



Department of
Environmental
Conservation

New York State Oak Wilt Response

2019 ANNUAL REPORT

Andrew M. Cuomo, Governor | Basil Seggos, Commissioner



Table of Contents

Year in Review	1
2019 Highlights.....	1
Background	2
Detection and Monitoring	3
Aerial Surveys.....	3
Public Reporting.....	3
Ground Surveys.....	3
Oak Wilt Testing.....	3
Issues Encountered during Surveys.....	4
New Infection Centers in Middlesex.....	5
Control Tactics and Treatment	6
Research and Development	7
Beetle Trapping.....	7
Symptom Monitoring.....	7
Interagency Partnerships	8
Public Information and Outreach	9
Oak Wilt Management Recognized	10
Literature Cited	11
Appendix A	12
Appendix B	13
Appendix C	14

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Year in Review

The New York State Department of Environmental Conservation (DEC) Division of Lands and Forests (DLF) has continued to eradicate or control oak wilt, a fungal disease that affects oak trees, since it was first detected in Glenville in 2008.

During the 2019 survey efforts, 138 symptomatic trees were examined for signs of oak wilt. Many of the trees surveyed, as well as the majority of those reported by the public, were stressed by poor environmental conditions (site flooding, soil disruption, etc.), or affected by other fungal diseases. Continued training for DLF staff, and increased experience in identifying oak wilt, led to greater efficiency during survey efforts. Staff were better able to assess a tree for possible infection in the field, reducing the number of samples that needed to be tested from 25% of the trees surveyed in 2018 to 12% in 2019.

Samples taken from three oaks in the town of Middlesex (Yates County) were sent to the Cornell Plant Disease Diagnostic Clinic for testing and came back positive for the disease. Confirmation of the disease in Yates County was a direct result of public reporting and inter- and intra-agency cooperation. Quick action on the part of DLF and their partners led to a second infection center being identified, which might have gone unnoticed if surveys had happened even a few weeks later in the season.

The dedication and cooperation of all DLF's partners, including the New York State Police, National Grid, NYS Partnerships for Regional Invasive Species Management (PRISMs), DEC Division of Operations staff, DEC Forest Rangers, DEC Environmental Conservation Officers (ECOs), landowners with infected trees, and the general public, have been instrumental in the continued success of DLF's oak wilt detection, management, and outreach efforts.

2019 Highlights

- A total of 13 samples taken from oak trees were sent to the Cornell Plant Disease Diagnostic Clinic, 3 of which tested positive for oak wilt.
- Two new infection centers were identified in the town of Middlesex, marking the first time that oak wilt has been confirmed in Yates County.
- A study from the University of Toronto recognized New York as the “Most Risk-Adverse State,” with the lowest risk of oak wilt spread due to its management practices.
- A total of 22 trees (5 infected and 17 buffer trees) were removed from infection centers in Glenville, South Bristol, and Middlesex.
- DLF and partners used a drone to survey around one Middlesex infection center.
- Testing by the Cornell Plant Disease Diagnostic Clinic confirmed that sap beetles caught in insect funnel traps deployed near infection centers were carrying the oak wilt fungus. This is the first time the fungus has been isolated from beetles in New York.
- Outreach provided through door-to-door interactions, mailings, public presentations, DEC Delivers emails, social media posts, YouTube videos, and a dedicated Forest Health phone line and email box, reached more than 130,000 people.

Background



A healthy oak (left) and symptomatic oak (right) during mid August

Oak wilt, a disease that affects oak trees, was first identified in the United States in Wisconsin in 1942 (Wilson and Lester, 2002) and has caused extensive damage in several upper Midwest states and Texas. It is caused by *Bretziella fagacearum*, a fungus that develops in the xylem, or water-carrying cells, of trees. The fungus blocks the flow of water, causing the leaves to wilt and fall off, killing the tree. All oaks are susceptible to the fungus, but red group oaks can die within one to six weeks, while white group oaks may take years to succumb.

Oak wilt was first detected in New York State in Glenville (Schenectady County) in 2008 and again in the same area five years later. Since 2013, oak wilt has been confirmed in Brooklyn, Islip, Riverhead, Southold, Canandaigua, and South Bristol, and newly detected in Middlesex (Yates County) in 2019.

DLF created an Oak Wilt Response Plan to prevent, detect, and manage the disease in New York. An Incident Command System (ICS) organization structure (See Appendix A, Figure 1) was established by DLF in Central Office (Albany, New York) to apply consistent implementation of response activities, delineate roles and responsibilities, and effectively disseminate information.

Detection and Monitoring

Aerial Surveys

Helicopter surveys were conducted between July and September over all infection centers, including a 16-square-mile area around each site. A drone survey was conducted around the Middlesex infection center to help staff get a closer and more thorough inspection of the tree canopy. Drone use during survey efforts will continue as site conditions allow.

A total of 87 symptomatic oaks were detected during aerial surveys, including 13 in Middlesex, 14 in Canandaigua, Bristol, and South Bristol; 17 in Glenville; 32 in Suffolk County; and 11 in Westchester, Brooklyn, and NYC (See Appendix B, Table 1).

Public Reporting

DLF staff responded to more than 100 calls and emails from the public reporting oak wilt. In most cases, staff were able to attribute the symptoms to other causes based on pictures and the information provided (See Figure 2, Page 5). Reports where oak wilt could not be ruled out were marked for further examination.

Ground Surveys

Using aerial survey data and viable public reports of symptomatic trees, DLF staff examined a total of 138 symptomatic trees across the state from June through October.

Oak Wilt Testing

Staff utilized pole saws, tree climbing tools, and an aerial lift to collect samples from 13 symptomatic trees that were considered potentially infected with oak wilt. The samples were analyzed by staff at the Cornell Plant Disease Diagnostic Clinic in Ithaca, New York, using live culture methods, standard PCR (polymerase chain reaction), and DNA sequencing procedures. Three samples from two locations in Middlesex tested positive for oak wilt (See Appendix B, Table 1 and Appendix C, Figure 3). Oak species tested for the disease included red oak (*Quercus rubra*) and bur oak (*Quercus macrocarpa*).



ECO's, Forest Rangers, and DLF staff conducting a drone survey.



DEC staff use an aerial lift to reach branches for oak wilt sampling.

Issues Encountered during Surveys

Leaf browning and defoliation, the two most common symptoms of oak wilt, are also common responses to other diseases and stress factors. To increase the efficiency of surveys and reduce the need for testing, DLF staff have been trained to recognize the browning patterns, timing of symptoms, and site conditions for a variety of oak health problems.

Many of the symptomatic trees surveyed, as well as those reported by the public, were suffering from a variety of non-oak wilt fungi, insect damage, and environmental factors (Figure 2). Anthracnose and other fungus-related leaf spots were on the rise due to very wet weather, and tubakia, another leaf spot, was the primary disease affecting symptomatic trees reported in

the fall. Leaf spots are usually superficial and will not affect the long-term health of the tree unless other stressors are present (Pokorny, 2017; Ruhl, 2018). Oak decline—a gradual dieback of oaks caused by an interaction of stressors including drought, fungi, and insects—was especially common in Long Island and the lower Hudson Valley. The most common environmental factors encountered were flooding and poor site conditions.

Staff explained to homeowners how their symptomatic trees differed from what they would encounter with oak wilt and provided information on what management options were available to address the actual health issue.

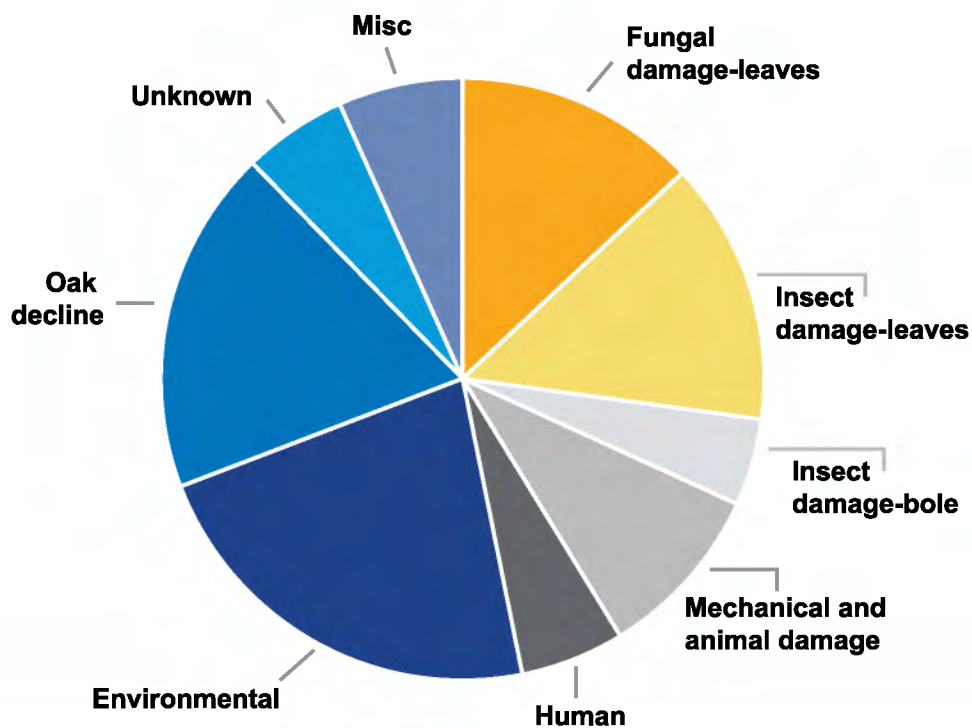


Figure 2: Proportion of oak wilt calls and surveys that were attributed to oak problems other than oak wilt

New Infection Centers in Middlesex



This infected tree at Bare Hill Unique Area was discovered during an aerial survey.

A concerned homeowner in Middlesex reported that two of his oak trees were wilting and rapidly dropping leaves. The trees had been pruned earlier in the year, creating wounds where the oak wilt fungus could have entered. DLF staff conducted a ground survey and took samples to be tested. Within a week of receiving confirmation that the trees were infected, DLF staff met at the site to discuss management activities with the homeowner. While there, another six wilting oak trees were observed on neighboring properties. Staff concluded that they were infected due to their proximity to the infection site and the timing of their symptoms and marked them for removal.

Aerial and ground surveys conducted around Middlesex resulted in another infected tree being confirmed in Bare Hill Unique Area. This site is more than four miles from the other one, so a second infection center was established. The infected tree was removed in October, and the stump was treated with herbicide.

Middlesex and Italy (Yates County) Town Supervisors were informed of the new oak wilt infection centers and future actions such as establishing a quarantine district and increasing survey efforts in the area.

Control Tactics and Treatment



A site treated in South Bristol to help prevent the spread of oak wilt

Five infected trees were removed from the infection centers in Glenville, South Bristol, and Middlesex (Table 2). At the Glenville and South Bristol management sites, 17 uninfected trees adjacent to the infected ones were removed to create a buffer. In Glenville, three of these trees were removed by National Grid, due to their proximity to powerlines, and the other trees were removed by a DEC contractor. DEC's Region 8 DLF and Operations staff worked together to cut

and chip the trees removed in South Bristol. In Middlesex, one infected tree was cut by DLF staff. The stumps of all removed trees were treated with glyphosate to kill any remaining tissue and prevent the fungus from spreading through the roots to other trees. In South Bristol, a trench was dug by the landowner to sever roots that had grafted together. Six stumps were ground at a 2017-confirmed infection center in Glenville.

Table 2. 2019 Summary of Tree Removal and Disposal

Location	Infected Trees Removed	Buffer Trees Removed	Herbicide Applied	Root Graft Disruption Applied	Trees Chipped	Stumps Ground
Glenville	1	12	Yes		Yes	6
South Bristol	3	5	Yes	Yes	Yes	
Middlesex	1		Yes			

Research and Development



Insect traps deployed at the ground level (left) and canopy (right) to catch sap beetles and oak bark beetles, respectively. These two groups of insects are known to be vectors of the oak wilt fungus.

Beetle Trapping

In the central United States, sap beetles (Coleoptera: Nitidulidae) are the primary insects that transport the oak wilt fungus. Knowing the diversity and seasonal distribution of these insects will help guide management decisions. DLF staff deployed 77 insect traps in South Bristol, Glenville, Brooklyn, and Central Islip from April to October. This is the last year for this study and the 2019 results are currently being compared and compiled with the previous years' data. Preliminary results show 41 species of sap beetles are present in New York and most are primarily active between May and July.

Sap beetles caught in the traps were also sent to Cornell to be tested for the oak wilt fungus. One sample from Glenville and one from South Bristol tested positive using PCR and DNA sequencing. This is the first time the fungus has been isolated from beetles in New York, opening the possibility of using insect traps as oak wilt detection tools across the state. DLF staff will expand this trapping study to areas outside of the known infection centers starting next year.

As a pilot study, DLF began trapping for oak bark beetles (*Pseudopityophthorus* spp.), another potential vector of the oak wilt fungus. Staff deployed five beetle traps in Central Islip from March to October. Trap catches were low, possibly due to a lack of an effective lure, so trapping will not resume until an appropriate trap and lure combination can be obtained. Preliminary results from the data that was collected show these beetles are active from April to June.

Symptom Monitoring

In management areas, trees that had a high probability of becoming infected were photographed during the growing season to document changes over time if symptoms began to appear. Photos were taken of the same trees from the same angles every two weeks. No symptoms were photographed during the 2019 growing season, but this monitoring will be continued in future years to record the progression of any potential disease symptoms.

Interagency Partnerships

DLF staff worked closely with regional experts from the U.S. Forest Service (USFS) and the Cornell Plant Disease Diagnostic Clinic to improve sampling methods, collection techniques, and training for the identification of oak wilt symptoms. Training conducted by Cornell in 2018 on proper sampling techniques resulted in better quality samples being submitted the following year, which then led to more accurate testing. Cornell conducted another training for DEC staff during 2019 to continue to improve the process.

DEC continues to work with the USFS to exchange research results and information on treatment methods. DLF staff attended an oak wilt management tour hosted by the USFS in Minnesota. While there, staff learned about new management techniques, including a rapid response practice where trees are girdled and treated with herbicide as soon as they are diagnosed with oak wilt. This practice kills the infected tree and its roots earlier in the season, reducing the chances of the disease spreading to nearby trees. However, this practice creates a standing dead tree that would be a liability in a populated area, so it is only practical in a remote setting. New York is continuing to focus on how to diagnose and treat infections as quickly as possible.

Within New York State, DLF partners with a variety of organizations to provide oak wilt surveying, management, and outreach.

- New York State Police provided helicopters and pilots for aerial surveys.
- ECOs and Forest Rangers assisted with the drone survey in Middlesex.
- National Grid cut down three trees at the Glenville infection center that were along powerlines.
- New York's PRISMs helped provide outreach to the public.



DLF interns work on cutting samples at the Cornell Sampling Workshop.

Public Information and Outreach

Outreach and education are important tools for the detection and prevention of oak wilt. Several tactics were used to inform the public and stakeholders about the disease.

- Municipalities and other stakeholders in areas with infected oak trees were contacted to collaborate on oak wilt detection, management, and outreach.
- Various presentations, workshops, and trainings were conducted across the state for professional staff, partners, and municipalities. Some programs were independent, and others were part of established events such as the Society of American Foresters Annual Meeting, the North America Invasive Species Management Association Conference, and the NYS International Society of Arboriculture Annual Conference. At these events, DEC staff interacted with more than 350 participants.
- Door-to-door surveys were conducted in neighborhoods around infection centers in Glenville to provide residents with information about oak wilt, reaching 536 homeowners.
- Information about oak wilt symptoms and quarantine district regulations were mailed to 46 landowners within the South Bristol Quarantine District.



An example of a mobile sign deployed in Saratoga Springs

- Mobile signs were used in South Bristol, Naples, Bear Mountain, and Saratoga Springs to inform people about prevention methods for oak wilt, including pruning oaks during the winter and using local firewood.
- Electronic methods of outreach dissemination were used, including social media posts on DEC's Facebook and Twitter pages, DEC press releases, DEC Delivers emails, and YouTube videos.
 - A total of 60,268 people viewed DEC's oak wilt Facebook posts.
 - A total of 14,915 people viewed oak wilt Twitter posts.
 - Nearly 2,000 people viewed oak wilt YouTube videos.
- DEC Delivers informational emails were sent to 53,303 subscribers.
- The oak wilt website had more than 8,000 visits.

Literature Cited

Corrigan, J. (2018). "Preparing Ontario for an Invasive Disease: A Review of Oak Wilt Management Strategies in the Great Lakes Region of the United States." *Master's Capstone, University of Toronto*.

Pokorny, J.D. (2017). "How to Recognize Common Diseases of Oaks in the Midwest: A Quick Guide," ed. S. Clark. U.S. Forest Service. *NA-FR-01-15*. Retrieved from https://www.fs.usda.gov/naspf/sites/default/files/publications/9190_fh_howtorecoakdis_508.pdf.

Ruhl, G. E. (2018). "Tubakia Leaf Spot on Oak—A Yearly Event." *Purdue University Landscape Report* 18(16). Retrieved from <https://www.purduelandscape.org/article/tubakia-leaf-spot-on-oak-a-yearly-event/>.

Wilson, A. D. and D. G. Lester. (2002). "Trench Inserts as Long-term Barriers to Root Transmission for Control of Oak Wilt." 1067–1074. Retrieved from <http://www.treesearch.fs.fed.us/pubs/5222>.

Appendix A

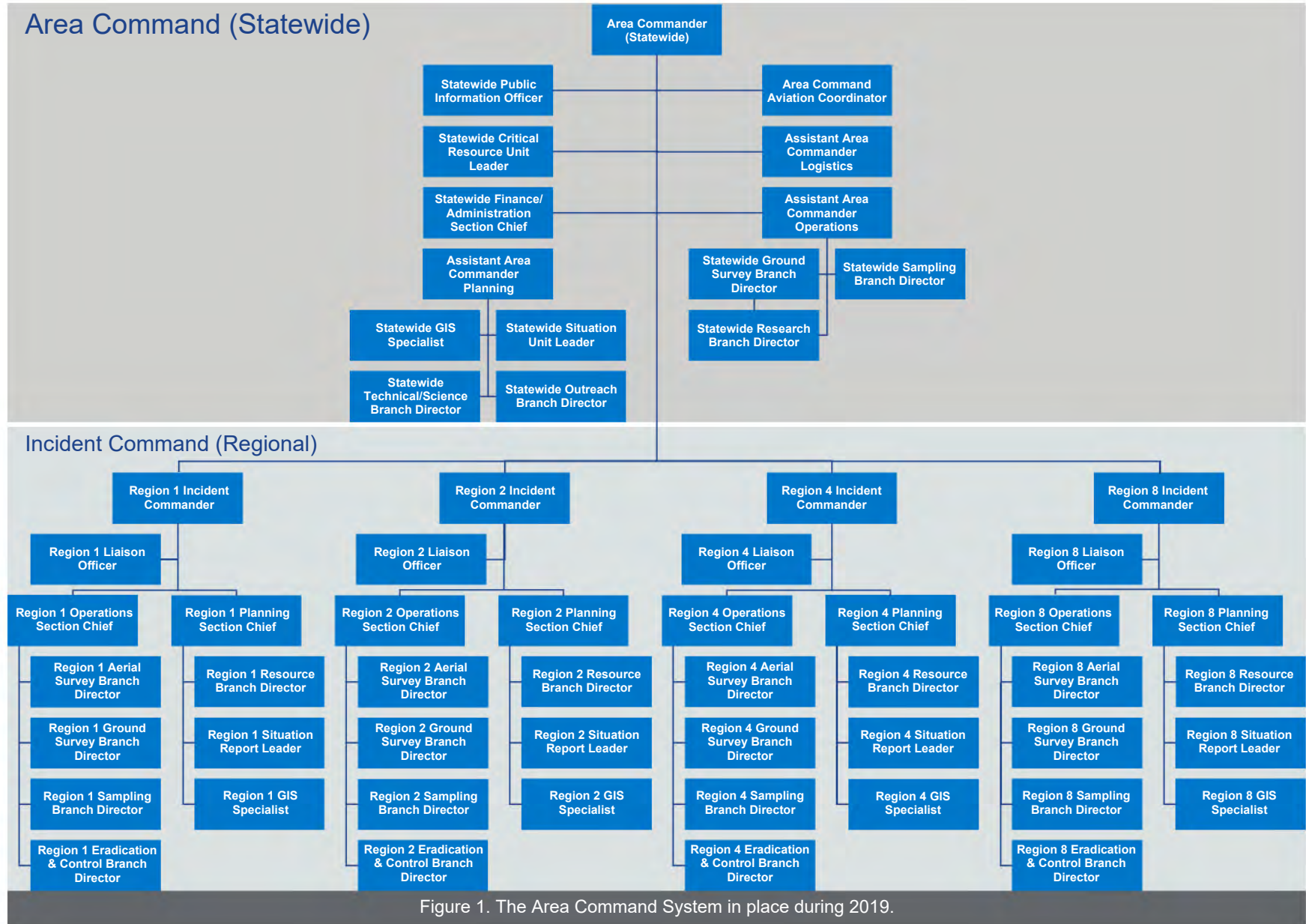


Figure 1. The Area Command System in place during 2019.

Appendix B

Table 1. Trees Detected/Checked Through Surveys and Sampled for Oak Wilt

DEC Region/County	Trees Checked as a Result of Aerial Surveys	Trees Checked as a Result of Public Reporting	Trees Sampled	Oak Wilt Positive Trees
REGION 1				
Suffolk	32	13		
REGION 2				
Queens	6			
Kings		1	1	
Bronx	4			
REGION 3				
Westchester	1			
REGION 4				
Schenectady	17	3	3	
REGION 5				
REGION 6				
Herkimer		1		
Oneida		1	1	
REGION 7				
REGION 8				
Livingston		1	1	
Ontario	14	4	1	
Yates	13	12	5	11
Monroe		1	1	
Orleans		1		
Steuben		1		
Seneca		12		
REGION 9				
Total	87	51	13	11

Appendix C

2019 Oak Wilt Sampling

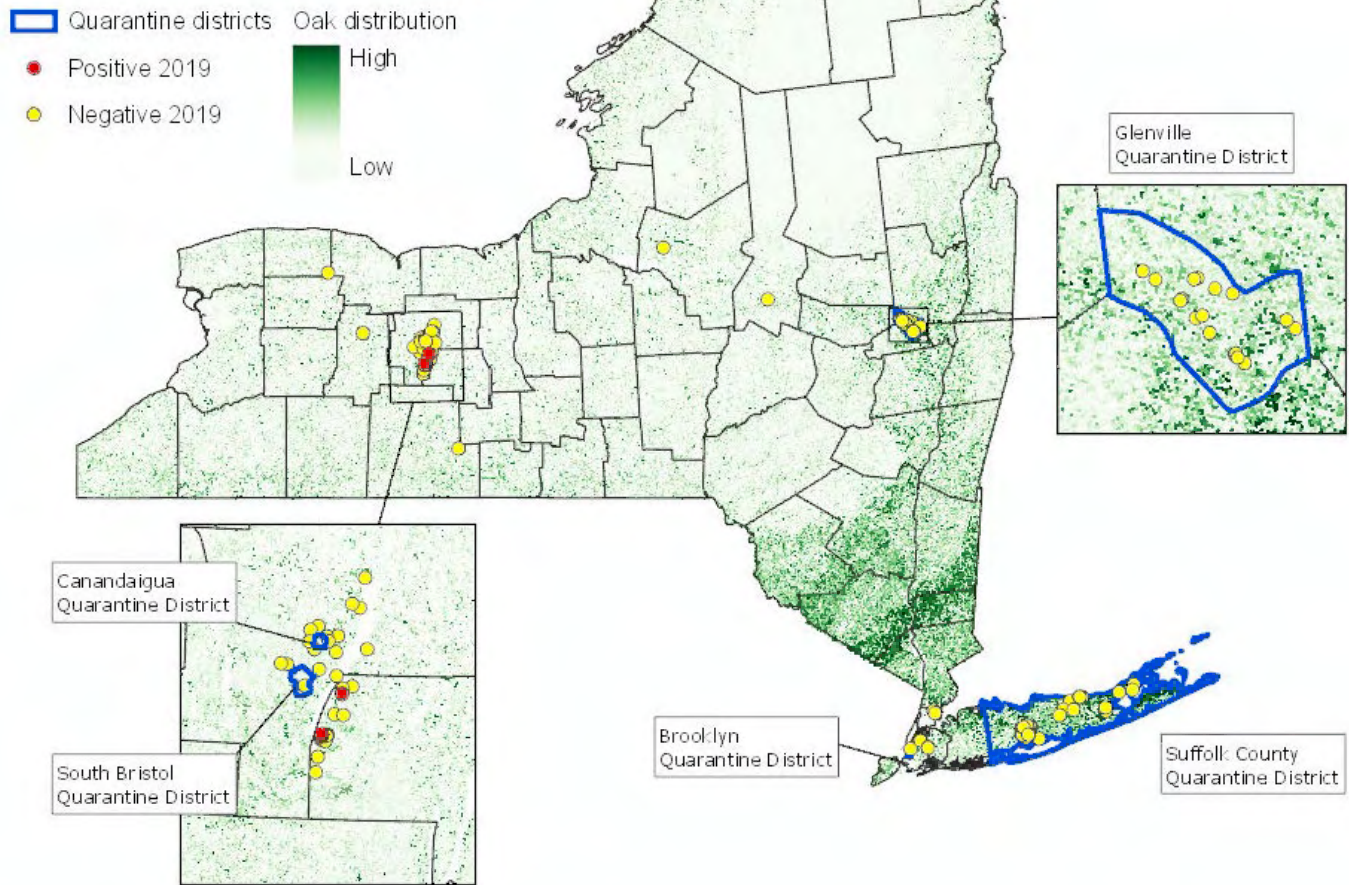


Figure 3. A map showing NY sampling results. The only samples that tested positive in 2018 were collected in Schenectady and Ontario counties.



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