

# MARYLAND 2021

## FOREST HEALTH HIGHLIGHTS

### The Resource

Maryland occupies a land area of 6,264,876 acres. Forestland comprises 2,709,062 acres of which nearly 76 percent is privately owned. Healthy, productive forests are critical in urban and rural areas for soil conservation, clean air and water, wildlife habitat, outdoor recreation, and aesthetics. The forest products industry is the largest employer in Allegany and Garrett Counties and the second largest employer on the Eastern Shore.

### Forest Health Monitoring

The Forest Health Monitoring (FHM) Program has two components: plot network and off-plot survey. The USDA Forest Service Northeastern Station Forest Inventory and Analysis Staff administer the plot network in Maryland. The plot network is designed to annually monitor, assess, and report on changes in the long-term condition of trees, soils, lichens, and air quality in forests.

The Maryland Department of Agriculture conducts the off-plot survey component of FHM. The objectives of the FHM Program are delimiting, mapping, and reporting forest pest problems as a supplement to the FHM plot network. Aerial and ground surveys, data collection, and reporting are conducted in accordance with FHM standards for air operations and GIS.

### Office of Plant Industries & Pest Management:

#### FOREST PEST MANAGEMENT

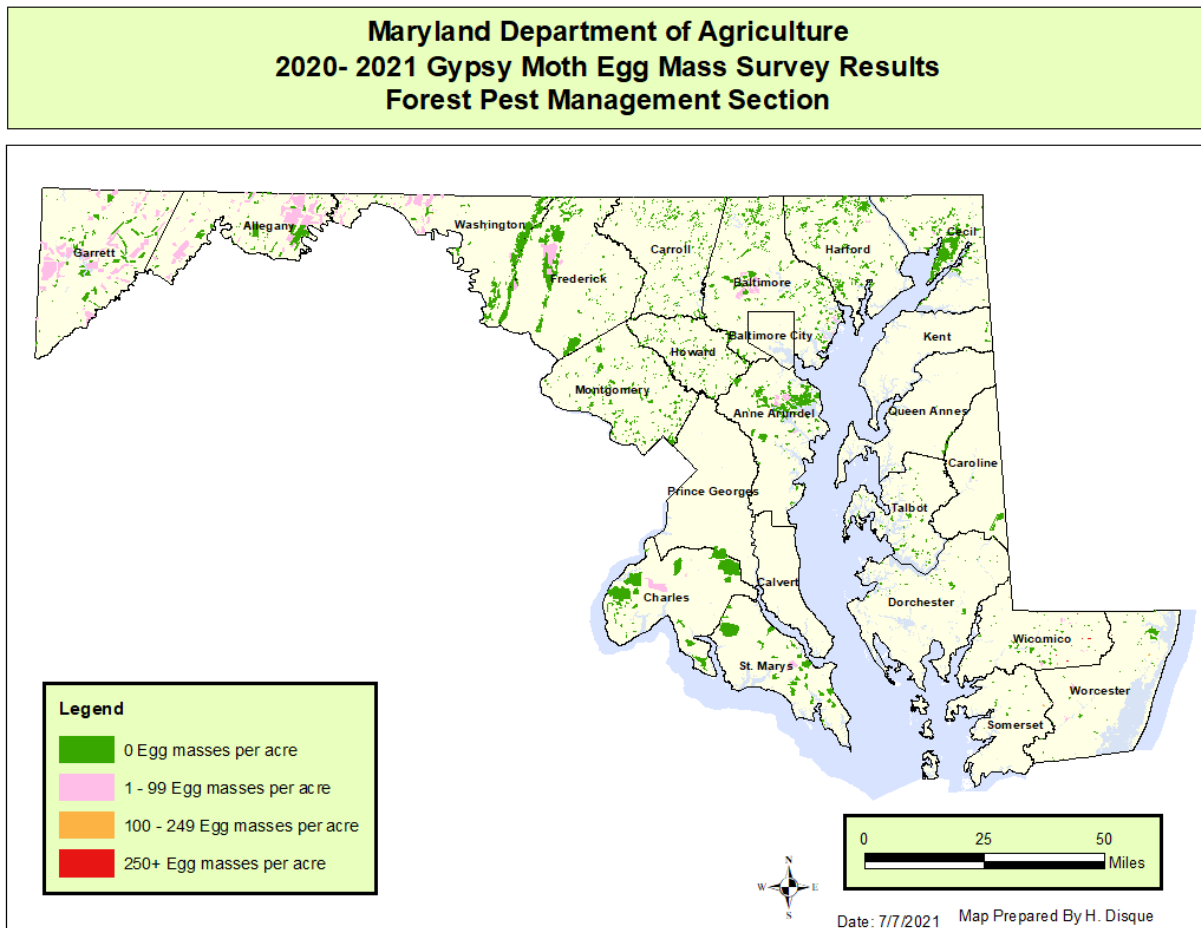
#### FOREST PEST MONITORING AND SURVEYING

#### *Lymantria dispar dispar* (Formally known as Gypsy Moth)

*Lymantria dispar dispar* (Ldd), the insect formally known as gypsy moth, is the most serious threat to oak forests in the United States. The first eggs were detected in Maryland in 1971 and the first extensive defoliation occurred in 1981. Each fall and winter, the department conducts an extensive survey for Ldd egg masses to determine potential areas of defoliation. From August 2020 through March 2021, Maryland Department of Agriculture Forest Pest Management (MDA FPM) personnel conducted Ldd egg mass surveys on 484,389 acres of “high value” forested

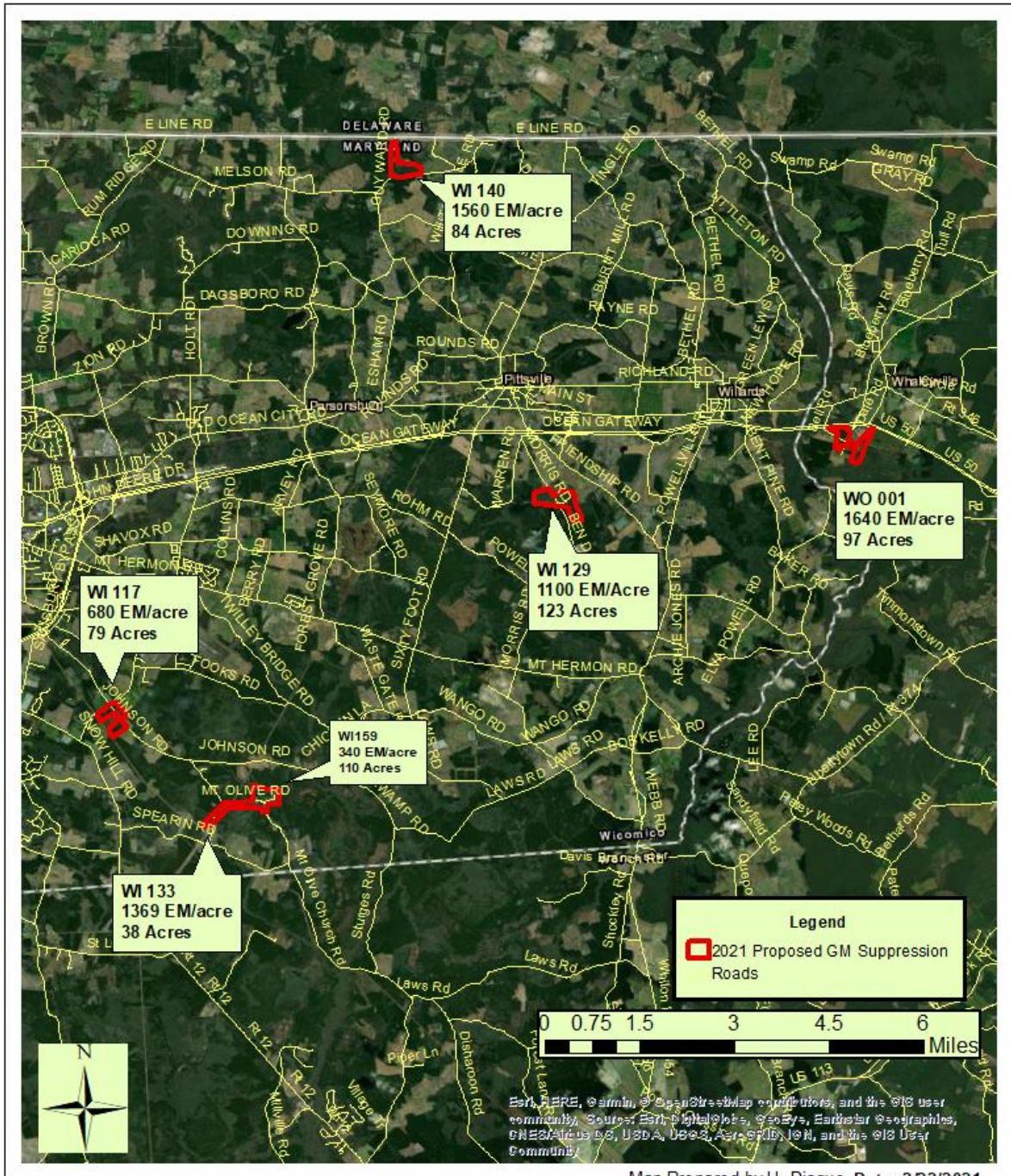
lands. High value” forested sites include areas with development, recreational use, managed forest and wildlife resources and other site conditions that render dieback and mortality to be economically and socially important. The survey results indicated that the current populations were sufficient to cause moderate to heavy defoliation on 531 acres in 2021. In May 2021, 531 acres that are located on the lower Eastern Shore and were sprayed with *Bacillus thuringiensis*. Ldd defoliation in 2021 totaling 30,000 acres was seen on the lower Eastern shore.

## MDA 2020-2021 MARYLAND GYPSY MOTH SURVEY RESULTS

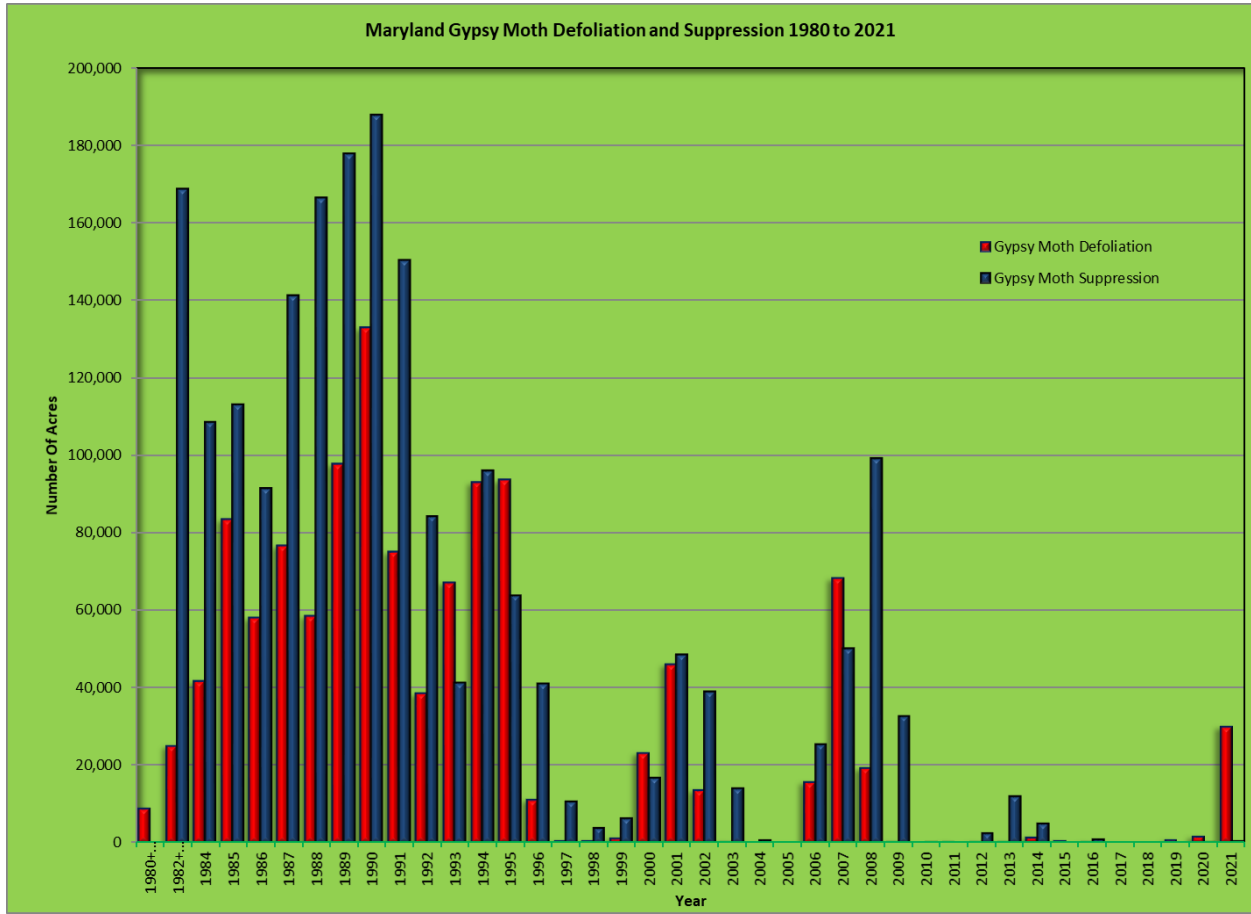


# MARYLAND GYPSY MOTH SUPPRESSION BLOCKS

## Maryland Department of Agriculture Forest Pest Management 2021 Proposed Gypsy moth Suppression Blocks Wicomico & Worcester Counties



# MARYLAND GYPSY MOTH DEFOLIATION AND SUPPRESSION 1980 to 2021



## MDA 2020-2021 Maryland Gypsy Moth Egg Mass Survey Summary

Maryland Department of Agriculture 2020 - 2021 Maryland Gypsy Moth Egg Mass Survey Summary Forest Pest Management								
County	Total	Private & County	State	# Positive	% Positive	# Blocks	# Acres	% Positive 2019-2020
<b>EASTERN SHORE</b>								
Caroline	41	0	41	0	0.0	6	4,233	0
Dorchester	122	84	38	0	0.0	39	3,314	0.8
Queen Anne's	18	0	18	0	0.0	7	442	5.6
Somerset	52	52	0	1	1.9	18	1,231	2
Talbot	197	193	4	0	0.0	75	6,632	1
Wicomico	226	220	6	25	11.1	70	6,952	8
Worcester	205	141	64	12	5.9	49	6,115	6
<b>TOTALS</b>	<b>861</b>	<b>690</b>	<b>171</b>	<b>38</b>	<b>4.4</b>	<b>264</b>	<b>28,919</b>	<b>3.8</b>
<b>SOUTHERN</b>								
Charles	191	159	32	3	1.6	35	44,037	1.2
St Marys	191	180	11	3	1.6	24	23,423	1.1
Anne Arundel	385	382	3	5	1.3	77	33,337	1.1
Prince Georges	0	0	0	0	0.0	0	0	0
Calvert	0	0	0	0	0.0	0	0	0
<b>TOTALS</b>	<b>767</b>	<b>721</b>	<b>46</b>	<b>11</b>	<b>1.4</b>	<b>136</b>	<b>100,797</b>	<b>1.1</b>
<b>NORTHEAST</b>								
Baltimore	750	670	80	14	1.9	210	39,572	2.4
Cecil	497	413	84	1	0.2	102	28,286	0.9
Harford	580	551	29	2	0.3	157	28,343	0.6
Kent	10	0	10	0	0.0	3	808	0
Baltimore City	0	0	0	0	0.0	0	0	0
<b>TOTALS</b>	<b>1,837</b>	<b>1,634</b>	<b>203</b>	<b>17</b>	<b>0.9</b>	<b>472</b>	<b>97,009</b>	<b>1.4</b>
<b>WESTERN</b>								
Allegany	887	400	487	161	18.2	126	48,105	20.8
Garrett	1,031	600	431	177	17.2	141	62,863	22.4
Washington West	323	202	121	61	18.9	55	12,492	10.2
<b>TOTALS</b>	<b>2,241</b>	<b>1,202</b>	<b>1,039</b>	<b>399</b>	<b>17.8</b>	<b>322</b>	<b>123,460</b>	<b>19.9</b>
<b>CENTRAL</b>								
Carroll	537	512	25	1	0.2	232	19,576	0.5
Frederick	738	602	136	7	0.9	171	52,348	0.5
Howard	329	296	33	3	0.9	121	12,670	0.8
Montgomery	653	872	81	0	0.0	196	22,966	0
Washington East	384	282	102	2	0.5	74	26,644	2.4
<b>TOTALS</b>	<b>2,641</b>	<b>2,564</b>	<b>377</b>	<b>13</b>	<b>0.5</b>	<b>794</b>	<b>134,204</b>	<b>0.7</b>
<b>TOTALS</b>	<b>8,347</b>	<b>6,811</b>	<b>1,836</b>	<b>478</b>	<b>5.7</b>	<b>1988</b>	<b>484,389</b>	<b>2.9</b>

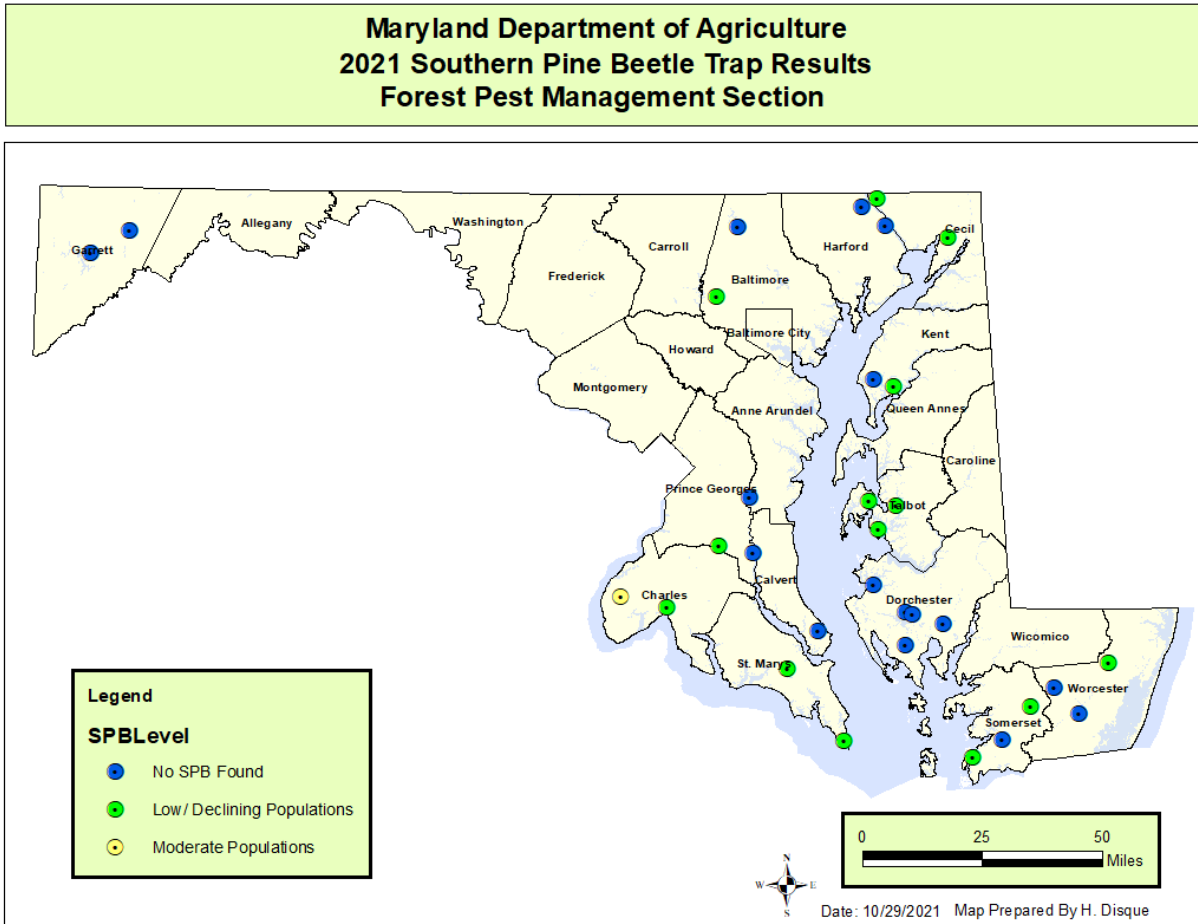
### Southern Pine Beetle

The Southern Pine Beetle (SPB) is one of the most destructive insect pests of pines. Maryland is at the northern edge of its range and is commonly found on the lower Eastern Shore and

Southern Maryland. Since 1989, Maryland has participated in a multi-state SPB survey throughout the southern United States using pheromone-baited traps. Traps were set up in 14 counties across Maryland. All traps collected low/declining populations to no SPB with the exception of one trap in Charles County which collected moderate populations of the beetle. At the site in Charles County, ground survey and an aerial drone survey were completed. No mortality or declining trees were found. The traps were set up shortly after the time of redbud bloom.

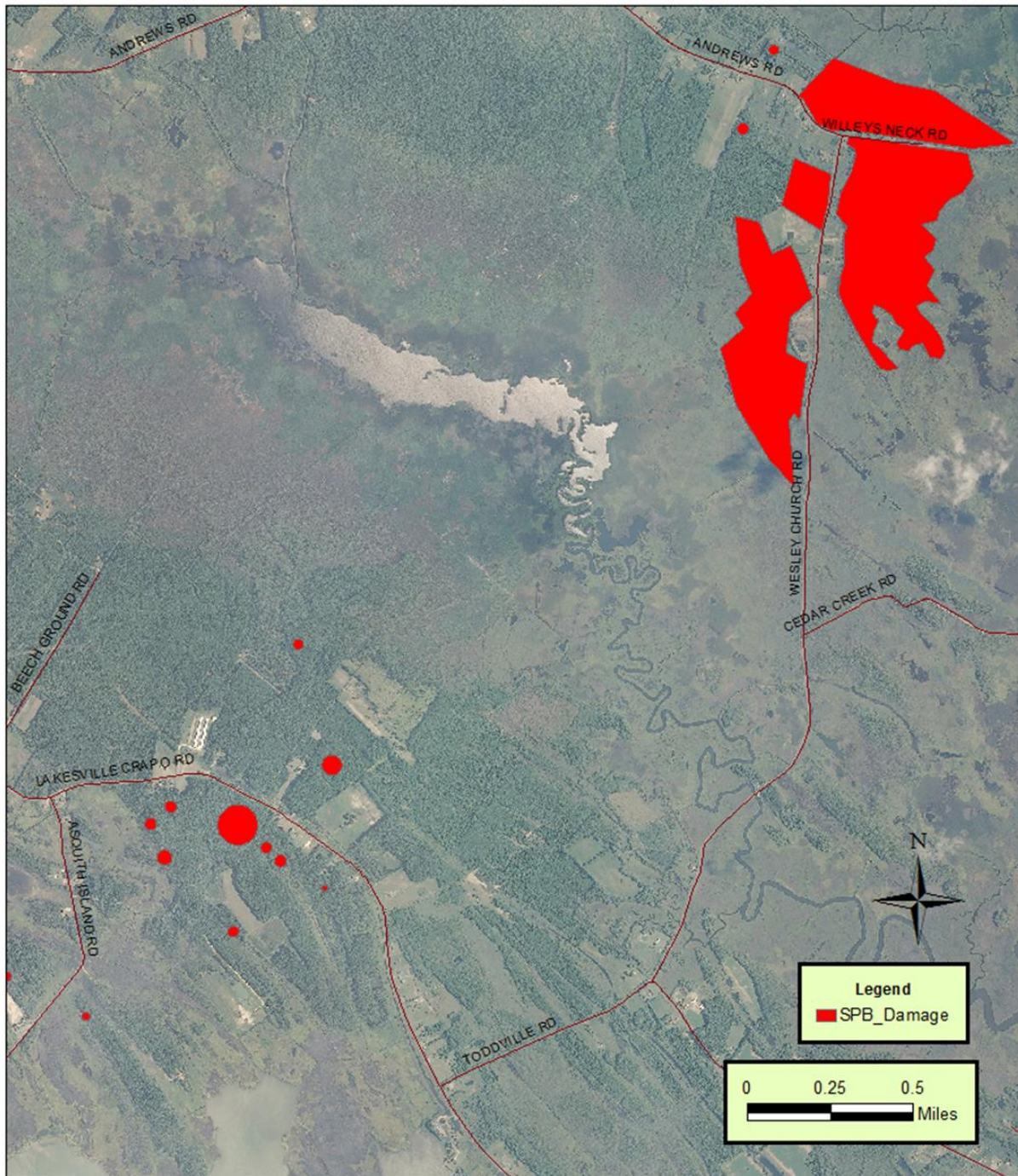
The Dorchester County area that had experienced an SPB outbreak in 2015-2017 has no additional mortality due to SPB. Many trees in this area and southern Dorchester County are exhibiting chlorotic needles due to flooding and salt-water intrusion.

### MDA 2021 SOUTHERN PINE BEETLE TRAP RESULTS



**MDA SOUTHERN PINE BEETLE AFFECTED AREAS 2015-2017 DORCHESTER COUNTY**

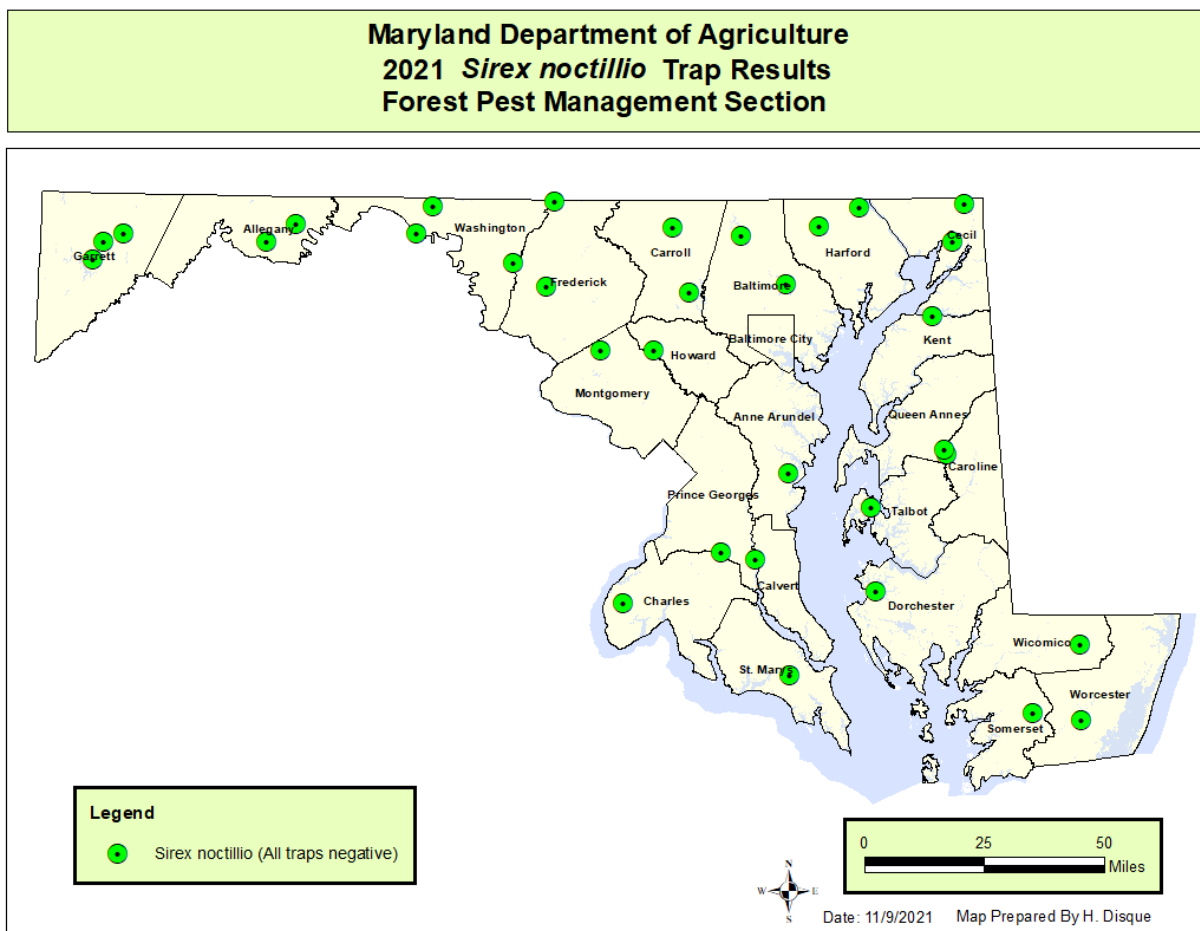
**Maryland Department of Agriculture  
Forest Pest Management Section  
Southern Pine Beetle Affected Area 2015-17  
Dorchester County**



### *Sirex noctilio* (Woodwasp)

*Sirex noctilio* has been the most common species of exotic woodwasp detected at U.S. ports-of-entry associated with solid wood packing materials. Recent detections of this woodwasp outside of port areas in the United States have raised concerns because this insect has the potential to cause significant mortality of pines. The *Sirex* woodwasp has not been detected in Maryland, but is known to be in Pennsylvania. To detect this insect, the department placed two traps per county on northern tier counties and one trap for all other counties, totaling 33 traps in pine woods. All traps were negative during the 2021 calendar year.

### MDA 2021 SIREX NOCTILLIO TRAP LOCATIONS



### Emerald Ash Borer (EAB)

MDA's Forest Pest Management put up 16 green funnel traps in non-positive counties around the state and in the parasitoid release areas to monitor for EAB. EAB was found in Harford, Cecil, Kent, and Baltimore counties.

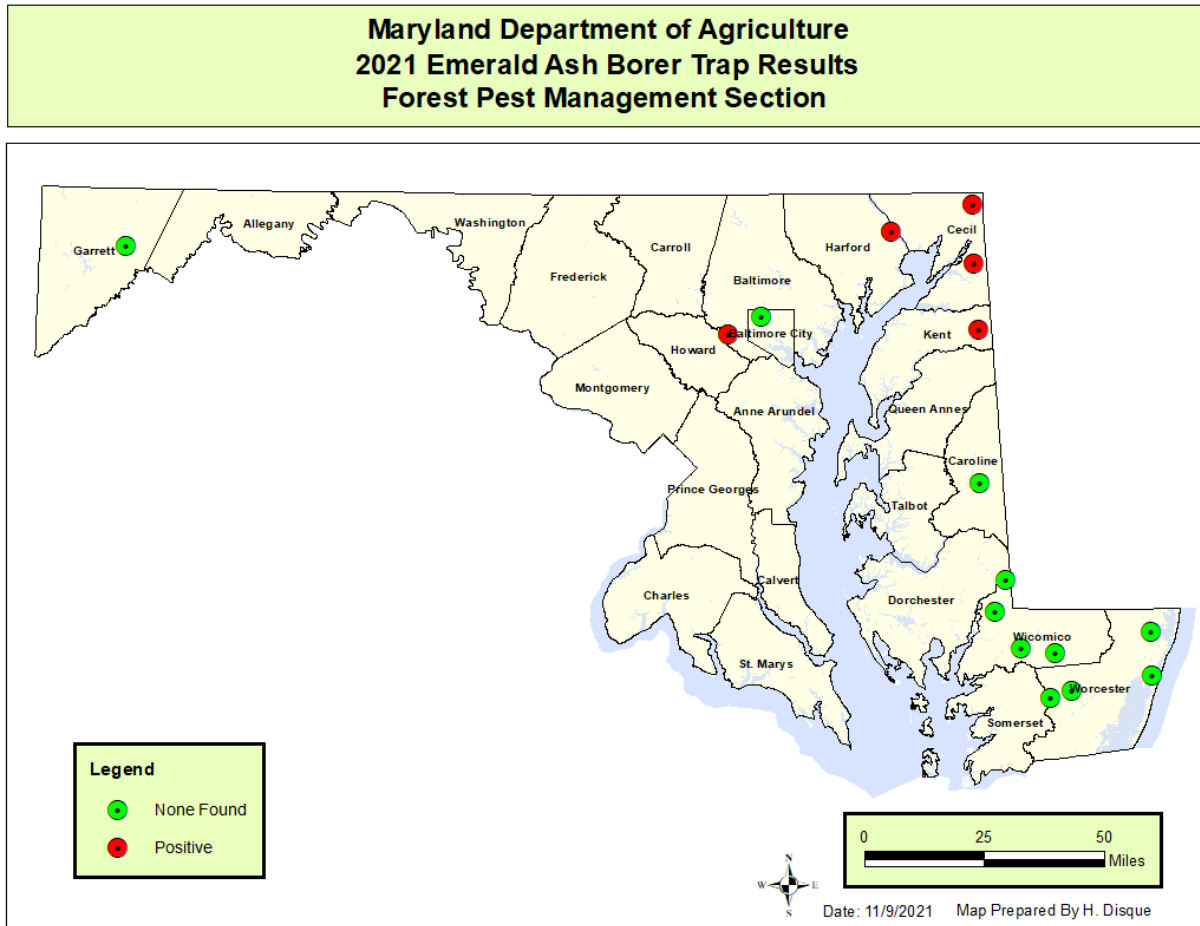


Large-scale, rapid tree die off has begun at the Baltimore County and Baltimore City parasitoid release locations. Rural forests along the upper Eastern shore are also experiencing rapid mortality.

During the 2021 field season Forest Pest Management released 15,003 parasitoids of the EAB. The parasitoids were released at four state park locations, one arboretum, and one state forest in Garrett, Harford, Baltimore, Cecil, and Caroline counties as well as Baltimore City. Forest Pest Management released 800 *Oobius agrili* as pupae in 8 vials. At one site 1,241 *Tetrastichus planipennisi* were released in 9 bolts. Two species of *Spathius* were released, 8,705 *Spathius agrili* as adults and 4,259 *Spathius galinae* pupae in sticks.

In addition, Forest Pest Management staff supervised treatments of ash trees around the state. This work was done at parks in cooperation with DNR, the Blackwater National Wildlife Refuge, and the Maryland Conservation Corps (MCC). In total 282 ash trees, 3,462” diameter at breast height (DBH) were treated using 21,410 ml of Tree-age, emamectin benzoate. Many of the trees treated were in riparian areas targeting rare tree species to provide seed for the future regeneration.

## MDA 2021 EMERALD ASH BORER TRAP LOCATIONS

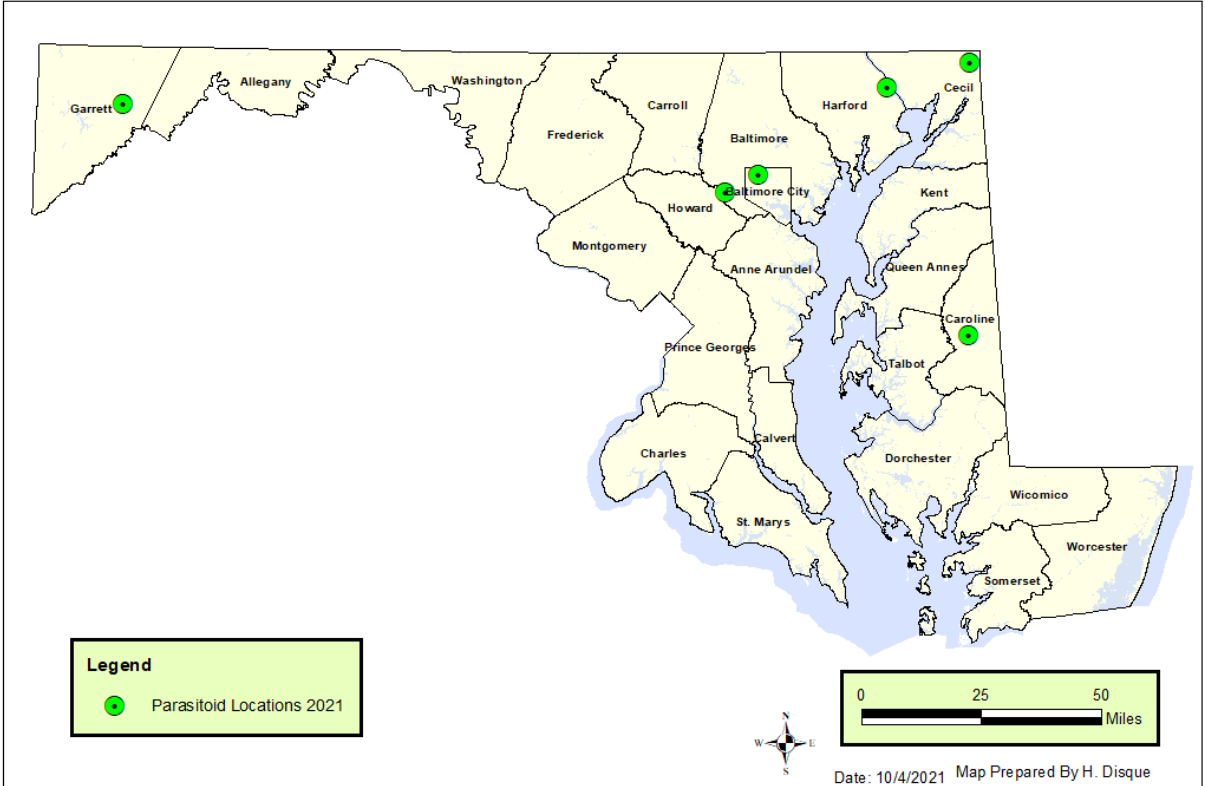


## MDA EMERALD ASH BORER PARASITOID RELEASE SUMMARY

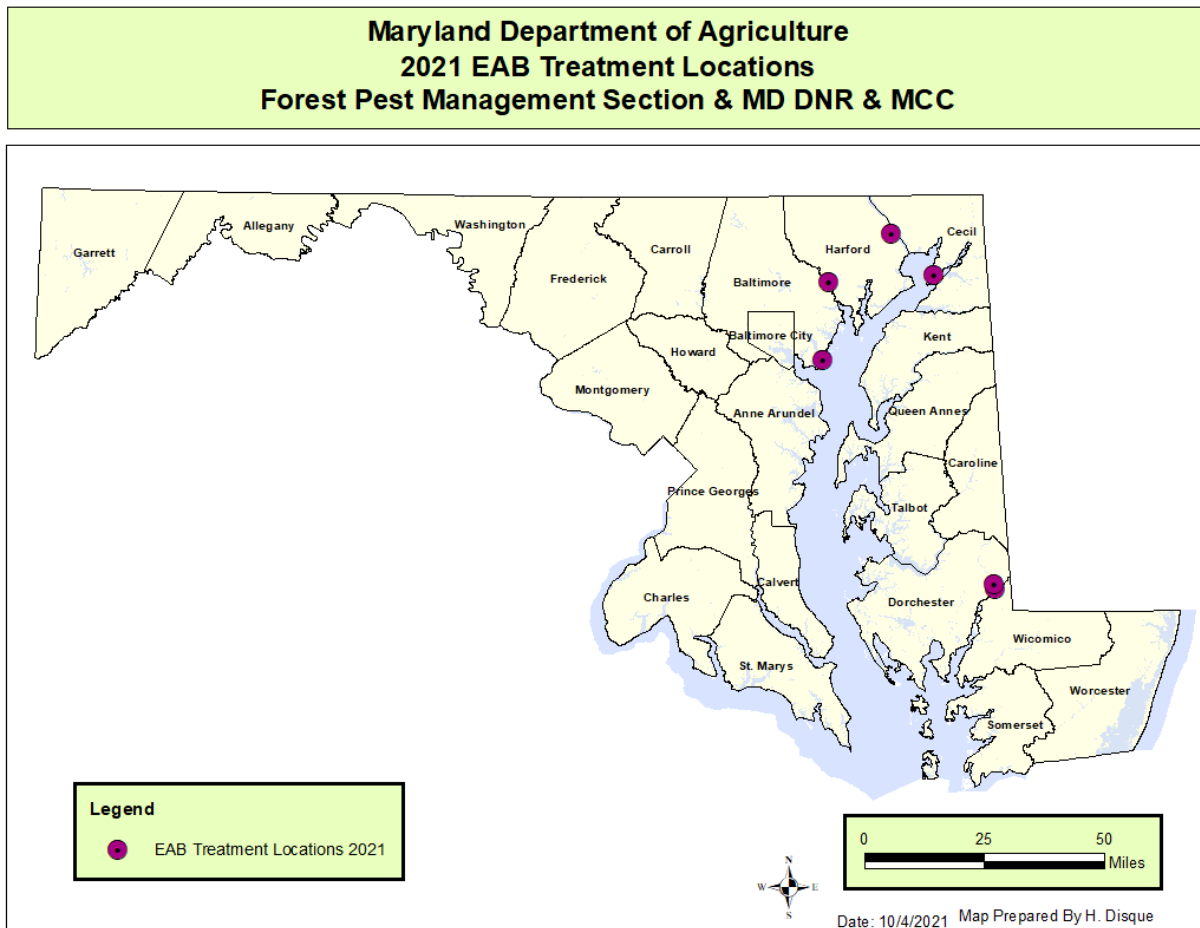
Maryland Department of Agriculture Forest Pest Management 2021 Emerald Ash Borer Parasitoid Release Summary										
Site Name	Latitude	Longitude	Oobius agrili (vials)		Spathius agrili		Spathius galinae		Tetrastichus planipennis	
			# vials	Total	# females	# males	# females	# males	# bolts	Total
Cylburn Arboretum	39.3513	-76.6537			2902	1437	654	218		
Savage River State Forest	39.6004	-79.1522	8	800			655	82	9	1241
Martinak State Park	38.86002	-75.8415					654	217		
Susquehanna State Park	39.61383	-76.151					677	225		
Patapsco Valley State Park	39.29593	-76.7836			2992	1374				
Fair Hill State Park	39.70282	-75.8288					656	219		
		Totals	8	800	5894	2811	3296	961	9	1241

# MDA 2021 EMERALD ASH BORER PARASITOID LOCATIONS

## Maryland Department of Agriculture 2021 Parasitoid Release Locations Forest Pest Management Section



## MDA 2021 EMERALD ASH BORER TREATED TREE LOCATIONS



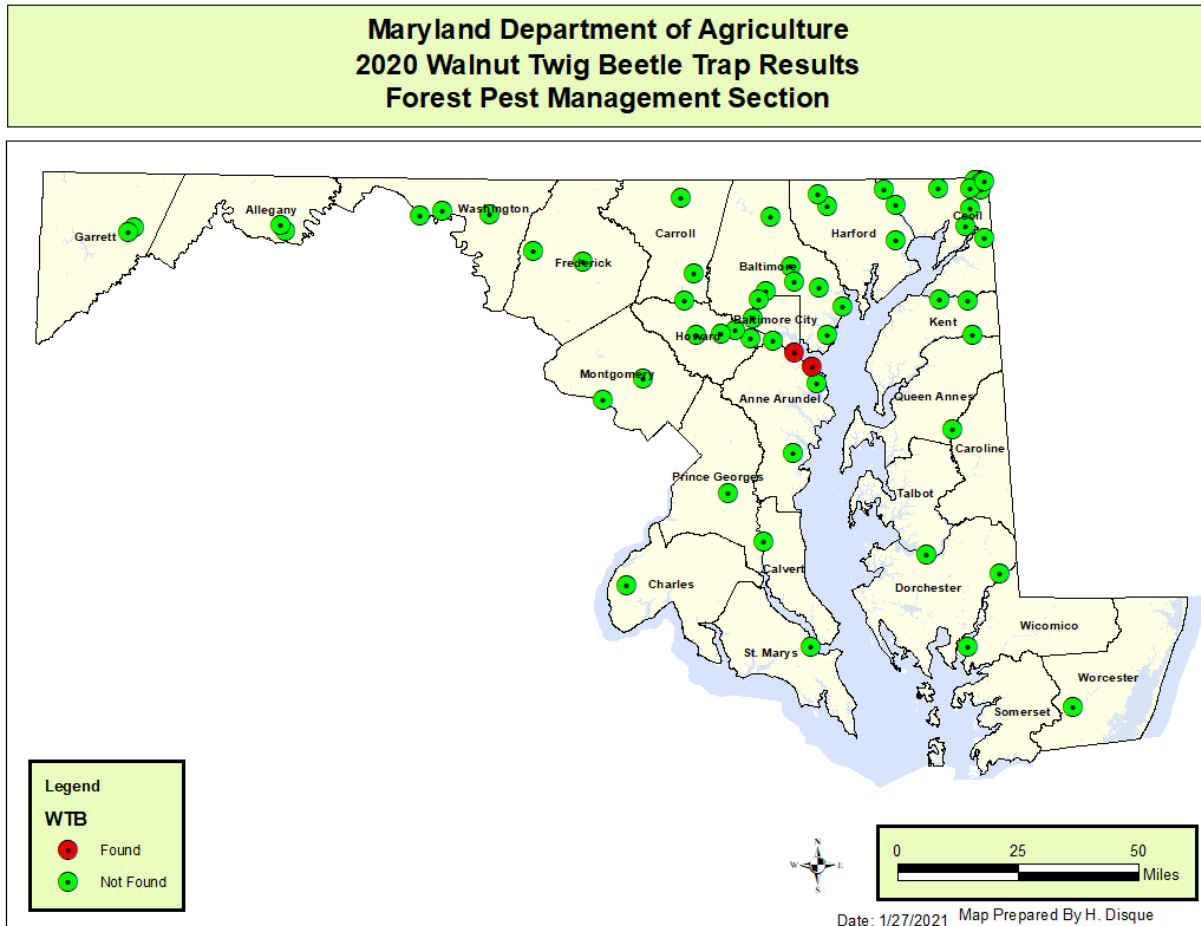
### Thousand Canker Disease of Black Walnut and Walnut Twig Beetle.

Thousand Canker Disease was first recognized in 2008 as a complex consisting of the walnut twig beetle *Pityophthorus juglandis* and the fungus *Geosmithia morbida*, and is blamed for widespread mortality of eastern black walnut planted in the western United States. It has since spread east and was first reported in the natural range of the eastern black walnut in 2010 when it was discovered in Tennessee. Since then, it has been found in seven eastern states (TN, IN, OH, PA, VA, NC, & MD). In 2011, Maryland along with several other mid-Atlantic states started surveying for this disease. The walnut twig beetle was first detected in Maryland in 2013 and by October 2014 thousand cankers disease was confirmed. A quarantine order for northeastern Cecil County was issued by the Maryland Department of Agriculture in January 2015 to limit the spread of Thousand Canker Disease of Black Walnut. Upon new positive detections in 2018, the quarantine order was updated to include all of Baltimore City and part of Baltimore County. This new quarantine was signed on May 1, 2019 by Maryland's Secretary of Agriculture.

In 2020, Forest Pest Management staff set 60 Lindgren funnel traps baited with the walnut twig beetle lure across 20 counties and in Baltimore City. Of these traps, 26 were set near previously positive sites in Cecil and Baltimore counties and Baltimore City to delimit the infested areas.

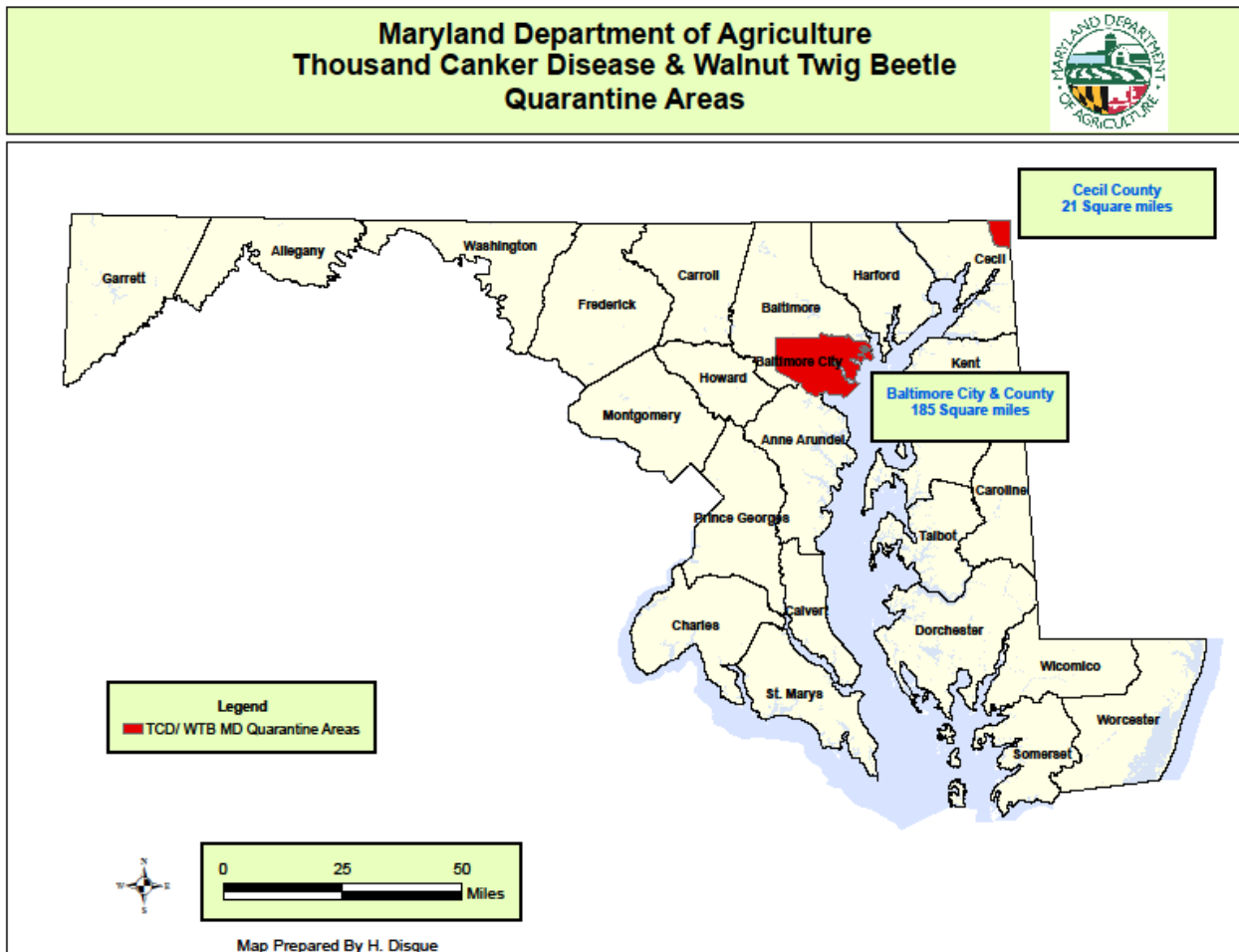
Traps were checked every two weeks, field samples were collected, samples were sorted and labeled in office, and then samples were sent to the Pennsylvania Department of Agriculture for identification. The previously positive site, trap CE01, was not positive in 2020. Trees at the original positive site have shown no evidence of decline. One trap in Anne Arundel County and one trap in Baltimore City were found to be positive. The Anne Arundel County find was the first record for the County. The trees are being monitored for decline and samples will be taken when TCD symptoms develop.

### MDA 2020 WALNUT TWIG BEETLE TRAP RESULTS





## MDA THOUSAND CANKER DISEASE & WTB QUARANTINE AREAS



### Hemlock Woolly Adelgid Suppression

The Hemlock Woolly Adelgid (HWA) remains the major threat to the health of eastern hemlock. Infested hemlocks occur in the metropolitan area between Baltimore and Washington and in natural stands from Cecil to Garrett counties. In 2003 to 2004, a joint task force comprised of the FPM and Maryland Department of Natural Resources (DNR) experts addressed the multi-disciplinary needs of the HWA infestation. The task force prioritized more than 50 hemlock stands and selected them as the sites for joint suppression efforts (chemical and/or biocontrol). Only publicly owned or public use sites would be part of this suppression project. Currently, the chemical option involves treating the hemlock trees with the insecticide imidacloprid by one of two methods – trunk injection or soil injection. The biocontrol option involves releasing HWA predators into the hemlock stands in an effort to reduce HWA populations.

A total of 6,692 hemlock trees and 75,415” DBH were treated in Maryland between July 1, 2020 and June 30, 2021. Of this total, 995 trees or 9,497” DBH were trunk injected and 5,696 trees or 65,897” DBH were soil injected. CoreTect was used to treat 1 trees totaling 21” DBH. Treatment efforts in 2020 were severely affected by the COVID-19 pandemic.

**MDA YEARLY IMIDACLOPRID TREATMENTS FOR HEMLOCK WOOLLY ADELGID CONTROL IN MARYLAND**

Maryland Department of Agriculture								
Forest Pest Management								
Yearly Imidacloprid Treatments for Hemlock Woolly Adelgid Control In Maryland 2004 - 2020								
	Trunk Injection	Trunk Injection	Soil Injection	Soil Injection	CoreTect	CoreTect	Total	Total
Year	#Trees	Inches DBH*	# Trees	Inches DBH	# Trees	Inches DBH	#Trees	Inches DBH
2004	166	2,687	0	0	0	0	166	2,687
2005	106	1,433	1,675	17,623	0	0	1,781	19,056
2006	38	476	1,015	9,465	0	0	1,053	9,941
2007	22	325	324	4,279	0	0	346	4,604
2008	129	1,982	18	257	0	0	147	2,239
2009	124	1,281	675	6,029	0	0	799	7,310
2010	724	8,534	3,673	33,701	98	862	4,495	43,096
2011	1,905	19,468	7,285	81,684	80	610	9,270	101,761
2012	1,957	20,206	10,086	105,395	4	45	12,047	125,645
2013	1,980	18,993	11,755	117,604	7	47	13,742	136,644
2014	1,844	19,047	6,915	75,751	644	7,853	9,403	102,651
2015	1,474	14,378	8,072	94,099	4	32	9,550	108,509
2016	1,822	19,791	8008	85,813	64	577	9,894	106,181
2017	1,435	15,610	8,511	93,997	234	252	10,180	109,859
2018	1,433	14,647	8,667	93,623	220	557	10,320	108,827
2019	1,431	14,994	8,386	82,628	27	180	9,844	97,802
2020	686	7,298	2,970	39,558	5	37	3,661	46,893
<b>Total</b>	<b>17,276</b>	<b>181,150</b>	<b>88,035</b>	<b>941,506</b>	<b>1,387</b>	<b>11,052</b>	<b>106,698</b>	<b>1,133,705</b>

**Hemlock Woolly Adelgid Predator Releases**

Over 54,297 predators have been released in Maryland since 1999. In 2020, 1,020 *Laricobius nigrinus* were released at sites in Harford and Frederick counties and 512 *Laricobius osakensis* were released in Garrett County.



## MDA MARYLAND HEMLOCK WOOLLY ADELGID PREDATOR RELEASES 2003-2020

Maryland Department of Agriculture Forest Pest Management Maryland Hemlock Woolly Adelgid Predator Releases 2003 - 2020						
Hemlock Stand	County	<i>Laricobius nigrinus</i>	<i>Laricobius osakensis</i>	<i>Scymnus coniferarum</i>	<i>Scymnus sinuanodulus</i>	<i>Sasajiscymnus tsugae</i>
Rocky Gap State Park	Allegany	3476	0	105	0	5000
Prettyboy Reservoir	Baltimore	3682	0	0	0	0
Cunningham Falls State Park	Frederick	1320	0	0	0	0
Frederick City Watershed	Frederick	3383	0	0	945	0
Broad Creek Scout Camp	Harford	3120	0	0	0	15410
Rocks State Park	Harford	1924	0	0	0	0
Hagerstown Watershed	Washington	1409	0	0	0	0
Big Run (Savage River State Forest)	Garrett	1685	0	0	0	0
Big Run State Park	Garrett	325	0	0	0	0
Dry Run (Savage River State Forest)	Garrett	150	0	0	0	0
Frostburg Watershed	Garrett	300	0	0	0	0
Laurel Run (Potomac State Forest)	Garrett	1684	0	0	0	0
Lostland Run (Potomac State Forest)	Garrett	1857	500	0	0	0
Poplar Lick (Savage River State Forest)	Garrett	2799	2022	0	0	0
Elk Lick (Savage River State Forest)	Garrett	1691	500	0	0	0
Gunpowder Falls State Park	Baltimore	0	1010	0	0	0
<b>Total</b>		<b>28805</b>	<b>4032</b>	<b>105</b>	<b>945</b>	<b>20410</b>

### HWAS Efficacy Surveys

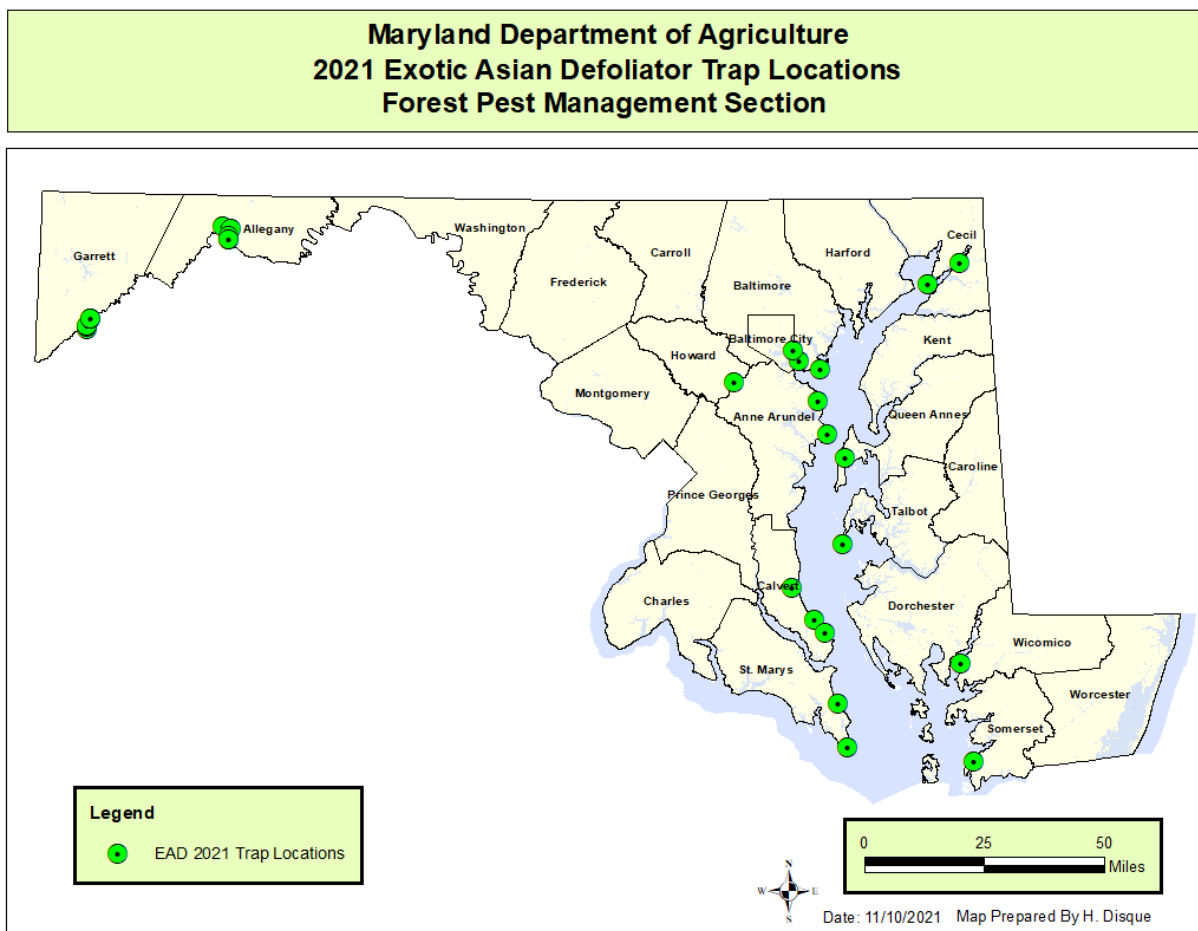
Treatment efficacy surveys have been conducted annually since 2006. Data analyzed through 2017 shows treated trees averaged a 79% reduction in HWA populations when measured 1-year post treatment and non-treated trees averaged a 24% increase in HWA populations when measured over the same period. . In 2019-2020, efficacy surveys were done at treatment sites in Baltimore, Frederick, Garrett, and Washington Counties.

### Exotic Asian Defoliator Survey

A comprehensive exotic Asian defoliator survey was proposed and funded through the Farm Bill for 2020. This survey increases the likelihood that this harmful invader can be detected early and that an appropriate eradication response can be mounted to protect Maryland's forest industry. One of the high-risk areas targeted is the Chesapeake Bay, as it is a major thoroughfare for ships coming into the Port of Baltimore. An increase in the size of ships and ship traffic coming to Baltimore has increased the risk of an accidental introduction of exotic Asian defoliators. Eight moths were chosen to survey based on their biological characteristics that enable them to become successful invaders, for their habitat preference, and prior intelligence that suggests an increased risk of introduction.

Forest Pest Management deployed traps at 19 locations statewide to determine the presence or absence of Asian defoliator moths. At each location six traps were set up to survey for the eight species of moths. Traps ran from May to September and were checked bi-weekly. Forests composed of oak, willow, sweet gum, poplar, beech, pine, and other host trees and shrubs were surveyed. Several Asian gypsy moth (*Lymantria dispar asiatica/japonica*) traps have been positive for gypsy moths. The European and Asian gypsy moths are difficult to morphologically separate, so the specimens were sent to the USDA's Otis laboratory for genetic testing and species determination. Final results are pending, however all of the samples that have been processed were determined to be European gypsy moth (*Lymantria dispar dispar*).

### MDA 2021 EXOTIC ASIAN DEFOLIATOR SURVEY LOCATIONS

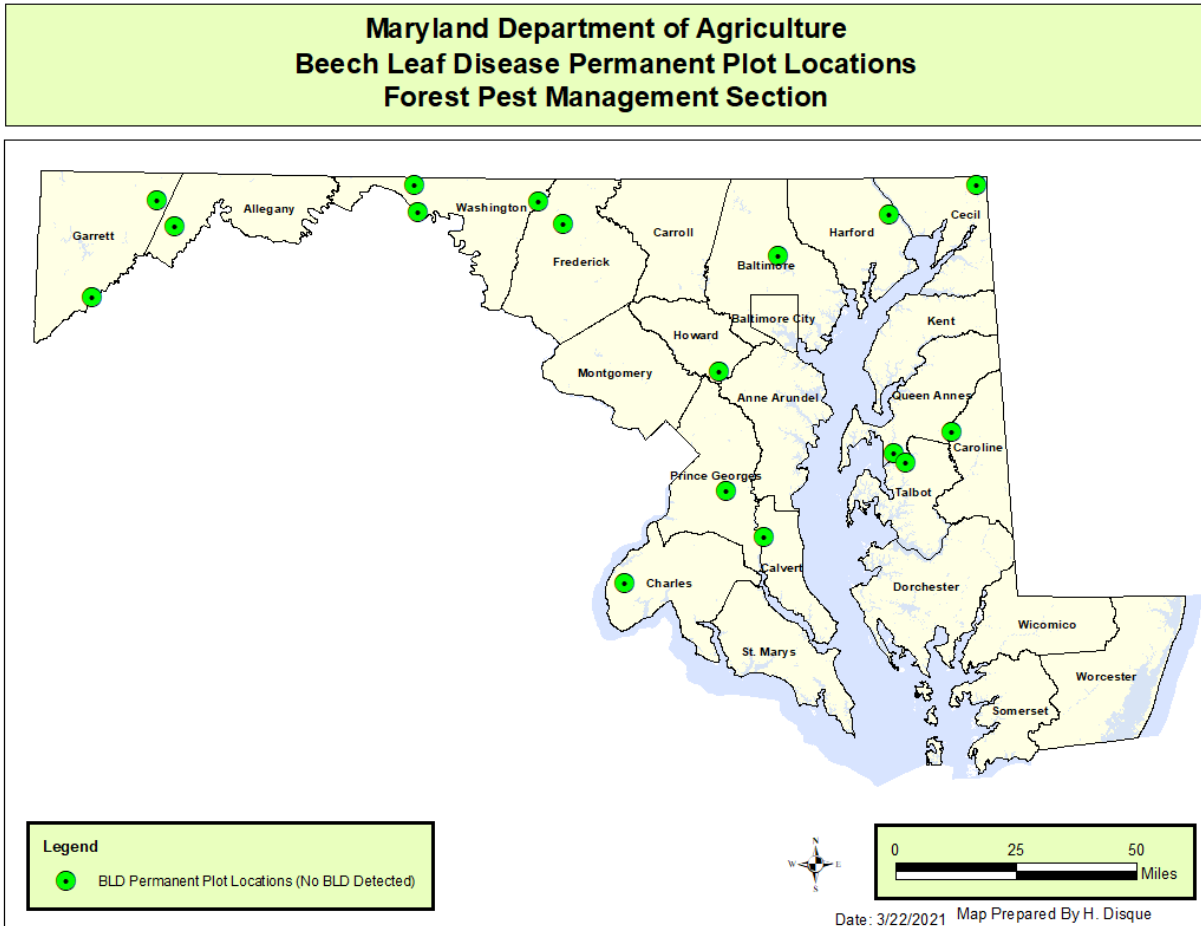


### Beech Leaf Disease (BLD)

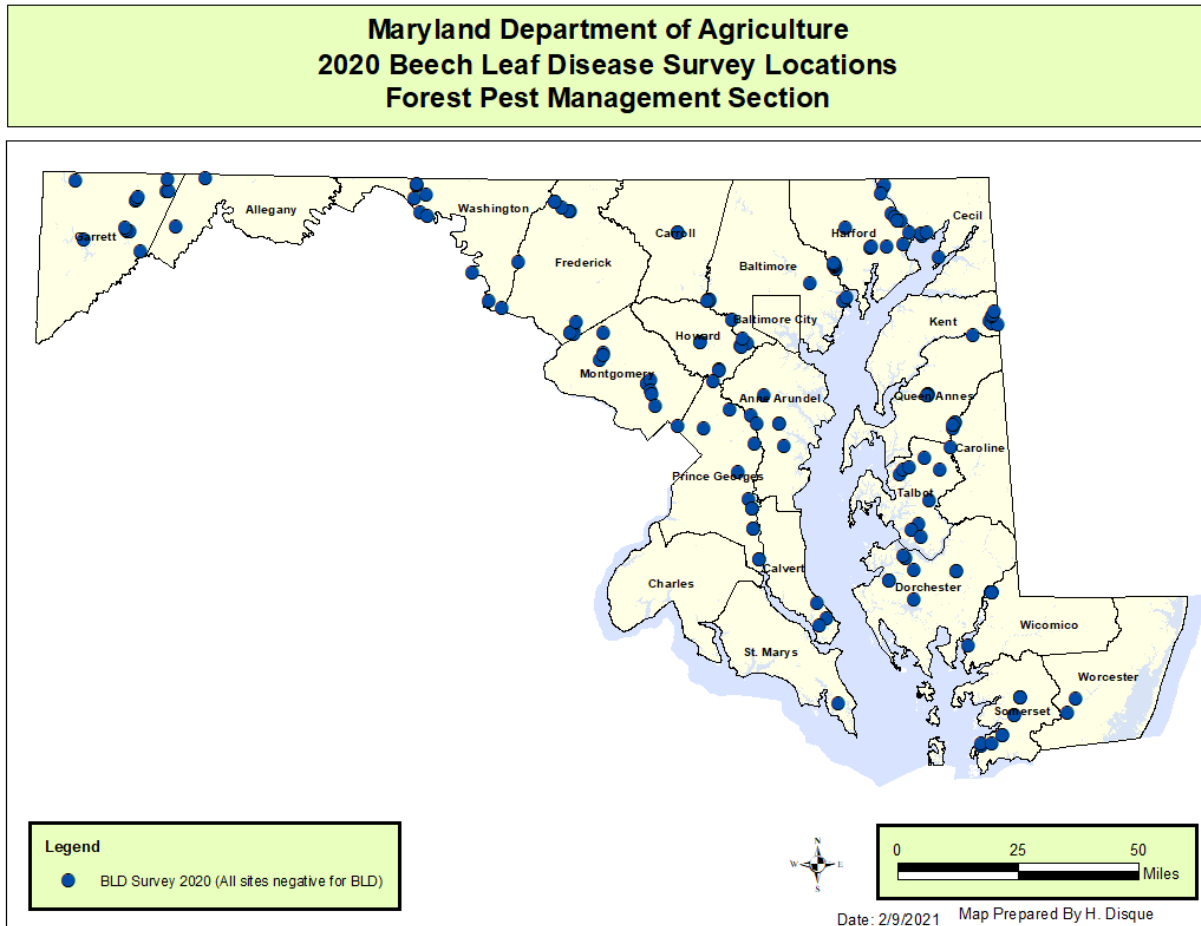
BLD was first discovered in declining American beech in Ohio in 2012. It has since been found in Pennsylvania, New Jersey, New York, Connecticut, West Virginia, Virginia, and southern Ontario, Canada. This disease which is linked to the nematode *Litylenchus crenatae mccannii* causes mortality of understory American beech saplings and seedlings, and severe decline in mature, overstory trees. FPM set up and monitored 17 permanent plot locations for BLD and

conducted over 160 site surveys. All sites have been negative for BLD. The majority (80) of the survey sites had trees in the 4-12 inch size class, with the 12-25 inch (48 surveys), the greater than 25 inch (23 surveys), and the under 4 inch (11 surveys) size classes following respectively.

### MDA 2020 BLD PERMANENT PLOT LOCATIONS



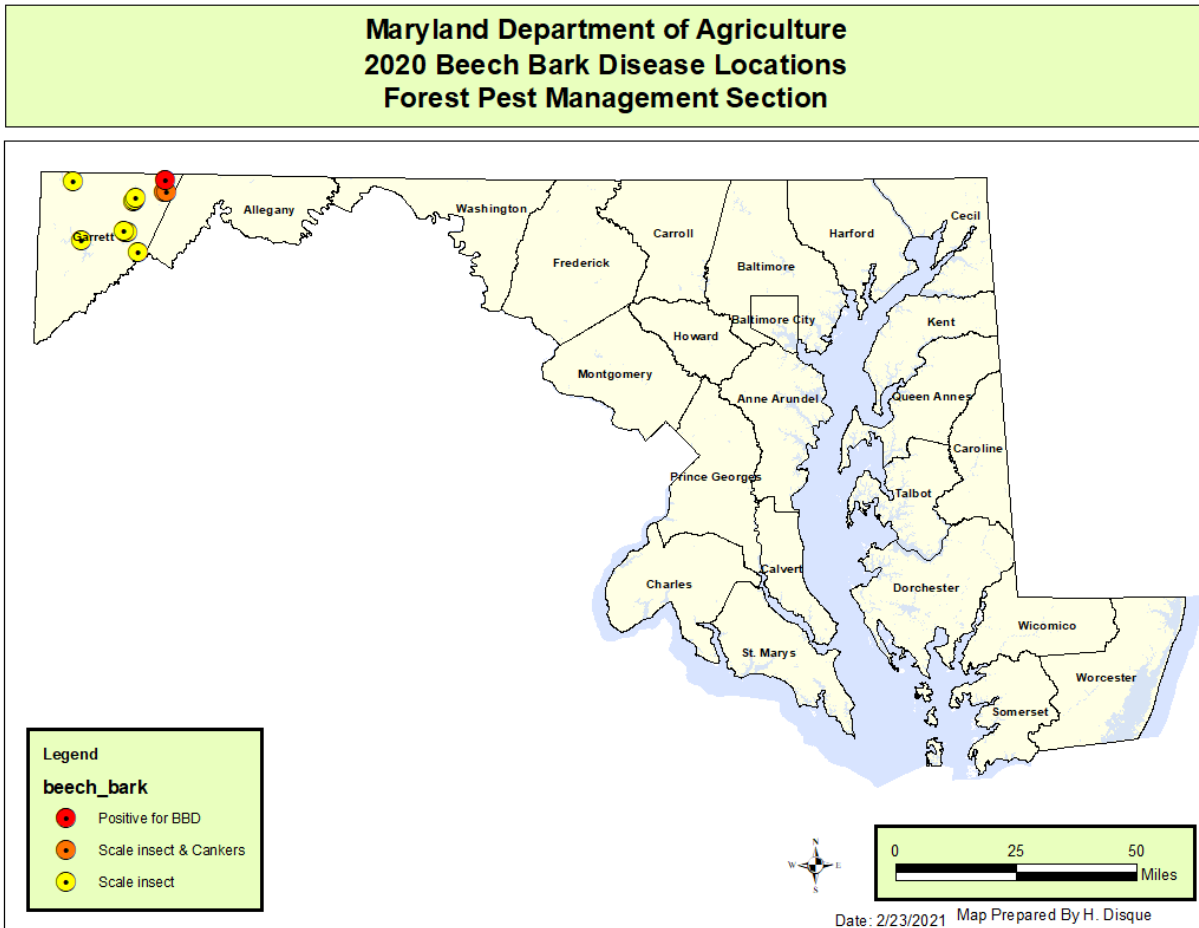
## MDA 2020 MDA BLD SURVEY LOCATIONS



### Beech Bark Disease

BBD has been found in approximately 160,000 acres in Allegany and Garrett counties. In 2013, four permanent BBD monitoring sites were established. Permanent plots were visited in 2020 for the detection of beech leaf disease. During beech leaf disease surveys, BBD was found in the Frostburg Watershed for the first time. Areas with confirmed BBD are highlighted on the map below.

## MDA POSITIVE BEECH BARK DISEASE (BBD) LOCATIONS



### Saltwater Intrusion

In July 2020, a saltwater intrusion delineation flight was flown across the Lower Eastern Shore. This flight mirrored the flights taken yearly since 2017 in order to determine the areas affected by saltwater intrusion and to map changes.

In total 50,365 acres of forest were found to be affected by saltwater intrusion. The affected acres were spread across the lower Eastern Shore. Dorchester, Somerset, Worcester, and Wicomico Counties were affected by saltwater intrusion. This is in contrast to 2019 when 10,174 acres were found to be affected by saltwater intrusion. The large majority of the mapped forests were either very severely or severely affected by saltwater intrusion.

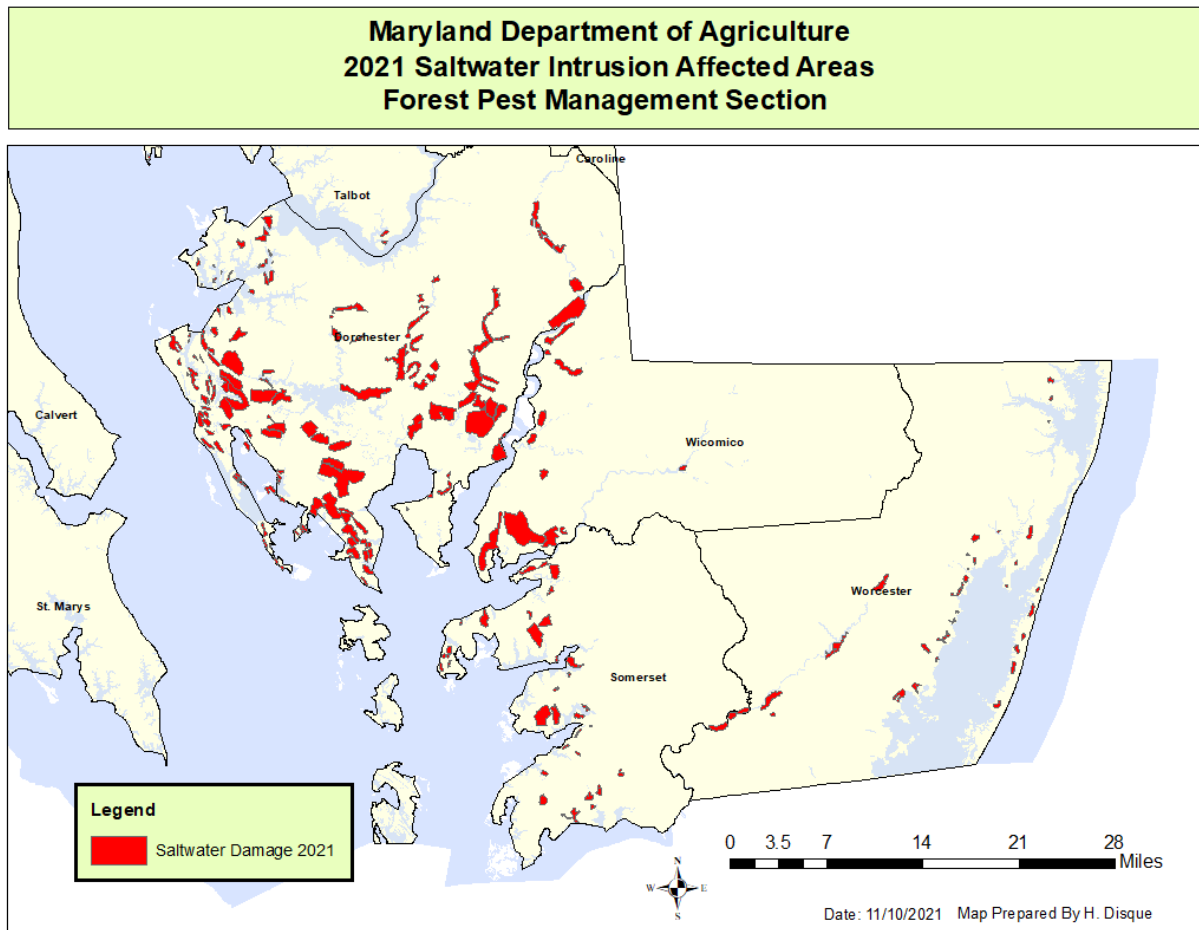
## MDA SALTWATER INTRUSION FLIGHT SUMMARY COUNTY

Maryland Department of Agriculture Forest Pest Management 2021 Saltwater Intrusion Flight Summary	
County	Acres
Dorchester	60,575
Somerset	8,249
Wicomico	9,799
Worcester	5,758
<b>TOTAL</b>	<b>84,381</b>

## MDA SALTWATER INTRUSION SEVERITY

Maryland Department of Agriculture Forest Pest Management 2021 Saltwater Intrusion Severity	
Percentage of Forest Affected	Acres
Very Light (1-3%)	647
Light (4-10%)	2,853
Moderate (11-29%)	13,386
Severe (30-50%)	24,764
Very Severe (>50%)	42,731
<b>TOTAL</b>	<b>84,381</b>

## MDA 2020 SALTWATER INTRUSION



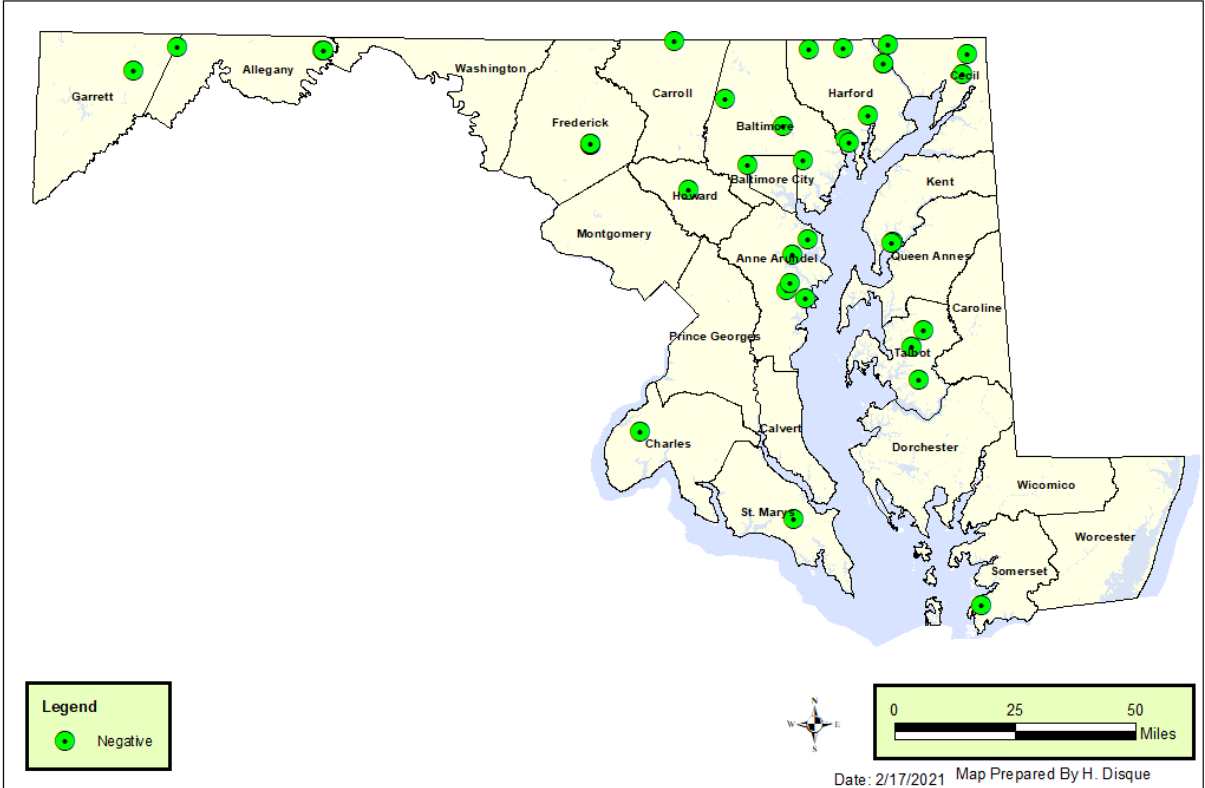
### Oak Issues

In Maryland there are significant numbers of mature oak trees in decline and dying. Secondary pests are present, but likely not the cause of mortality. An oak wilt survey has begun and samples are being processed at the University of Maryland Plant Diagnostic Laboratory. Over 89 sites were visited in the summer of 2020, and samples were collected at 33 sites. Samples were taken from leaves, branches, bole, roots, and the soil as available and transported to the UM PDL for testing.

The UM PDL tested for Oak Wilt, and several other fungal and bacterial tree pathogens. Lab results found no positive sites for Oak Wilt, *Bretziella fagacearu*. The results did indicate several other pathogens were found including *Phytophthora cinnamomi*, *Phytophthora cactorum*, *Diplodia corticola*, *Xylella fastidiosa*, and *Botryosphaeria dothidea* among others.

# MDA 2020 OAK WILT DECLINE SURVEY RESULTS – OAK WILT

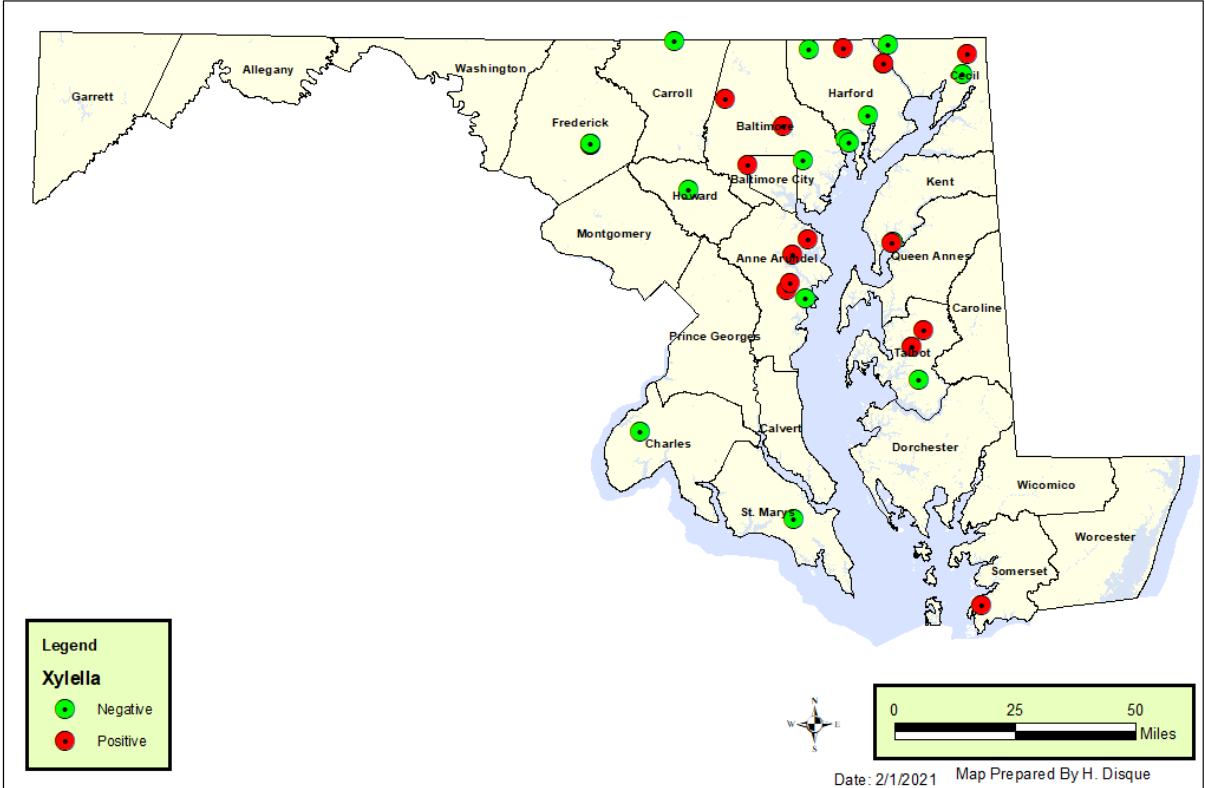
## Maryland Department of Agriculture 2020 Oak Decline Survey Results- Oak Wilt Forest Pest Management Section





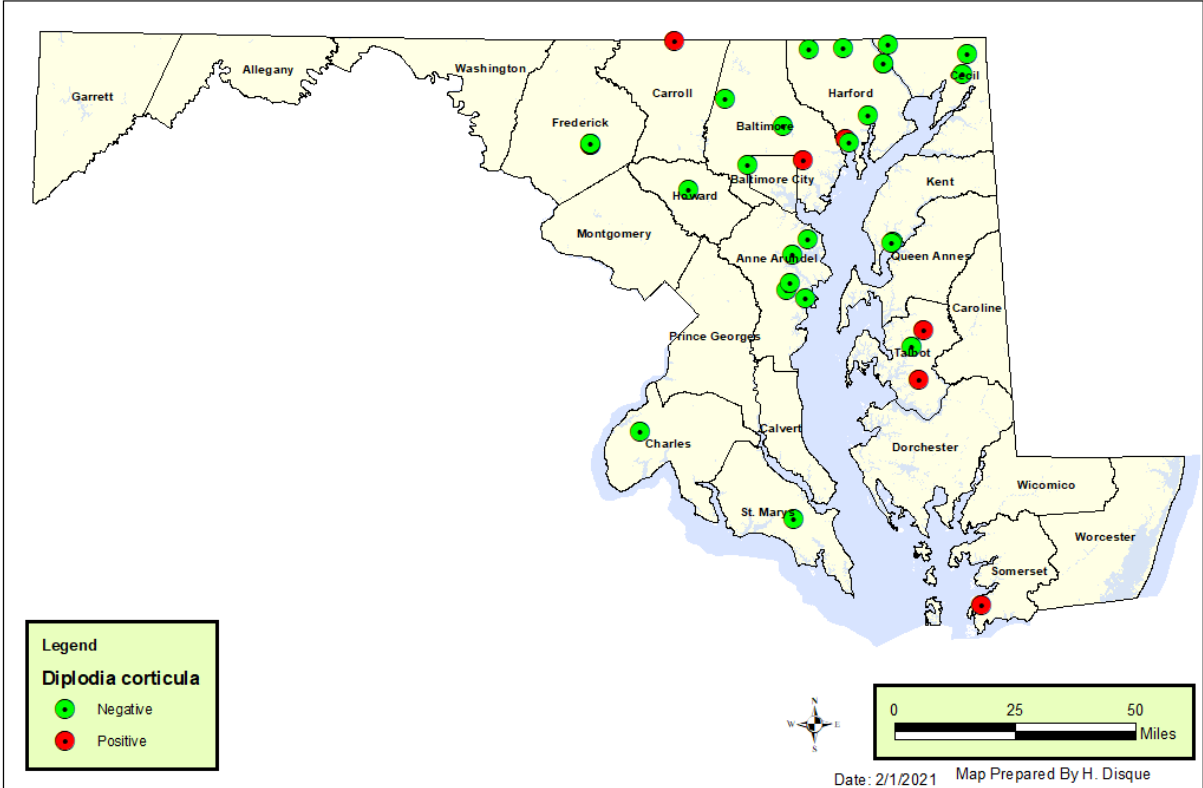
# MDA 2020 OAK WILT DECLINE SURVEY RESULTS – XYLELLA

## Maryland Department of Agriculture 2020 Oak Decline Survey Results- Xylella Forest Pest Management Section

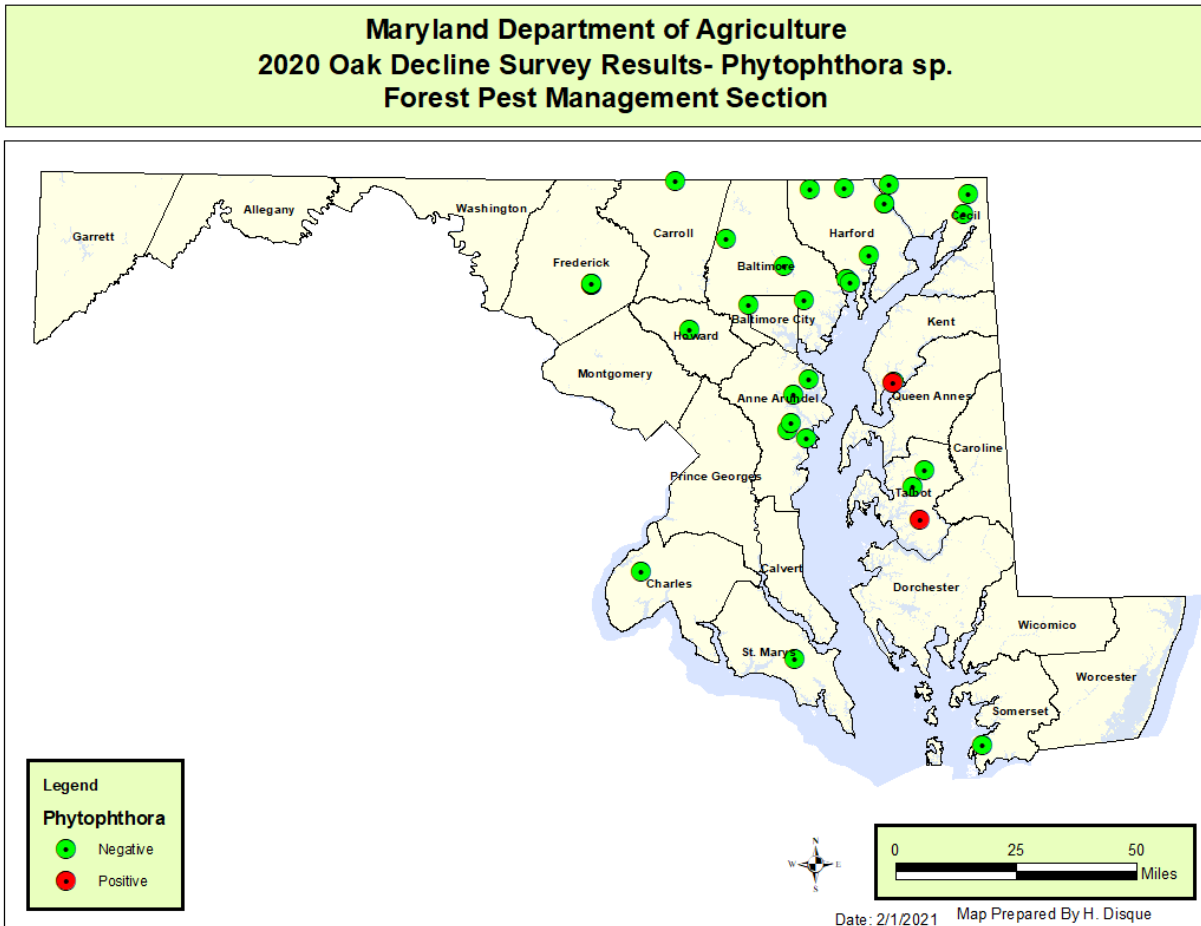


# MDA 2020 OAK WILT DECLINE SURVEY RESULTS – DIPLODIA CORTICULA

## Maryland Department of Agriculture 2020 Oak Decline Survey Results- *Diplodia corticula* Forest Pest Management Section



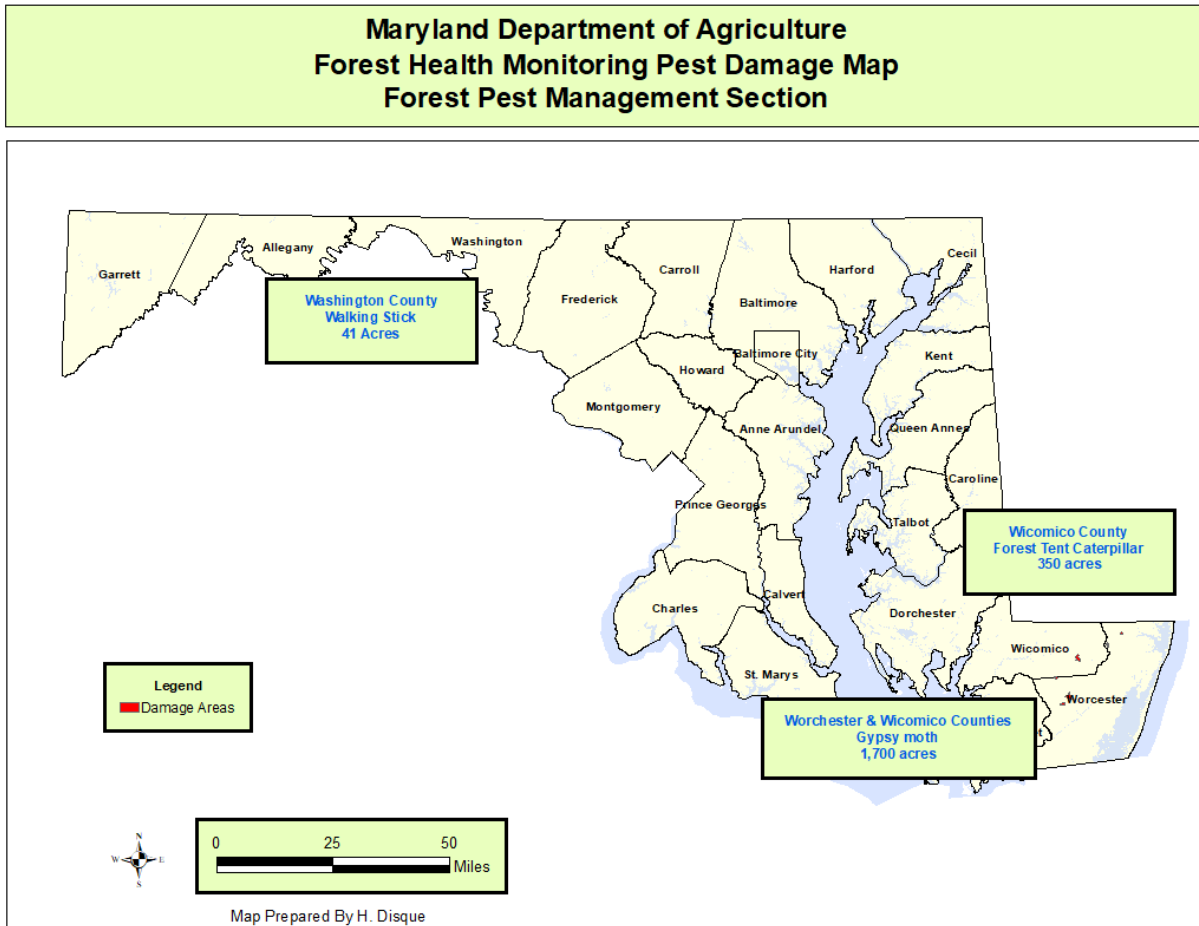
# MDA 2020 OAK WILT DECLINE SURVEY RESULTS – PHYTOPHTHORA



## FOREST HEALTH MONITORING- PEST DAMAGE

Defoliation areas were mapped during an aerial flight, a drone flight, and a ground survey.

## MDA FOREST HEALTH MONITORING PEST DAMAGE MAP

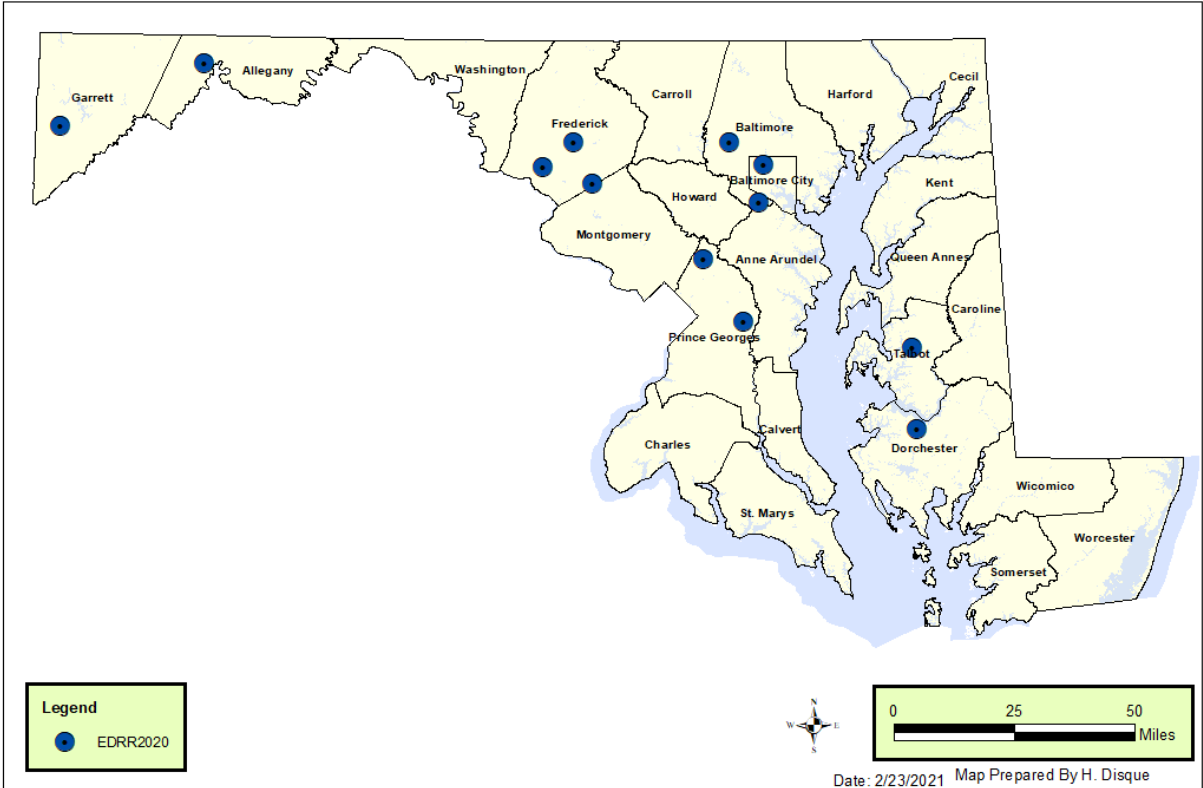


### Additional Forest Pest Surveys

Four additional surveys were conducted by FPM. These include a survey for Redbay Ambrosia Beetle, a survey for unknown exotic bark beetles also known as Early Detection Rapid Response (EDRR), an oak pest commodity survey, and a survey for *Phytophthora ramorum* using a stream bait technique. None of these pests or disease were found in the state in 2020.

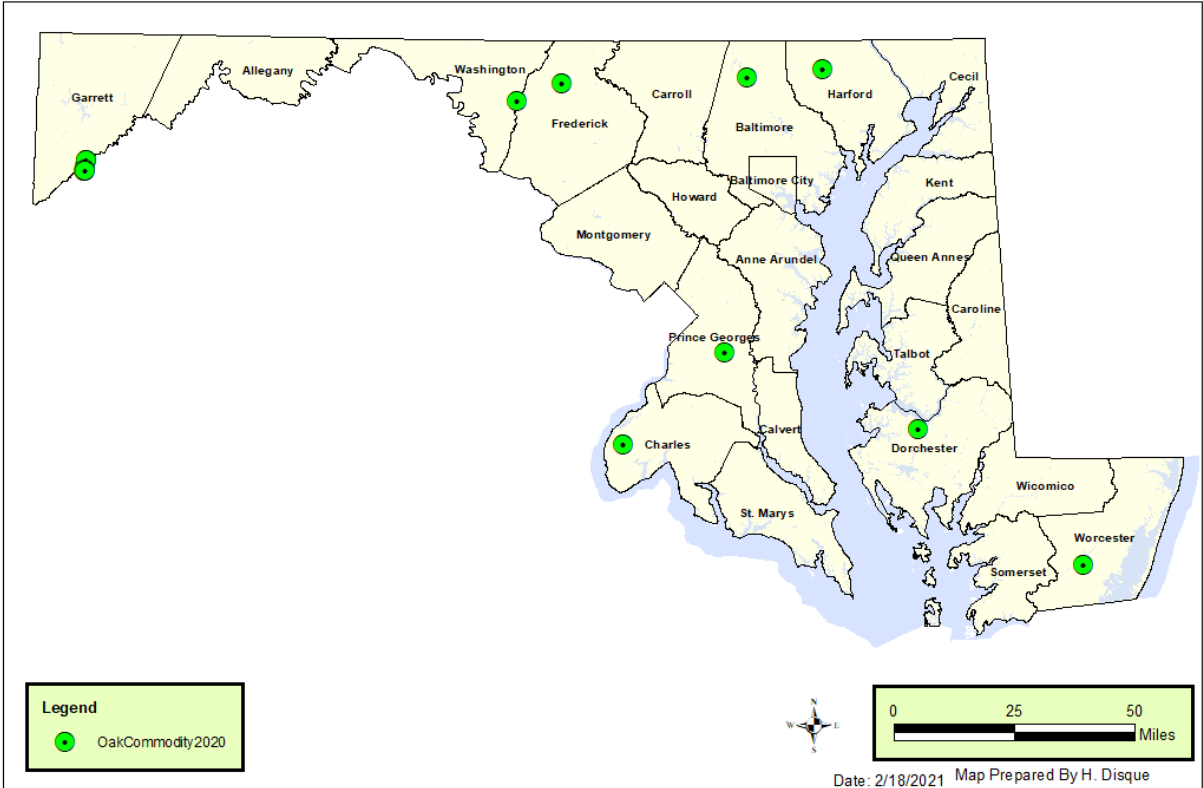
# MDA EDRR SURVEY MAP

## Maryland Department of Agriculture 2020 EDRR Trap Locations Forest Pest Management Section



# MDA OAK COMMODITY SURVEY MAP

## Maryland Department of Agriculture 2020 Oak Commodity Survey Sites Forest Pest Management Section



# MDA P. RAMORUM SURVEY LOCATIONS MAP

## Maryland Department of Agriculture 2020 *Phytophthora ramorum* Stream Bait Survey Forest Pest Management Section

