

Mosquito Larvae Monitoring and Control – Madison Metro Area

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Summary

The primary purpose of the mosquito monitoring and control activities of Public Health Madison and Dane County (PHMDC) is to understand and minimize the risk of West Nile Virus (WNV) infection in humans. In 2011, we saw the percentage of sites producing high number of *Culex spp.* decrease in comparison to prior years. Important program findings include:

- ❏ WNV vectors are present in the metropolitan area and create a potential WNV infection risk for humans in the area.
- ❏ Over 4% of the water sources monitored for mosquito larvae produced high numbers of *Culex* larvae.
- ❏ Thirty-eight (19.2%) inspected sites produced high numbers of *Culex spp.* larvae in four or more of the past seven years.
- ❏ Ditches accounted for nearly 77% of sites that produced high numbers of *Culex* larvae. The remaining 23% of the problem sites were retention/ detention ponds or rain gardens. Two rain gardens continue produced high numbers of *Culex* larvae.
- ❏ Larvicide treatment successfully reduced high numbers of *Culex* larvae in all treated sites. More work is needed to identify more permanent source reduction measures for areas that continually produce high numbers of mosquito larvae.
- ❏ Water sources on private property, especially small containers, likely exist and provide suitable breeding habitat for mosquitoes that may carry WNV. The identification and elimination of these sites continues to be an important component in the effort of minimizing WNV infection risks.

Introduction

In 2011, PHMDC continued its partnership with the City of Middleton, City of Monona, City of Sun Prairie, Town of Madison, Village of Maple Bluff, Village of Shorewood Hills, and University of Wisconsin to monitor and control the breeding activity of targeted mosquito species on public property. The primary targeted mosquito species of this annual surveillance is the *Culex* mosquito species due to its identification as the principal vector for human transmission of WNV and has accounted for the vast majority of WNV infected mosquitoes captured throughout the country. If present, other potential mosquito species that are potential vectors for WNV are also monitored; in Dane County, this primarily includes the *Aedes* mosquito species. Mosquito larvae sampling was performed by PHMDC staff from late May through the end of September to locate water sources producing large numbers of mosquito larvae. Larvicide applications were made as needed in water sources found to produce high levels of target mosquito larvae.

This report summarizes the results of mosquito monitoring and treatment in the metropolitan area. Maps of sampled areas and site-specific mosquito larvae surveillance results are provided

in the results and discussion section of the current report. Some water sources in the metropolitan area were not monitored or treated because they were inaccessible to PHMDC staff. Accessibility is determined based on several factors including land ownership, safety, and physical barriers.

Methods

At each surface water source, PHMDC staff sampled for mosquito larvae along the water's edge by quickly skimming the surface of the water with a dipper (plastic cup on a pole). Samples at each location consisted of a composite of one to ten dips. The number of dips depended on the size of the water source and the number of larvae present. Larvae activity for each sample was measured as the number of larvae per dip. When three or more *Culex* larvae are found per dip, the site is treated with larvicide or other action is taken to reduce the number of mosquito larvae. Most mosquito monitoring is performed at surface water sources. On occasion, catch basins are sampled when there is additional concern in a given area. The table below lists the number of sites by community with high concentrations of *Culex* or *Aedes* larvae; all other sites tested reported either low concentrations of larvae or no larvae noted.

Table 1. Summary results of 2011 mosquito larvae inspections of accessible sources in the Madison metropolitan area.

	City of Madison	Village of Maple Bluff	City of Middleton	City of Monona	City of Sun Prairie	Town of Madison	UW Madison	Total Metro Area
High <i>Culex</i>	22	0	2	1	0	0	1	26
High <i>Aedes</i>	3	0	2	0	3	0	1	9
# of inspected sites	339	2	67	20	101	14	29	572
% High <i>Culex</i>	6.5%	0.0%	3.0%	5.0%	0.0%	0.0%	3.4%	4.5%
% High <i>Aedes</i>	0.9%	0.0%	3.0%	0.0%	3.0%	0.0%	3.4%	1.6%

Results and Discussion

Mosquito larvae in surface water

During the summer of 2011, department staff made 1,551 inspections of 572 sites in order to evaluate and treat, as necessary, *Culex* and *Aedes* populations at selected sites in the metro area. The bulk of these inspections were conducted at ditches (247 sites, 43.2%) and detention/retention ponds (253 sites, 44.2 %); however, other sites evaluated included, but not limited to, creeks, marshes, rivers, and rain gardens. In the metro area, 4.5% of all inspected sites produced high numbers of *Culex* larvae at least once during the season (Table 1); 1.6% of the sites produced high numbers of *Aedes* larvae. No other mosquito species was found in high numbers.

At the community level, the City of Madison reported the largest percentage of sites with high numbers of *Culex* larvae (6.5%); high concentrations were also reported at sites in the Cities of Monona (5.0%) and Middleton (3.0%) and the UW campus (3.4%). The City of Sun Prairie reported the largest percentage of sites with high concentrations of *Aedes* larvae (3.0%) but high concentrations were also reported in the Cities of Madison (0.9%) and Middleton (3.0%) and the UW campus (3.4%).

Table 2 provides the result of monitoring at sites that produced high numbers of *Culex* or *Aedes* larvae; all other inspected sites produced either no larvae or low larvae. Figures 1 – 9 (at the end of the report¹) identify the locations of the water sources that produced high numbers of *Culex* larvae.

Table 2. Sites in the Madison Metropolitan Area that produced high numbers of *Culex* and *Aedes* larvae in 2011

Site Group Name	Total for site			High <i>Culex</i> in Site		High <i>Aedes</i> in site	
	# sites	# Inspections	# Acres*	# sites	# Acres	# sites	# Acres
City of Madison							
1 Barton Road Rain Garden	1	3	0.03	1	0.03		
2 Cherokee Greenway	2	19	1.5	2	1.5		
3 Cottage Grove Amnicon Ditch	1	7	0.2	1	0.2		
4 East Badger Mill Creek Greenway	14	65	7.8	2	1.0		
5 Edna Taylor Park	7	15	12.6			1	0.3
6 Elver Park Greenway	13	39	17.3	2	1.5		
7 Kottke Drive Detention Area	1	14	0.2	1	0.2		
8 Mendota – Pheasant Branch Greenway	26	111	21.5	2	1.3		
9 Mendota Gammon Greenway	3	18	0.7	1	-		
10 Mendota – Pheasant Branch Greenway	1	3	0.3	1	-		
11 Milwaukee Street Greenway	9	36	6.8	1	0.3	1	0.3
12 Nob Hill Ponds	7	11	14.3	1	0.1		
13 North Penito Creek Greenway	5	12	9.7	1	2.2		
14 Starkweather – Olbrich Greenway	10	25	11.3	1	4.8		
15 Stricker's Pond	1	12	4	1	4		
16 Sycamore Avenue Detention Pond	1	10	0.5	1	0.5		
17 Warner Park Lagoon	10	41	33.7	1	0.1	1	0.2
18 West Badger Mill Creek Greenway	12	35	6.4	1	0.4		
19 Westchester Gardens Park	3	18	6.6	1	-		
City of Middleton							
20 Deming Way	7	18	6.1			1	1.2
21 Lakeview Community Park	4	12	3.2			1	-
22 Orchid Heights Park	13	65	4.7	1	-		
23 Stricker's Pond	5	24	24.5	1	4		
City of Monona							
24 Winnequah Park	4	12	4.2	1	-		
City of Sun Prairie							
25 Stonehaven Terrace	2	5	1.4			2	1.4

¹ This report is available on the Public Health for Madison and Dane County website at www.publichealthmdc.com. Figures 1–9 in the electronic version are provided in color, making it easier to identify and evaluate individual sites.

Table 2. Sites in the Madison Metropolitan Area that produced high numbers of *Culex* and *Aedes* larvae in 2011

Site Group Name	# sites	Total for site		High <i>Culex</i> in Site		High <i>Aedes</i> in site	
		# Inspections	# Acres*	# sites	# Acres	# sites	# Acres
26 Stoneridge Terrace	1	2	0.9			1	0.9
UW Madison							
27 University Bay Ditches	4	12	2	1	0.8	1	0.3

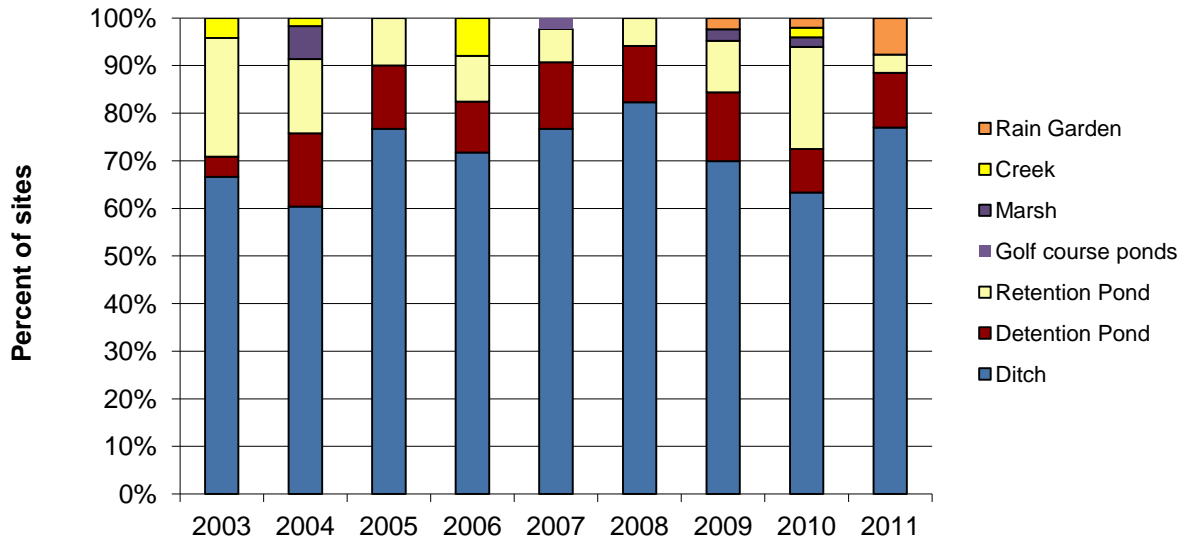
* Information marked with an “-“ indicates that acreage data was not available at the time of this report or the reported acreage is <0.1 acres .

Since 2003, a total of 198 sites have been found to produce high numbers of *Culex* larvae in at least one season. Thirty-eight (19.2%) of these sites have been found to produce *Culex* larvae repeatedly (four or more years) over the past nine years.

The types of water sources that produced high numbers of larvae are generally consistent from year to year (Fig 8). In 2011, ditches continue to be the most important source of mosquitoes with 76.9% of all high *Culex* producing sites being classified as ditches. Detention/ retention ponds (15.4%) and rain gardens (7.7%) account for the remaining sources of the high *Culex*. A similar pattern was observed with sites reporting high numbers of *Aedes*; approximately 56% were derived from ditches, 33% from retention ponds, and 11% from rain gardens.

Since 2003, other types of sites have been found to be capable of producing high numbers of *Culex* mosquitoes. In 2011, sites near marshes, creeks, and in rain gardens were found to produce high numbers of *Culex* mosquitoes. *Culex* mosquito production near marshes is hard to predict because varying water levels and weather patterns are capable of creating suitable habitat in a short period of time. Rain gardens, however, are designed to manage these factors and should not be sources of *Culex* mosquitoes if designed and maintained properly. Several large, natural water sources, like Mud Lake, Nine Springs Marsh, the Yahara River, Lakes Mendota and Monona, and others, are not assessed because they are unlikely to produce *Culex* mosquitoes. Assessment of these areas would likely change the results for the floodwater mosquito (*Aedes vexans*) and increase the number of mosquito species identified.

Figure 8. Types of water sources producing high numbers of *Culex* larvae, 2003 – 2011.



Larvicide Applications

During the 2011 mosquito season, a total of 31 treatments were performed at 23 sites. An additional 9 treatments were scheduled but cancelled due to weather or site conditions that prevented effective treatment or eliminated the need for treatment. All treatments were effective in reducing larvae numbers below the treatment threshold of 3 larvae per dip.

Figure 1. 2011 Mosquito larvae monitoring results - Middleton, WI

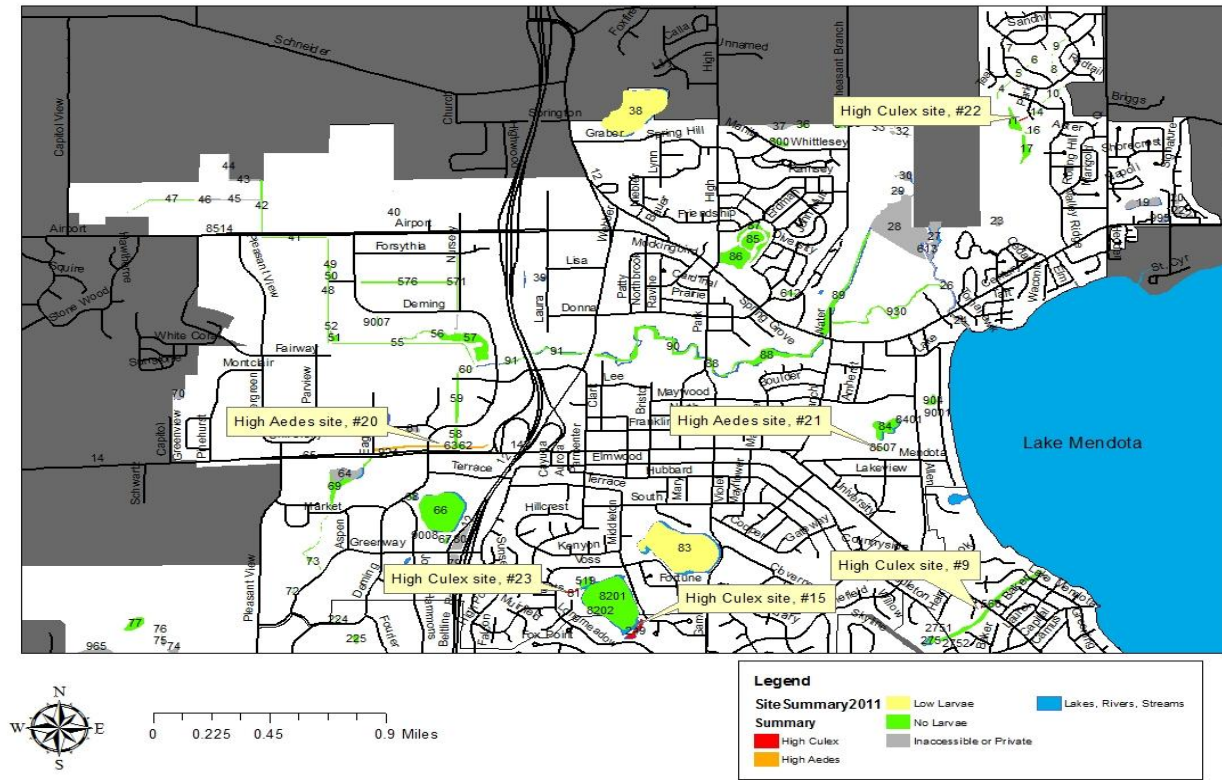


Figure 2. 2011 Mosquito larvae monitoring results - Madison, WI (northern west side)

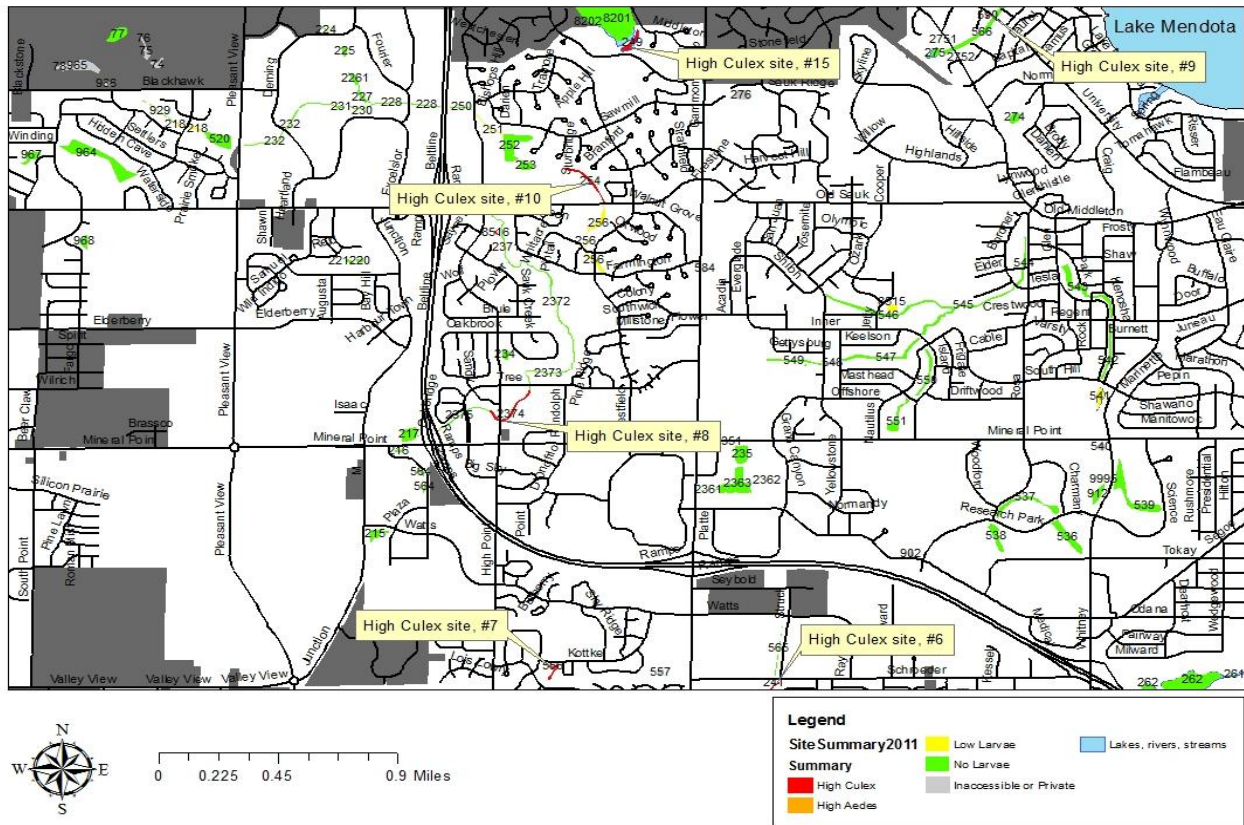


Figure 3. 2011 Mosquito larvae monitoring results - Madison, WI (southern west side)



Figure 4. 2011 Mosquito larvae monitoring results - Madison (near west side), Village of Shorewood Hills, and Town of Madison, WI.

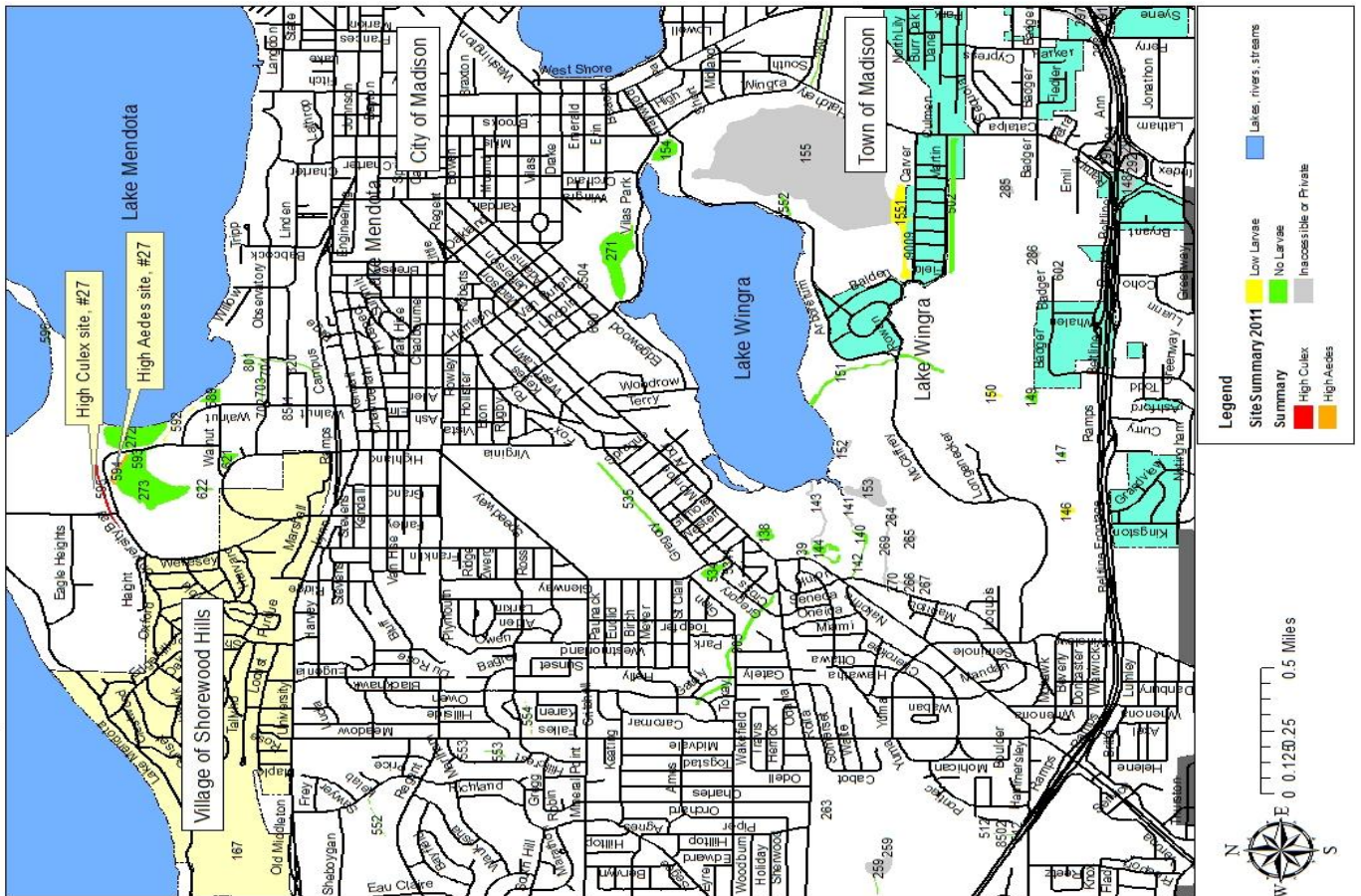


Figure 5. 2011 Mosquito larvae monitoring results - Madison (south side), City of Monona, and Town of Madison, WI.

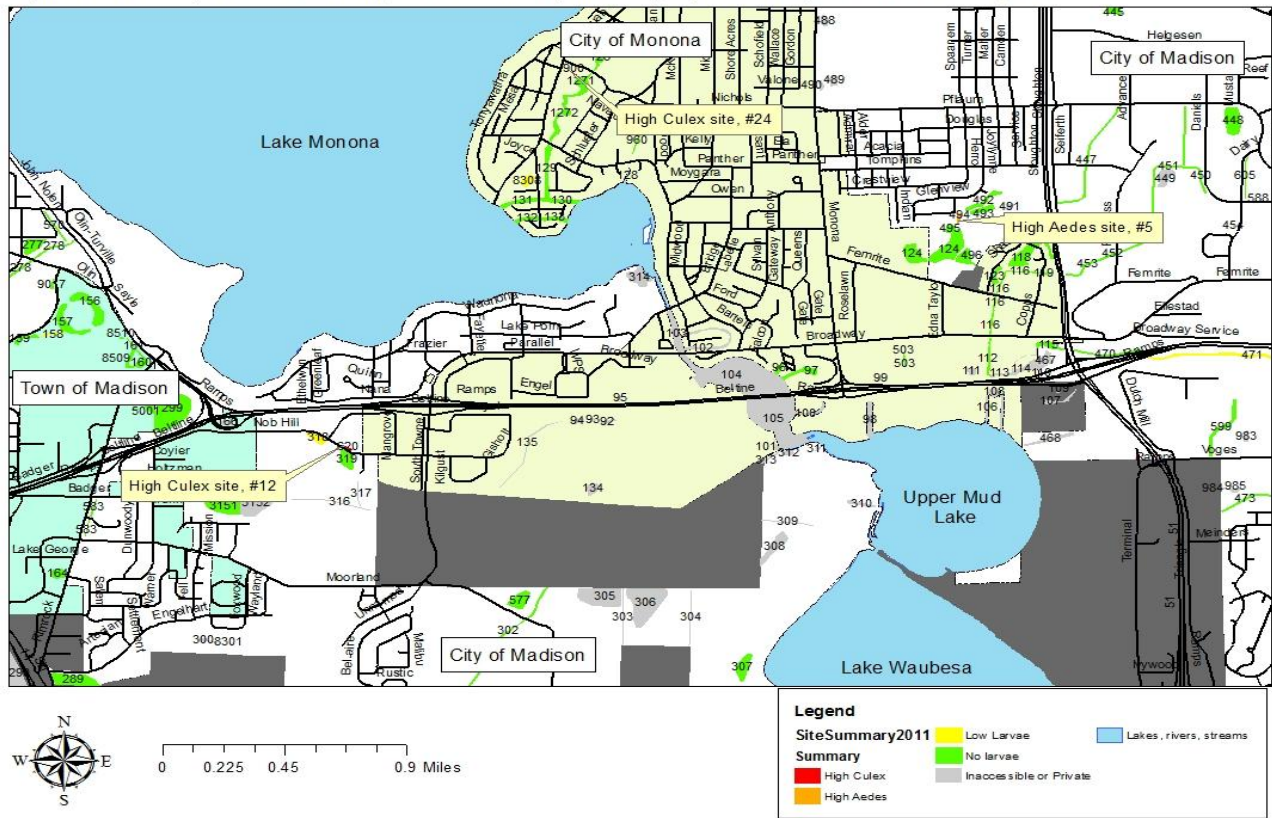


Figure 6. 2011 Mosquito larvae monitoring results - Madison (southeast) and City of Monona, WI.



Figure 7. 2011 Mosquito larvae monitoring results - Madison (north) and Village of Maple Bluff, WI.

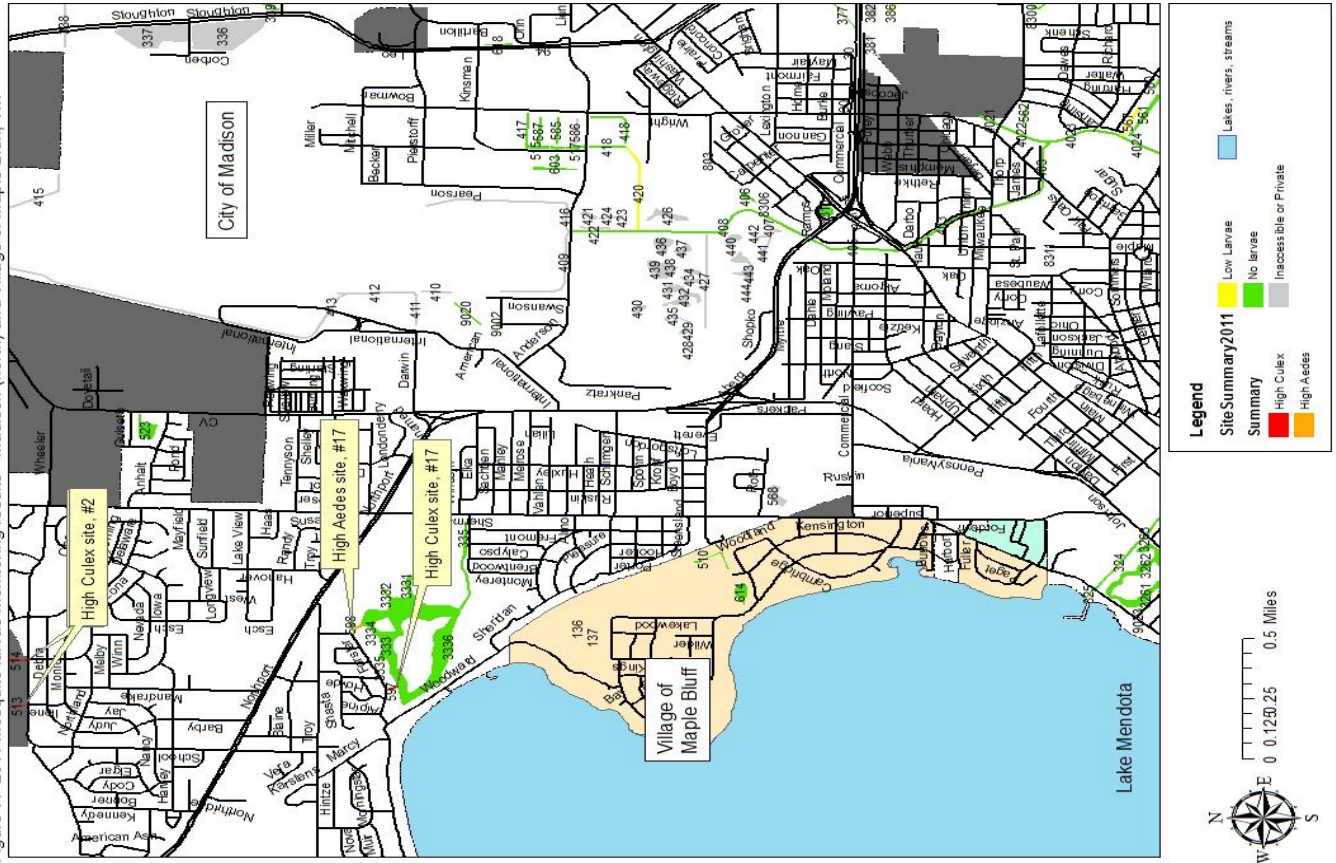


Figure 8. 2011 Mosquito larvae monitoring results - Madison (northeast), WI.

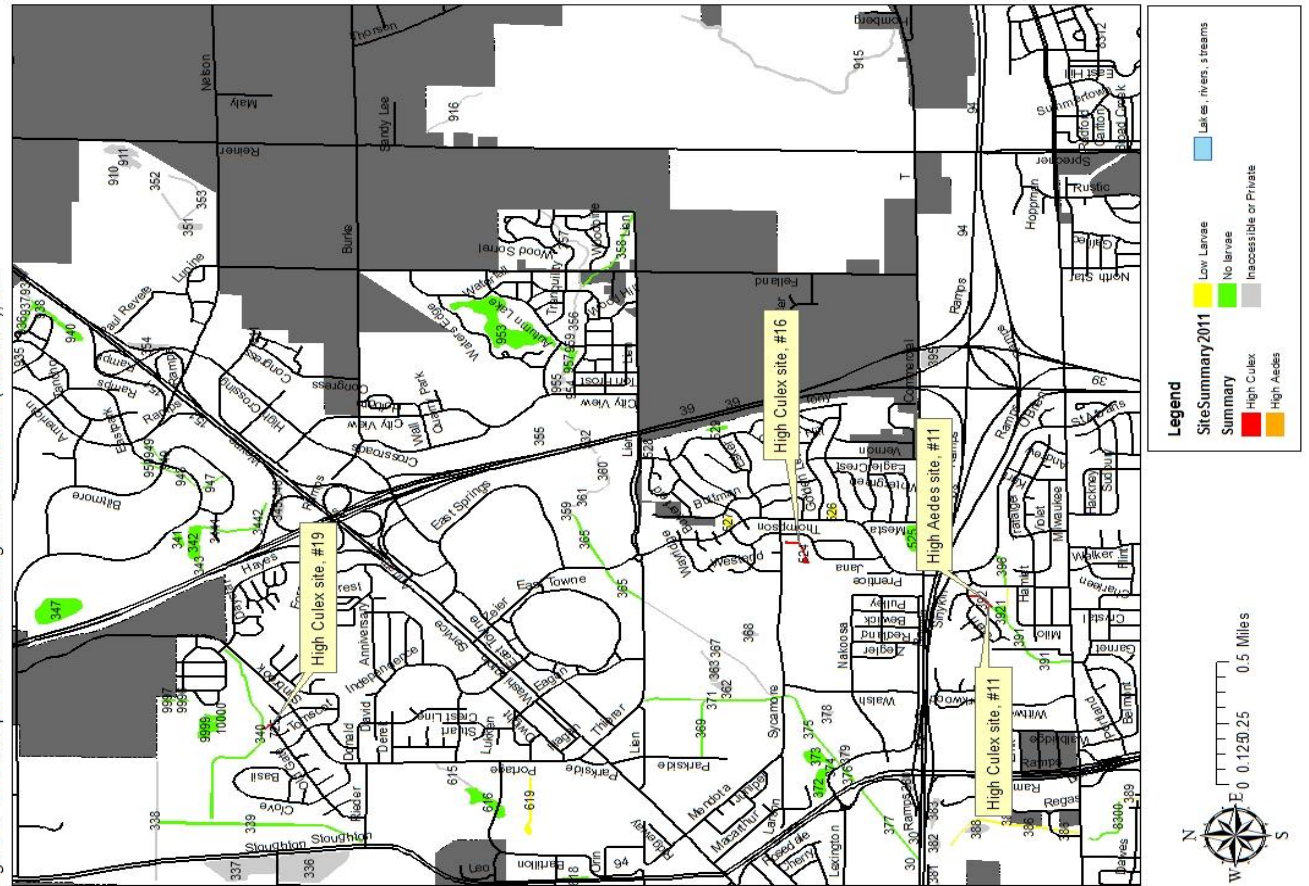


Figure 9 2011 Mosquito larvae monitoring results - City of Sun Prairie, WI.

