

Mosquito Larvae Monitoring and Control – Madison Metro Area

2 March 2011

Prepared by John Hausbeck, Environmental Health Services Supervisor

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 2010, we saw the percentage of sites producing high number of *Culex spp.* continue to increase. Important program findings include:

- ❏ WNV vectors are present in the metropolitan area and create a potential WNV infection risk for humans in the area.
- ❏ Just under 17% of the water sources monitored for mosquito larvae produced high numbers of *Culex* larvae.
- ❏ Forty-two (21%) sites produced high numbers of *Culex spp.* larvae in four or more of the past seven years.
- ❏ Ditches accounted for nearly 63% of sites that produced high numbers of *Culex* larvae. Another 30% of the problem sites were retention or detention ponds. Two rain gardens continue produced high numbers of *Culex* larvae.
- ❏ Larvicide treatment successfully reduced high numbers of *Culex* larvae for 1 to four weeks 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. Elimination of these sites will be important in the effort of minimizing WNV infection risks.

Introduction

In 2010, 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. Targeted mosquito species include those in the *Culex* group because they have accounted for 94% of the WNV infected mosquitoes captured throughout the country and are the most likely to spread infection. 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. The following maps provide locations of the sites sampled and results of mosquito larvae sampling at these sites. 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.

Public Health for Madison and Dane County staff and UW–Madison Medical Entomology students performed adult mosquito surveillance weekly through the mosquito season. Light/CO2 and gravid traps were set at eight locations around the Madison metropolitan area.

Table 1. Summary results of 2010 mosquito larvae inspections in the Madison metropolitan area.

	City of Madison	Village of Maple Bluff	City of Middleton	City of Monona	Village of Shorewood Hills	City of Sun Prairie	Town of Madison	UW Madison	Total Metro Area
High <i>Culex</i>	67	2	11	1	0	11	2	5	99
High <i>Aedes</i>	26		1	0	0	4	5	2	38
High Other	0	0	0	0	0	1	0	0	1
Low Larvae	131	2	33	1	0	52	5	16	238
No Larvae	130	0	21	18	1	38	2	5	215
Total	354	4	66	20	1	106	14	28	591
Accessible Sites									
% High <i>Culex</i>	18.9%	50.0%	16.7%	5.0%	0.0%	10.4%	14.3%	17.9%	16.8%
% High <i>Aedes</i>	7.3%	0.0%	1.5%	0.0%	0.0%	3.8%	35.7%	7.1%	6.4%

Results and Discussion

Mosquito larvae in surface water

During the summer of 2010, department staff made 2,075 inspections of 591 water sources in the metro area. These inspections were made at ditches (257 sites, 43%), ponds (259 sites, 44%), and other surface water sources (75 sites, 13%). Seventeen percent (17%) of the sites inspected produced high numbers of *Culex* larvae at least once during the season (Table 1). Another 6% of the sites produced high numbers of *Aedes* larvae but not *Culex*. The only other mosquito species found in high numbers was *Uranotaenia sapphirina*. It was found only

once in high numbers in a ditch in Sun Prairie. This species is not considered to be a vector for WNV. Table 2 provides the result of monitoring at sites that produced high numbers of *Culex* or *Aedes* 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 2010

Site Name	Total for site			High <i>Culex</i> in Site		High <i>Aedes</i> in site	
	# Sources	# Inspections	# Acres	# Sources	# Acres	# Sources	# Acres
City of Madison							
1 Atlas Ave Retention Pond	1	12	7.1	1	7.1	0	0
2 Atom Ct Rain Gardens	1	3	<0.1	1	<0.1	0	0
3 Badger Mill Creek Greenway	7	18	10.6	1	0.5	1	1.3
4 Barton Rd Rain Garden	1	3	<0.1	1	<0.1	0	0
5 Cherokee Country Club	1	3		1		0	0
6 Cherokee Greenway	2	18	1.5	2	1.5	0	0
7 Cottage Grove Amnicon Ditch	1	12	0.2	1	0.2	1	0.2
8 Dairy Dr	1	3	0.3	1	0.3	0	0
9 East Badger Mill Creek Greenway	14	56	7.8	8	4.5	3	2.4
10 East Starkweather – East Towne Greenway	22	41	20.1	3	3.8	0	0
11 Elver Park Greenway	13	51	17.3	6	6.3	3	3.5
12 Forest Hill Greenway	1	3	2.1	1	2.1	0	0
13 Glacier Greenway	5	15	1.9	1	0.8	1	0.4
14 Glen Oak Hills Greenway	3	11	5.6	2	4.7	0	0
15 High Point Ditches	1	3	3.6	1	3.6	0	0
16 International Lane	1	3	0.1	1	0.1	0	0
17 Kipp St Ponds	6	14	3.1	1	2.5	0	0
18 Kottke Dr Detention Area	1	10	0.2	1	0.2	0	0
19 Mendota – Pheasant Branch Greenway	26	105	21.5	5	2.4	1	0.5
20 Mendota Gammon Greenway	3	21	0.7	2	0.1	0	0
21 Merlham Dr Greenway	1	3	0.2	1	0.2	0	0
22 Milwaukee St Greenway	9	55	6.8	4	2	0	0
23 Nine Springs E-way	15	16	31.3	2	4.3	0	0
24 Nob Hill Ponds	8	42	16.7	2	1.1	0	0
25 North Penito Creek Greenway	5	24	9.7	1	2.2	2	2.6
26 Odana Golf Course	4	4	3.7	1	0.4	0	0
27 Old Sauk Trails	1	3	0.4	1	0.4	0	0
28 Pontiac Trail Ditch	2	14	<0.1	2	<0.1	0	0

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.

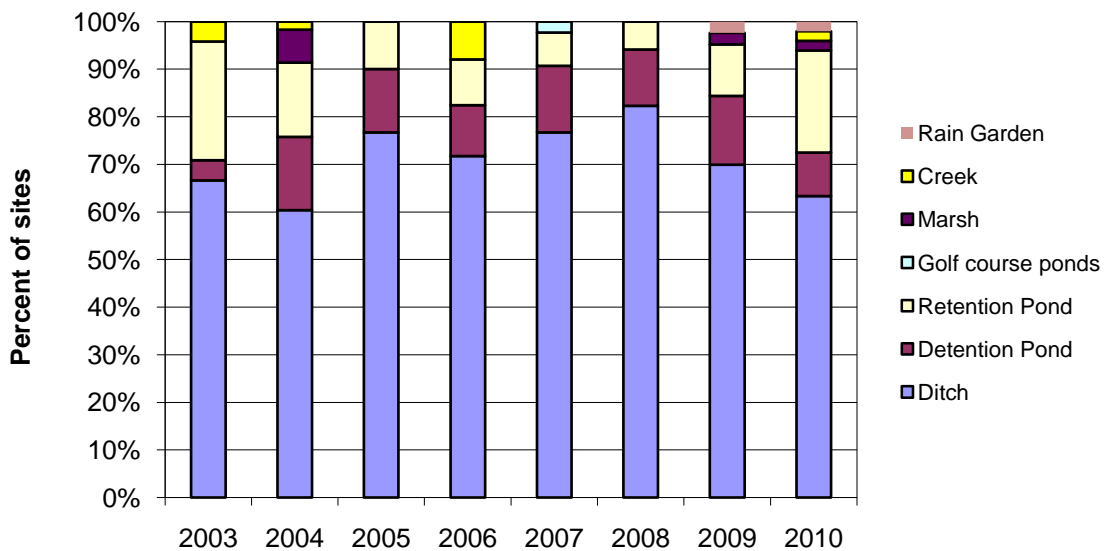
Table 2. Sites in the Madison Metropolitan Area that produced high numbers of *Culex* and *Aedes* larvae in 2010

Site Name	Total for site			High <i>Culex</i> in Site		High <i>Aedes</i> in site	
	# Sources	# Inspections	# Acres	# Sources	# Acres	# Sources	# Acres
29 Ridgewood Ponds	3	14	1.2	1	0.5	0	0
30 Starkweather – Olbrich Greenway	10	43	11.3	1	4.8	1	0.6
31 Stricker's Pond	6	37	28.5	1	4	0	0
32 Sycamore Ave Detention Pond	1	11	0.5	1	0.5	0	0
33 The American Center	4	9	11.7	1	0.6	0	0
34 Warner Park Lagoon	10	57	33.7	2	1.1	0	0
35 West Badger Mill Creek Greenway	12	36	6.4	2	1.2	2	1.3
36 West Towne Ponds	5	15	6.7	1	<0.1	0	0
37 Westchester Gardens Park	3	23	6.6	1	<0.1	1	2.5
38 Westerfield Retention ponds	2	6	0.3	1	0.1	0	0
Village of Maple Bluff							
39 Maple Bluff Country Club	4	19	1.3	2	0.3	2	0.3
City of Middleton							
40 Middleton Business Park	9	21	4.4	1	0.1	0	0
41 Middleton Hills	3	9	10.9	2	8.5	0	0
42 Orchid Heights Park	13	59	4.7	6	0.6	4	0.4
43 Stricker's Pond	6	37	28.5	1	<0.1	0	0
44 Tiedman Pond	1	3	28.4	1	28.4	0	0
City of Monona							
45 Winnequah Park	4	12	4.2	1	<0.1	0	0
City of Sun Prairie							
46 Glacier Crossing	1	3	0.5	1	0.5	1	0.5
47 Hickory Grove Estates	3	9	1.3	1	0.1	0	0
48 Lois Dr	3	9	7.2	1	6.3	0	0
49 Providence Neighborhood	2	6	2.9	1	2.2	0	0
50 Westwynde	6	18	3.9	2	1.3	0	0
51 Weybridge	3	9	4.8	1	0.7	0	0
52 Wydham Hills	1	3	0.1	1	0.1	0	0
53 Wyndham Hills Neighborhood	18	36	14.6	2	2.6	0	0
Town of Madison							
54 Alliant Energy Center	9	33	9	1	0.2	5	2.3
55 Harvey Schmidt Park	1	3	<0.1	1	<0.1	0	0
UW Madison							
56 UW Arboretum	22	36	158	1	7.3	2	7.9
57 Observatory Dr Ponds	4	12	1	1	0.3	0	0
58 University Bay Ditches	4	13	2	1	0.8	2	1.2
59 University Bay Marsh	1	3	9.7	1	9.7	0	0
60 Willow Creek	1	3	0.9	1	0.9	0	0

Since 2003, a total of 197 sites have been found to produce high numbers of *Culex* larvae in at least one season. Forty-two (21%) of these sites have been found to produce *Culex* larvae repeatedly (four or more years) over the past eight years.

The types of water sources that produced high numbers of larvae are generally consistent from year to year (Fig 8). In 2010, ditches continue to be the most important source of mosquitoes with 63% of all high *Culex* producing sites being classified as ditches. Detention and retention ponds account for another 30% of the high *Culex* sources. Since 2003, other types of sites have been found to be capable of producing high numbers of *Culex* mosquitoes. In 2010, 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 – 2010.



Larvicide Applications

During the 2010 mosquito season, a total of 141 treatments were performed at 71 sites. An additional 13 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. 2010 Mosquito larvae monitoring results - Middleton, WI

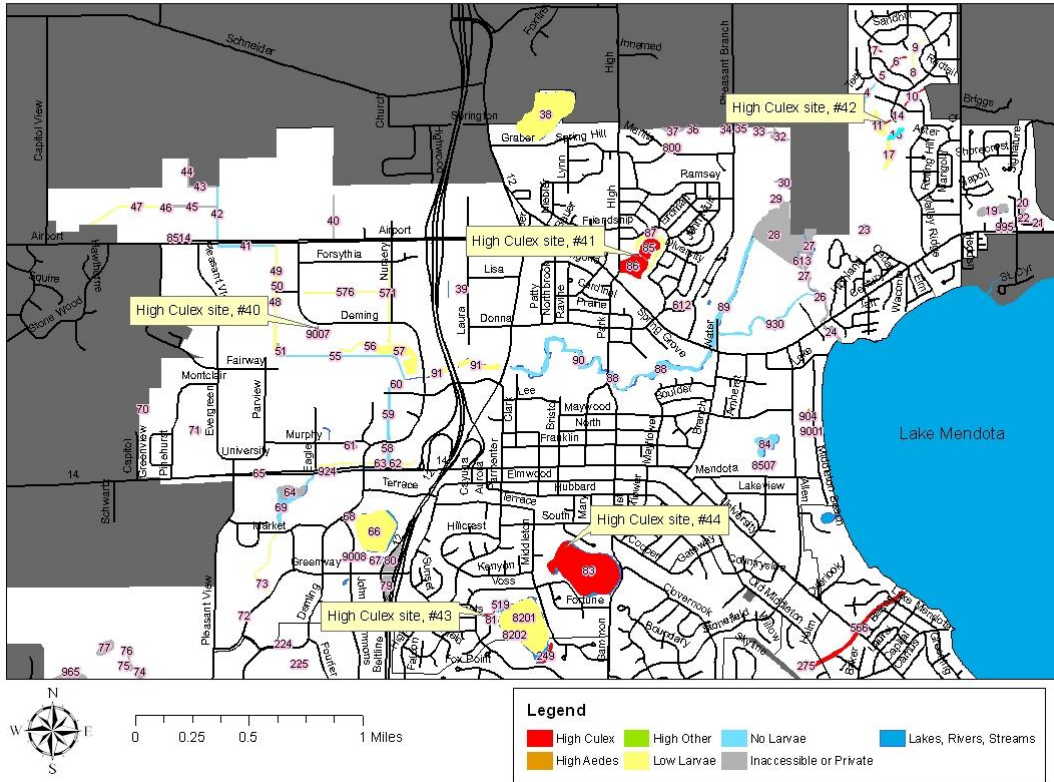


Figure 2. 2010 Mosquito larvae monitoring results - Madison, WI (northern west side)

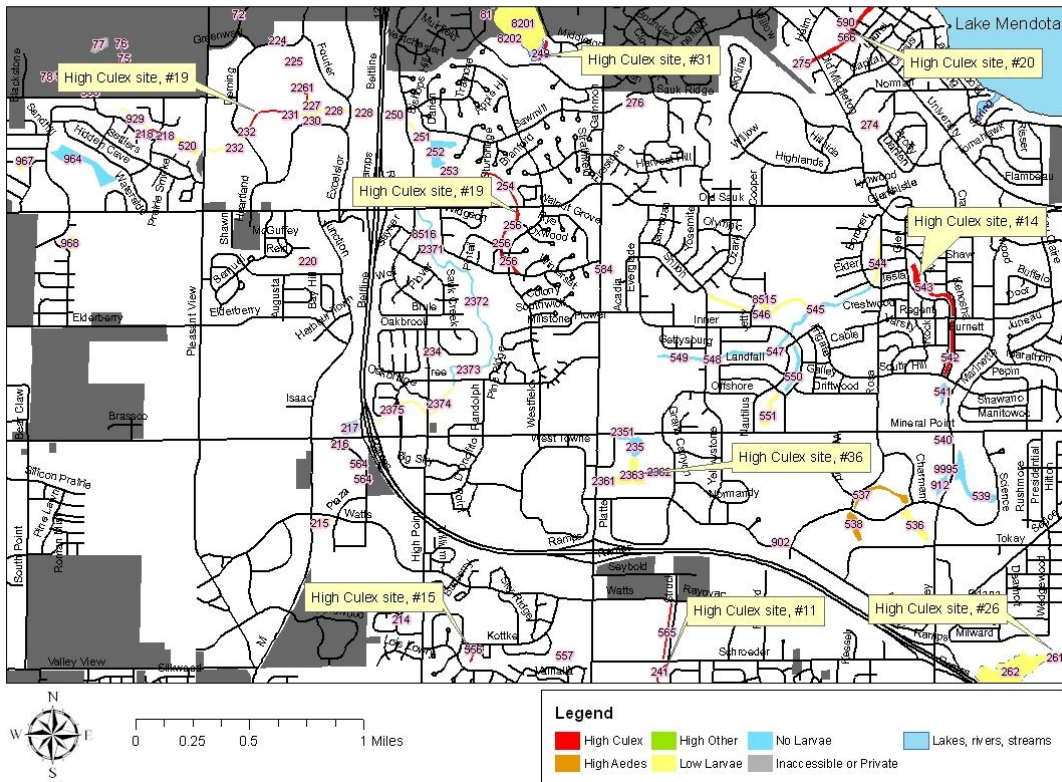


Figure 3. 2010 Mosquito larvae monitoring results - Madison, WI (southern west side)

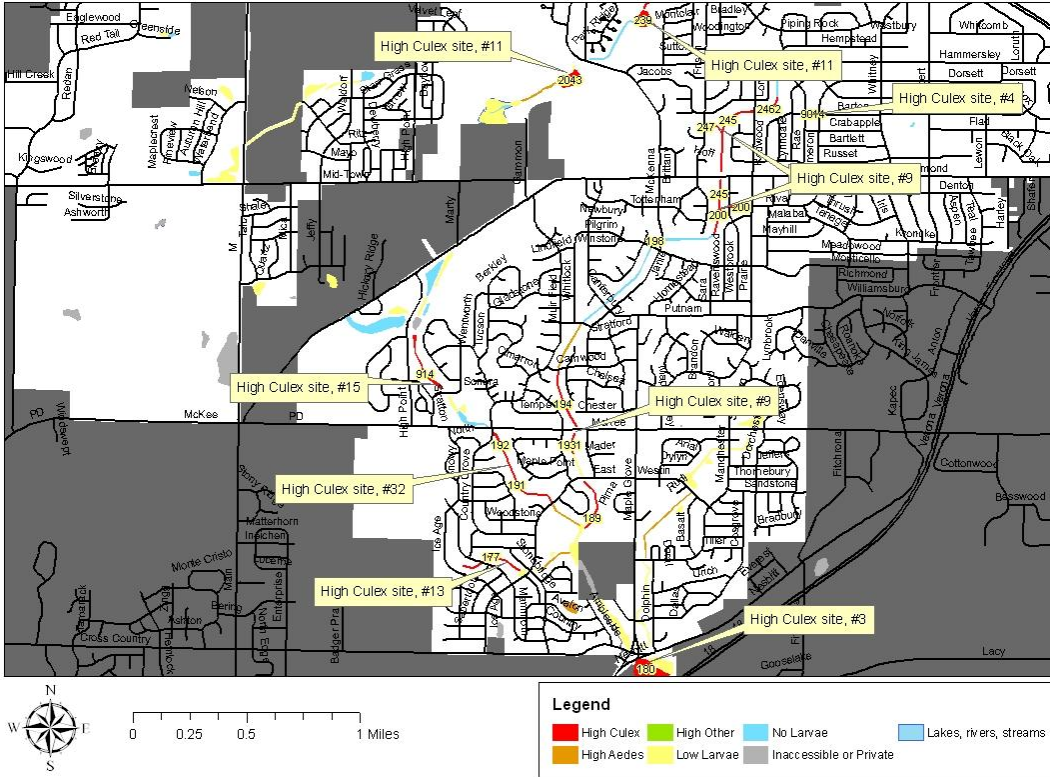


Figure 4. 2010 Mosquito larvae monitoring results - Madison (near west side), Village of Shorewood Hills, and Town of Madison, WI.

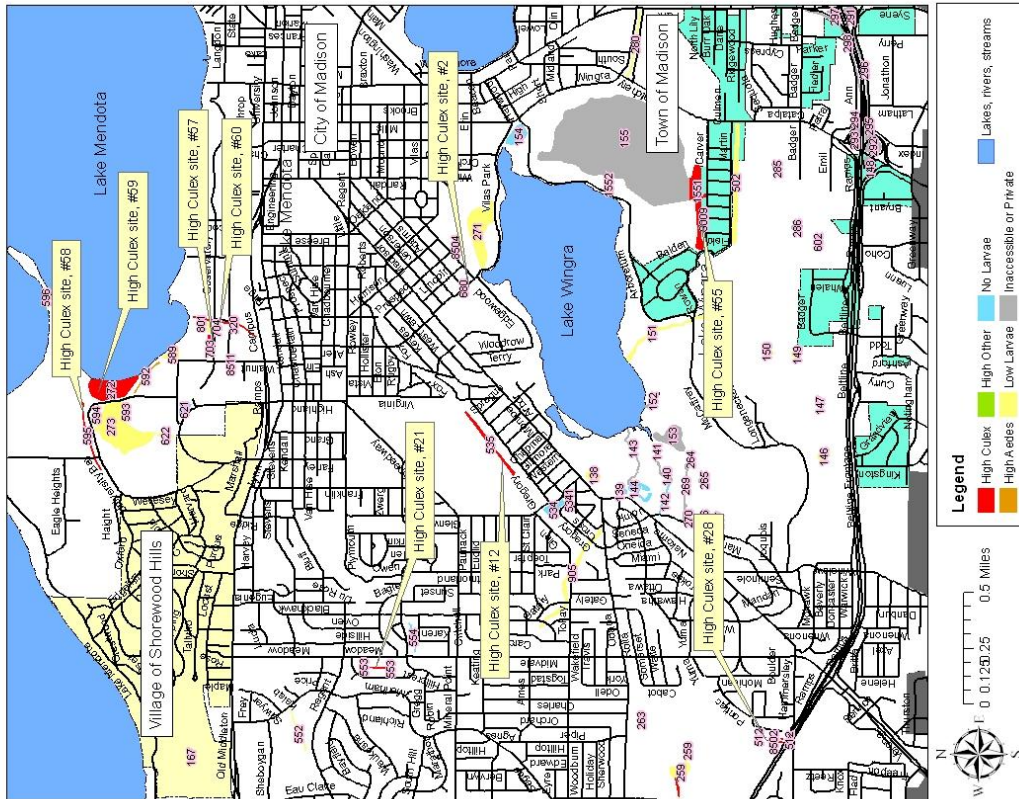


Figure 5. 2010 Mosquito larvae monitoring results - Madison (south side), City of Monona, and Town of Madison, WI.

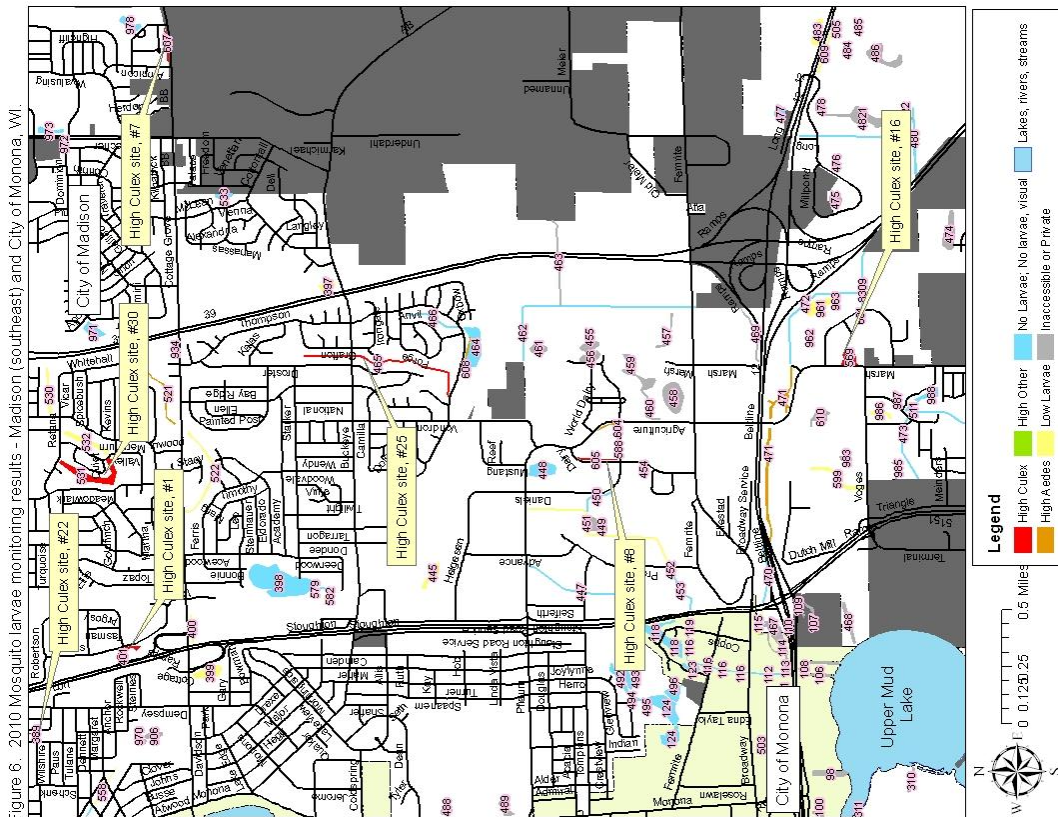
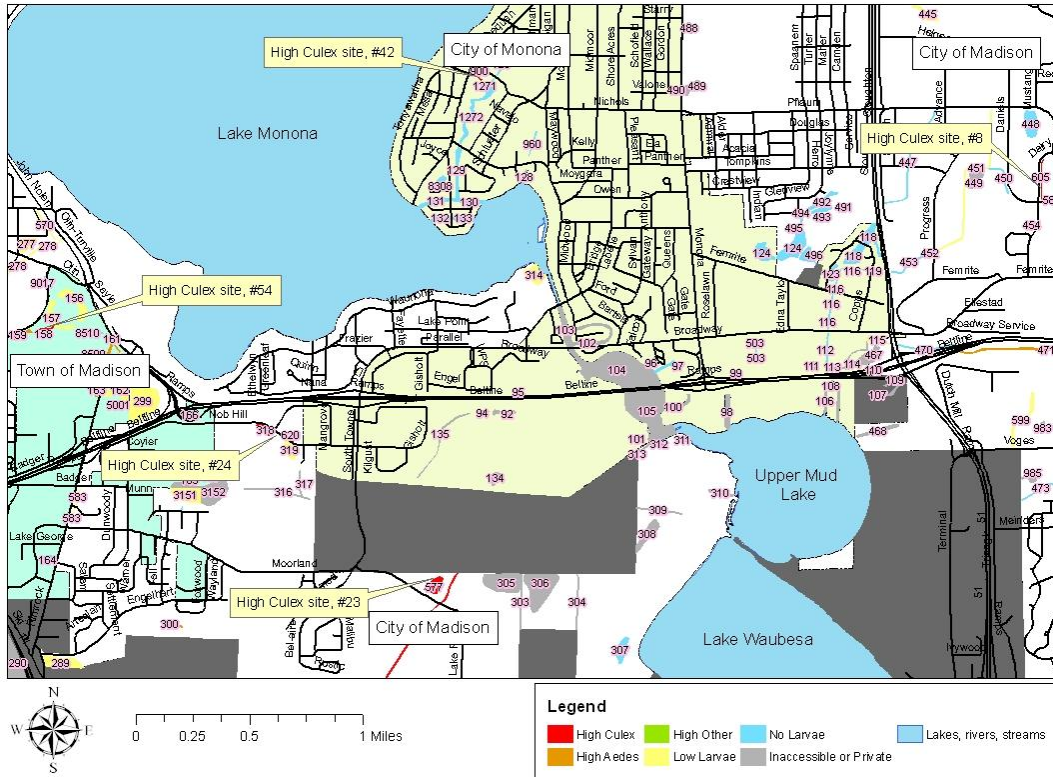


Figure 7. 2010 Mosquito larvae monitoring results - Madison (north) and Village of Maple Bluff, WI.

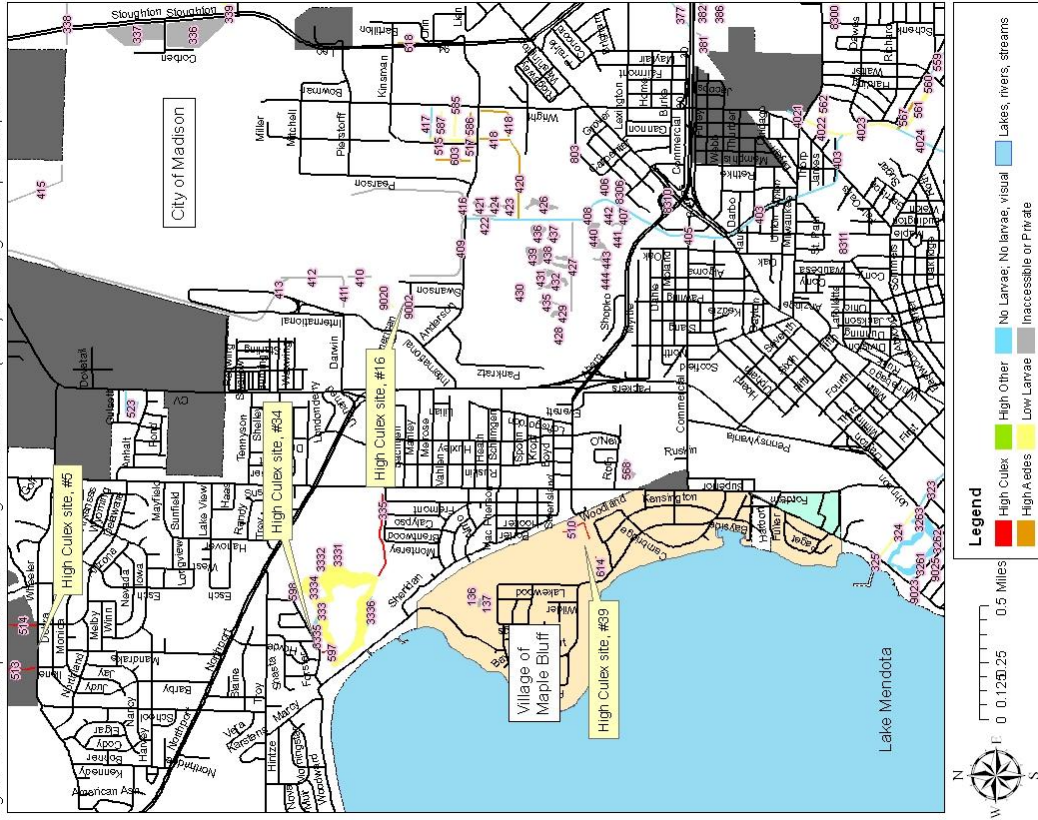


Figure 8. 2010 Mosquito larvae monitoring results - Madison (northeast), WI.

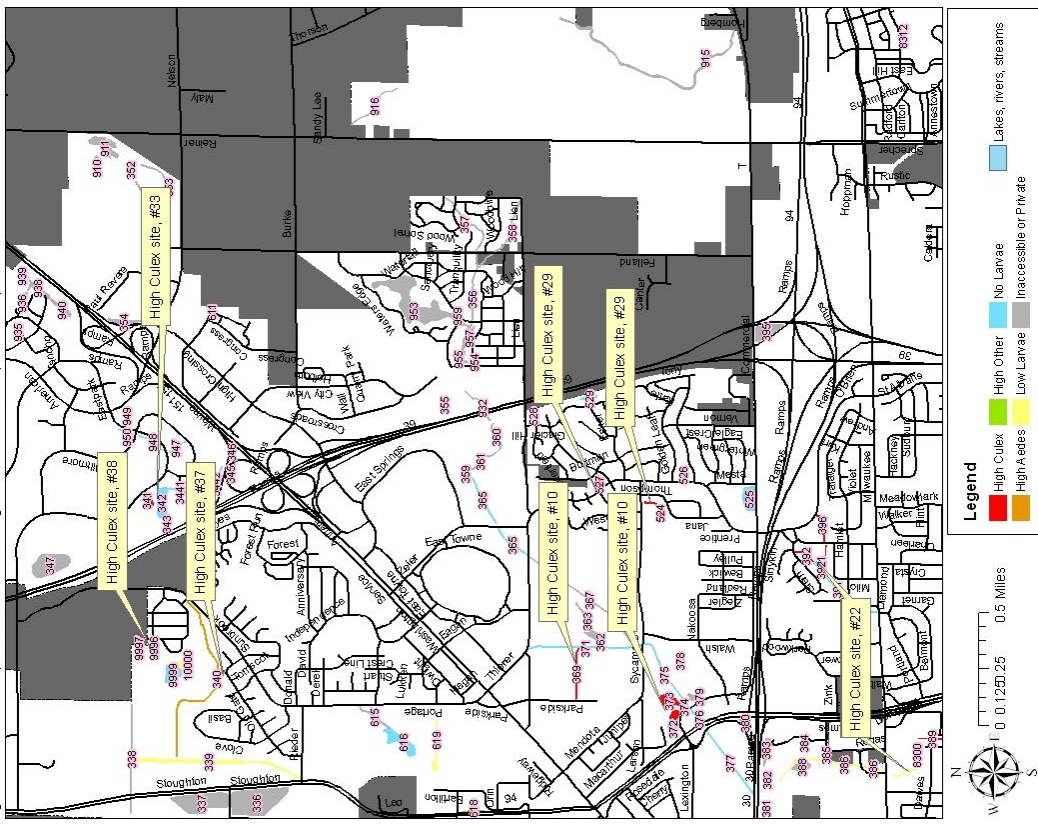


Figure 9 2010 Mosquito larvae monitoring results - City of Sun Prairie, WI.

