar,* accounted for approximately 18,000 acres of recorded forest damage, concentrated in Orange and Sullivan counties, a decrease of the statewide 65,000 acres of gypsy moth damage from 2008. Although, considering the extent of defoliation in some areas and shared host type with FTC this estimate is probably closer to approximately 30,000 acres for 2009, with a decrease of 53,000 acres from 2008.

Inundation was more significant this year than previous years with approximately 14,000 acres of water damage, up 8,000 acres from 2008.

The Standardized Precipitation Index (SPI) for April-September 2009 shows greater overall moisture conditions for New York[1]. The SPI indicates normal moisture conditions in St. Lawrence, Franklin and Clinton counties (+0.50 to +0.79), abnormal moisture conditions in the Adirondacks (+0.51 to +0.79), moderate moisture conditions in the western areas (+0.80 to +1.29) and extreme moisture conditions in the Catskills and Hudson River Valley (+1.60 to +1.99) (Figure 1). The approximate area measurements for water damage are 3,800 acres, 300 acres and 7,900 acres, respectively.

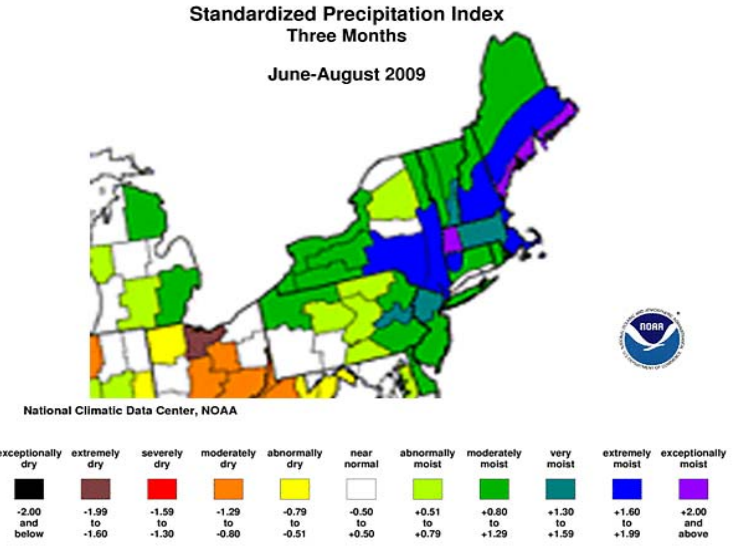

Figure 1. Standard precipitation Index June-August 2009
National Oceanic and Atmospheric Administration

There was approximately 23,352 acres of foliage discoloration caused by several confirmed and unconfirmed causal agents. This estimate accounts for 19,500 acres of unconfirmed foliage discoloration, 3,250 acres caused by flooding/high water, 600 acres caused by forest tent caterpillar, and 12 acres caused by two-lined chestnut borer, *Agrilus Bilemeatus.*

Mortality was also detected from the air and accounted for approximately 126,973 acres of total damage statewide, with an estimated 529,343 dead tress. This figure accounts for unconfirmed mortality and confirmed causal agent mortality. The acreage totals are 84,775 acres and 42,198 acres, respectively.

Other less significant damage includes: beaver, sucking insects, human activities and abiotic damage.

[1]The 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).

Prepared by Scott McDonnell

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.

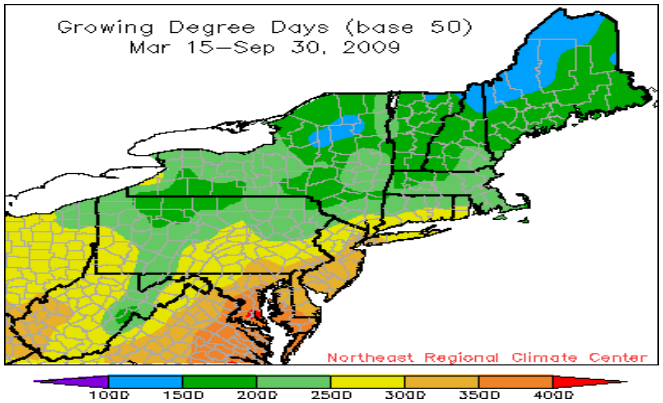

Figure 2. Growing Degree Days Accumulation.
Cornell University Atmospheric Sciences and Turf Team 2009.

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.

The survey for the 2009 season was adjusted in accordance with areas not flown from the previous survey year. The remaining flights were modified and flown subordinately to these priority areas (Figure 3).

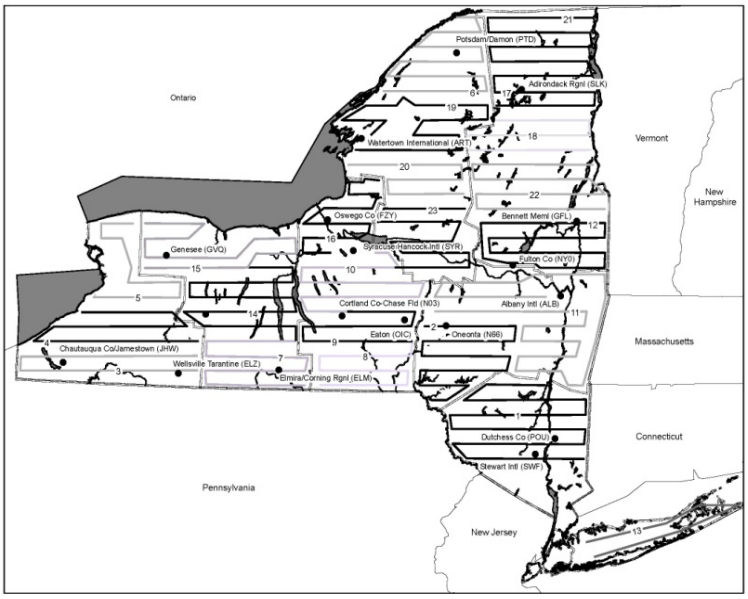

Figure 3. Aerial flight lines.

The flights are flown using a Cessna 206 or a Partenavia P-68 Observer, depending on pilot qualifications, aircraft availability and terrain type. The flights 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 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).

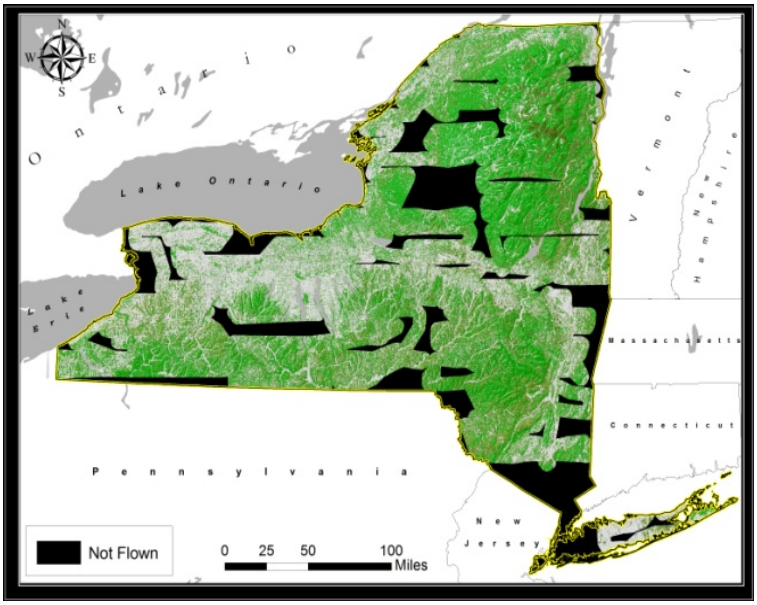

Figure 4. Flown/Not Flown

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.

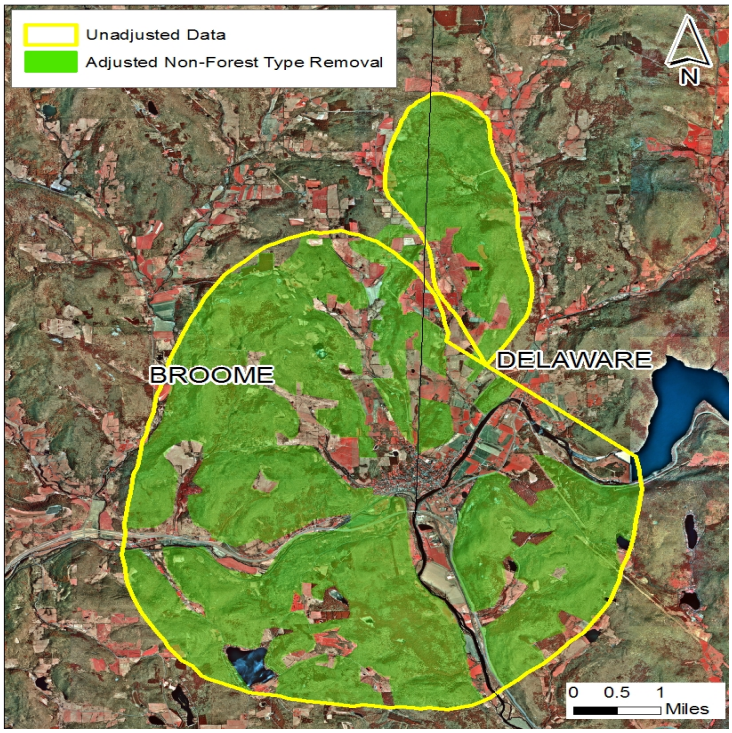

Figure 5. Removed non-forest areas.

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 2).

For those polygons which had damage causing agents that could not be verified with reasonable accuracy were either named with the three broad aerial categories, aforementioned, or left at a level of detail that could be gathered from on-the-ground evidence. In total, 164 of the 516 polygons were visited and categorized, which accounted for 399,312 acres of the total 728,172 acres, respectively. In addition, 149 polygons were further categorized from spatial correlation, which accounted for approximately 178,474 acres. In total, 577,786 acres of damage were either categorized based upon ground observations or spatial correlation (Appendix, Table 2). All damage causal agent categories were taken from the *Aerial Survey Geographic Information System Handbook*, provided by the Forest Health Monitoring Program, Forest Service.

Regional Overview

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

Region 1
The survey was conducted in Suffolk County beginning in Brookhaven, moving across Huntington and Babylon, then east toward Montauk and west again toward Riverhead. The flight took one and a half hours covering approximately 165 miles and showed 37 acres of inundation.

Region 2
Due to air traffic congestion and restrictions on helicopter usage, the survey was not conducted in region 2.

Region 3
The survey was conducted in an east west pattern beginning in northern Orange and Putnam counties and ending in northern Ulster and Dutchess counties. Due to scattered thunderstorms throughout the day, parts of the survey were truncated in Dutchess and Ulster counties. Although, these truncated areas were shown not to be affected on a broad scale, according to on-the-ground observations.

The survey showed a collapse in the gypsy moth, *Lymantria dispar,* population in Orange and Sullivan counties from the previous year, probably due to an increase in moisture occurring in early spring, as well as an increased spread of nucleopolyhedrosis viruses (NPV) and entomophagous fungi, *Thelohania solenopsae.* Gypsy moth accounted for 18,000 acres, a decrease of 62,000 acres from the previous year.

Other significant damage included 70,000 acres of forest tent caterpillar (FTC), *Malacosoma disstria*, defoliation and 10,000 acres of FTC and Eastern Tent Caterpillar, *Malacosoma americanum,* mortality. The majority of mortality was caused by FTC, located in northwestern Ulster and northern Sullivan counties.

Region 3 showed 250 acres of hemlock woolly adelgid, *Adelges tsugae*, damage which was recorded near the town of Esopus. The estimate for the region is probably closer to 750 acres becuase many times surrounding hardwood crowns hide damage and only the most severe damage is detected from the air..

Water damage accounted for 150 acres and was distributed across the region. Although, the areas of recorded water damage were probably underestimated for the season, as the survey was conducted in mid-June and much of the precipitation came later in the season.

The survey also showed 3,600 acres of unconfirmed mortality, which was distributed across the region in small areas of softwood stands totaling 1,000 acres. The remaining 2,600 acres were attributed to hardwood species located in northern Ulster County near the heavy outbreaks of FTC, probably caused by repeated defoliations over subsequent years.

State lands affected by defoliation include: Balsam Lake Mountain, Belleayre day use area, Belleayre Ski Center, Big Indian, Delaware (Middle Mountain), Dutchess 4, Phonecia, Shandaken, northern area of Slide Mountain, Sundown, Willowenmoc, Willowemoc Creek waterway access and Little Beaverkill fishing access. The largest of these affected areas occurred on Big Indian and Shandaken, and near Little Beaverkill fishing access and Willowemoc Creek access areas. Mortality affected Dutchess 4, Balsam Lake Mountain near Gas Hollow Road, and Delaware near Post Road.

Region 4
The first flight was conducted on July 7th in northern Albany County, followed by flights conducted on July 9th in Greene, Columbia, Rensselaer, northern Schoharie, northern Otsego, Montgomery, and Schenectady counties and finished on July 14th in Delaware County. The survey for Region 4 produced 130 polygons concentrated in Delaware, Greene and

Otsego counties and of those polygons, 44 were ground checked, 32 were spatially correlated and 54 remained unchecked (Appendix, Table 2).

The majority of the damage was observed in Otsego, Delaware and Greene counties, with 250,000 acres of damage observed. There were 223,000 acres of damage caused by FTC, of which 206,000 acres were classified as defoliation and 17,000 acres classified as mortality. Delaware County contained all the mortality associated with confirmed FTC, which can be attributed to consecutive years of defoliation. These areas of mortality were located in the Delaware unit vicinity.

The remaining mortality was unconfirmed and accounted for 16,000 acres, concentrated in Delaware, Otsego and Schoharie counties. Unconfirmed defoliation comprised 11,000 acres and was distributed in Delaware and Otsego counties.

Schenectady, Albany, Rensselaer, Columbia, and Schoharie counties like most survey years showed minimal damage. The small areas of mortality observed averaged 75 acres in size and were a mix of softwood and hardwood type. These unknown areas were not ground checked and remain labeled with the more general Damage Causal Agent (DCA) of mortality.

State forest units affected by defoliation include: Belleayre day use area, Belleayre Ski Center, Delaware County detached parcel, John Lennox state demonstration forest, Delaware River fishing access, eastern Columbia 2, Delaware, western Delaware 3, Delaware 12, Devil's Tomb Campground, Dry Brook Ridge, northern tip Elm Ridge near route 23, northeastern Greene 1, Greene 2, 3, 5, southeastern Greene-Delaware 1, Halcott Mountain, Hunter-West Kill Mountain, Indian Head, northwestern Middle Mountain, Otsego-Schoharie 1, Otsego1-9, Otsego 12, Otsego 16, northwestern Otsego 19, northeastern Phoenicia, Rusk Mountain, Shandaken, and Vinegar Hill Wildlife Refuge.

The state areas affected by mortality include: Delaware County detached parcel, John Lenox state demonstration forest, Columbia 2, Delaware, Delaware 3, Dry Brook Ridge, and Middle Mountain.

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

Region 5

The first flight began on July 10th in the Sacandaga region with flights continuing on July 29th over the High Peaks, August 4th near Indian Lake and Lake George, and August 6th near Plattsburgh.
As with previous years most of region 5 remained unaffected from major outbreaks of insects, with only minor mortality caused by inundation and storm damage.

There was 12,600 acres of hardwood mortality, of which 5,500 acres affected white birch. This occurred just west of Lake Champlain on Hurricane and Giant Mountain areas, probably caused by storm ice/snow damage. Blue Mountain Wild Forest showed 3,000 acres of scattered birch mortality. The remaining hardwood mortality was scattered throughout Region 5 and totaled 4,000 acres of unknown cause and 100 acres caused by water damage. The areas of unknown hardwood mortality include land on forest preserve near Chazy Highlands State Forest, Jessup River Forest Preserve, a small area west of West Canada Lake Wilderness, and the southeast portion of Shaker Mountain. The remaining unknown DCA hardwood mortality areas were on private lands.

There was 5,000 acres of softwood mortality, of which 3,250 acres were caused by water damage and the remaining mortality was of unknown cause. The water damage plots were relatively small with most falling under 100 acres with the exception of 2,000 acres delimited just north of Debar Mountain Wild Forest.

There was no observed defoliation.

Region 6

The survey began on June 25th in St. Lawrence County, with flights continuing on August 5th and 13th in the vicinity of Fort Drum and completed in southern Region 6 on August 25th. Portions of Region 6 were not surveyed including the Fort Drum restricted area, and due to numerous days

of poor weather conditions, an area southeast of Fort Drum.

There were 30,500 acres of total mortality, of which 1,000 acres were attributed to flooding/ high water, 17 acres of human activity, 200 acres of Dutch elm disease, *Certatocystis ulmi*, and the remaining 29,300 acres labeled as unconfirmed mortality. The majority of mortality totaling 23,000 acres (area includes parts of Region 7 on Tug Hill Plateau) was located on the northern portion of the Salmon River Watershed, as well as intersecting Lewis 11 and 91. This area had been defoliated in subsequent years by FTC, probably attributing to the increase in mortality. The other units in Region 6 affected by mortality include: Aldrich Pond, Cranberry Lake, Five Ponds, Grasse River, Lewis 17, 18, 26, and 38, Oneida-Lewis 1, St. Lawrence 5 and 10.

There were 42,000 acres of defoliation(area includes parts of Region 7 on Tug Hill Plateau) of which 32,000 acres were from unknown defoliators, 1,700 acres from FTC, and 8,300 acres from flooding/high water.

The areas of defoliation intersecting Region 6 state forest units include: Jefferson 4 and 5, Lewis 17, 18, 27, 29, 41 and 43, Lewis County detached parcels Lot-38 and Lot-50, and Oneida 4, 8, 17, and 18.

The Tug Hill Plateau near Region 6 and Region 7 border showed a large collapse in FTC population from the previous year, which was down 100,000 acres from 2008.

Region 7

The survey began on June 30th in the southern area of Region 7 with portions of the flight truncated due to severe thunderstorms. The Syracuse area was flown on July 15th and the area northeast of Syracuse was flown on July 28th. There was a dramatic increase in FTC defoliation in central Region 7 from the previous 2008 season, which includes Madison, Chenango, Cortland, Onondaga, and Cayuga counties. This year showed 233,000 acres of hardwood defoliation caused by FTC (mainly on hilltops), which was an increase of 93,000 acres from the previous 2008 season. Much of the heavier damage for 2009 was on hilltops and in eastern Region7, with less severe conditions near the Finger Lakes area.

The state forest units affected by FTC defoliation include: Cayuga 1, 2 and 4, Chenango 2, 17, 20, 21, 23, 25, 30 and 91, Chenango-Madison 1 and 2, Cortland 1-8, 11, 14, and 16-18, Lewis 41, Madison 1, 2, 4-13, and 92, Madison-Oneida 1, Oneida 22, Onondaga 1 and 39, Oswego 8, 14, 25, 36, 38, and 58, Tioga 1, 3, 7 and 8, Tompkins 1-3, Carpenter Falls Unique Area, Heiburg Forest, and Lebanon Reservoir fishing access area.

The remaining hardwood defoliation was caused by inundation and accounted for 1,125 acres.

FTC mortality totaled 3,500 acres, affecting Madison 1 and 5 and Cortland 3 and 17. Those areas with unconfirmed mortality showed 20,000 acres in damage, which was caused by FTC from years of subsequent defoliation. The areas of unconfirmed mortality affected Oswego 2, Cortland 3, Chenango 12 and 19 and Broome 8 and 9.

Softwood mortality amounted to very little, 100 acres total with 25 of those acres attributed to inundation with the remaining sites unchecked.

Region 8

The survey began on July 18th in central Region 8, Finger Lakes area. Northern Region 8 was flown on July 22nd and southern Region 8 on August 18th.

There was no observed evidence of gypsy moth east of Canandaigua Lake, as with the previous year. Although, due to a late observance in middle July and an abnormally wet season, many of the defoliated trees recovered more quickly. Consequently, these conditions put the aerial observation outside the time detection window. The observations for this year, within the same area, showed 600 acres of defoliation caused by FTC and another 400 acres of unconfirmed defoliation, down from the previous year's 18,000 acres of gypsy moth defoliation.

In total, the Finger Lakes flight accounted for 5,500 acres of FTC defoliation and 500 acres of FTC discoloration. Water damage accounted for 750 acres of mortality and 50 acres of discoloration. The remaining areas of damage

were comprised of 100 acres of foliage discoloration and 50 acres of unknown mortality.

Northern Region 8 showed 280 acres of mortality, 400 acres of defoliation and 400 acres of discoloration, all caused by water damage. This area of Region 8, as with previous years, showed very little forest damage from biotic casual agents.

The southern area of Region 8 showed the greatest affects from FTC with 14,000 acres of moderate to heavy defoliation and another 100 acres of mortality.

The units affected by damage include, defoliation of Ontario 91 by FTC and defoliation by inundation on Steuben 13 and Steuben-Schuyler 1.

Region 9

The survey began on June 23rd in southern Region 9, Allegany Plateau and vicinity, and was completed June 24th in northern Region 9, Buffalo area.

Region 9 showed Scotch pine discoloration on most stands, typical for Region 9. Those softwood stands with atypical damage included, 400 acres of unknown mortality, 225 acres of water damage mortality, and 15 acres of unknown discoloration. Wyoming 1 was affected by 50 acres of softwood mortality.

Hardwood damage showed 6,000 acres of unknown defoliation, probably due to FTC; 100 acres of mortality; 1,500 acres of discoloration and 120 acres of two-lined chestnut borer mortality. Niagara 91 showed minor defoliation.

An aerial survey for Emerald Ash Borer (EAB) was conducted over Randolph, NY and vicinity. Those ash trees with dieback or signs of stress were ground checked and proved to be free of EAB.

Acknowledgements:
NYSDEC Region Staff
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Division of Lands and Forests - Forest Health Unit
USDA Forest Service

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Appendix

	Region 1	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Total
Damaging Agent									
Abiotic Damage				9					**9**
Flooding/High Water	37	148	438	3,873	6,653	1,148	1,753	229	**14,279**
Foliage Discoloration				5,457	7,790	4,768	159	1,318	**19,491**
Mortality		2,651	15,116	21,144	25,086	19,214	144	1,421	**84,775**
Defoliators		44	10,552		14,575	18,702	625	5,708	**50,206**
Forest Tent Caterpillar		67,998	222,530		1,660	216,385	18,667		**527,240**
Eastern Tent Caterpillar		6,544							**6,544**
Two Lined Chestnut Borer					12			121	**133**
Dutch Elm Disease					191	975			**1,166**
Foliage Disease					34				**34**
Human Activities					17				**17**
General Insects		474							**474**
Gypsy Moth Caterpillar		17,780							**17,780**
Hemlock Woolly Adelgid		92							**92**
Elongated Hemlock Scale		90							**90**
Fire		1,640							**1,640**
Dieback		4							**4**
Beaver					4,184				**4,184**
Human Caused Fire			31						**31**
Total	**37**	**97,467**	**248,666**	**30,483**	**60,202**	**261,191**	**21,347**	**8,796**	**728,189**

Table 1. Total damage (acres) for New York State per region.

Region	Polygons Checked On Ground	Acres	Spatially Correlated Polygons	Acres	Polygons Not Checked on Ground	Acres	Total Polygons	Total Acres
1	0	0	0	0	1	37	1	37
3	28	89,552	9	7,349	13	557	50	97,458
4	44	169,278	32	56,211	54	23,176	130	248,665
5	5	150	0	0	45	30,332	50	30,482
6	7	8,699	9	3,168	32	48,333	48	60,200
7	47	109,917	95	108,704	25	42,569	167	261,190
8	16	16,802	4	3,042	14	1,501	34	21,345
9	17	4,914	0	0	21	3,881	38	8,795
Total	164	399,312	149	178,474	205	150,386	518	728,172

Table 2. Ground truth matrix.

Damage Causing Agents found in New York

By Robert Cole and Maria Moskalenko

Forest Tent Caterpillars: James B. Hanson, USDA Forest Service, www.forestryimages.org

Forest Tent Caterpillar Egg mass: James Solomon, USDA Forest Service, www.forestryimages.org

The forest tent caterpillar (FTC) is identifiable by white spots and blue lines down its back. A full-grown FTC can reach a length of two inches. In New York it has been most commonly observed on sugar maple, cherry, oak, birch, basswood and ash. Larvae hatch and begin feeding when leaves emerge. They continue to feed for the next five or six weeks, and then spin themselves into a silky cocoon in a folded leaf. Trees can usually handle FTC defoliation for three years. Aerial pesticide application is a current form of control in New York.

Photos by Doug Allen, SUNY ESF

The sugar maple borer is a black long-horned beetle with yellow lines on its back. The only known host to this insect is sugar maple and is a common pest in stands throughout the tree's range. The sugar maple borer has a two-year life cycle. After hatching in mid-summer, the larvae mine horizontal galleries deep into the sapwood. They over-winter in the tree and begin mining again in the spring. Two-year-old adults emerge in June or July. The bark splits and peels open to expose the galleries, making an infestation easily recognizable. It usually attacks trees that are unhealthy, over-mature or stressed and removal of such trees is the best form of control.

Photo by Susan Hagle, USDAFS

Western gall rust (pine-pine gall rust) is found as round galls on the branches of two and three needle pines. Many galls on a tree can reduce growth rate, cause witches brooms and dieback of twigs and branches, increase chance of infection by secondary pathogens, and may cause mortality.

Eastern tent caterpillar: Clemson University - USDA
Cooperative Extension Slide Series, www.forestryimages.org

Photos by Lacy Hyche

The full-grown Eastern tent caterpillar (ETC) is two inches long, black with a white stripe down its back and light blue spots on either side of the line. The ETC prefers apple and cherry and less commonly hawthorne, beech and willow. Larvae hatch and begin feeding as leaves emerge. They spin silk tents between tree branches, where they live, leaving only at night to feed. One form of control is to destroy the tents.

Armillaria mycelium

Armillaria rhizomorphs

Photos from the State of Eastern Ontario Forests

Armillaria mushrooms

Photo from Associazone Micologica Bresadola

Armillaria root disease is a natural component of forests. It is caused by several species of fungi, which can attack living or dead woody material. It can be identified by the black shoestring rhizomorphs or white mycelial fans on the trunk, or the honey mushroom fruiting bodies around the base of the tree. Armillaria causes white rot which causes the wood to look water soaked, and then turn light brown and later light yellow or white with black zone lines. This causes wood decay and growth reduction, which open the tree to attacks by other disease causing agents, and these can all lead to mortality. To control individual infected trees, chemical fumigants can be applied to reduce infection level. To manage commercial stands, minimize stress and wounding to trees and remove infected stumps and roots.


University of Wisconsin Urban Horticulture


Kenosha County Department of Planning and Development

The gypsy moth caterpillar (GMC) can be identified by the raised sets of blue and red spots that it has on its back. Oak is the preferred host tree in New York. GMC eggs hatch around the time the trees start budding. The larvae emerge in May and begin feeding on leaves. The larvae reach maturity in June and begin to pupate. Pupation takes place in a white to yellow cocoon and lasts one to two weeks. The moths are observable for approximately a week after this. GMC infestations are usually in two to four year cycles of noticeable and not noticeable defoliation. Infestations of long duration or high density can cause mortality. Silvicultural practices and aerial pesticide application are two common forms of control.

Photo by Horticulture Home and Pest News Diplodia Tip Blight and Diplodia canker
http://www.ipm.iastate.edu/ipm/hortnews/2005/3-9-2005/diplodia.html

Photo by Yard & Garden Line News
Volume 8 Number 15 September 15, 2006

Diplodia Shoot Blight and Drought
Michelle Grabowski, Regional Extension Educator, Horticulture
http://www.extension.umn.edu/yardandgarden/YGLNews/YGLNews-Sept1506.html

Diplodia blight occurs on many species of pines including Austrian pine, Scotch pine, and red pine. Trees with Diplodia often have stunted and brown shoots that have short brown needles. Trees are most susceptible to infection from May to June and in highly moist conditions. Fungicides can help control Diplodia if applied in early spring when the buds are opening.

Canadian Forest Service

The Hypoxylon canker of aspen starts out looking like a yellowish-orange blister then becomes a blackened crumbly sore. This pathogen will attack Quaking aspen, Bigtooth aspen, and Balsam poplar. The cankers weaken the surrounding wood, making the trees susceptible to wind, ice, and snow damage. A tree can be girdled and killed within five years of the initial infection. There is no known control for Hypoxylon canker.


Heterobasidion annosum
Photo by Maria Moskalenko

Annosus root rot infects many species of pine found in New York. It has been observed on Scotch pine, as well as Sugar maple and oak. It can be identified by its stringy white rot that forms under the bark. Fruiting bodies may appear at the base of the tree that are brown on top and white underneath. Annosus decays the roots which makes the trees susceptible to wind throw. To prevent the spread of Annosus, borax should be applied to freshly cut stumps and wounds.