

Healthy people and places

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 2012, the percentage of sites producing high number of *Culex spp.* increased in comparison to the levels reported in 2011. Important program findings include:

- NV vectors are present in the metropolitan area and create a potential WNV infection risk for humans in the area.
- Solution Over 6% of the water sources monitored for mosquito larvae produced high numbers of *Culex* larvae.
- A Thirty-nine (19.0%) inspected sites produced high numbers of *Culex spp.* larvae in four or more of the past seven years.
- A Ditches accounted for 77.5% of sites that produced high numbers of *Culex* larvae. The remaining 22.5% of the problem sites were retention/ detention ponds.
- A 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 2012, 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.

	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 Culex	34	0	2	0	0	4	0	0	40
High Aedes	8	0	1	0	0	1	0	0	10
# of inspected sites	378	2	70	20	1	105	14	25	615
% High Culex	9.0%	0.0%	2.9%	0.0%	0.0%	3.8%	0.0%	0.0%	6.5%
% High Aedes	2.1%	0.0%	1.4%	0.0%	0.0%	0.9%	0.0%	0.0%	1.6%

Table 1. Summary results of 2012 mosquito larvae inspections of accessible sources in the Madison metropolitan area.

Results and Discussion

Mosquito larvae in surface water

During the summer of 2012, department staff made 2,208 inspections of 615 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 (50.3%, 265 individual sites) and detention/ retention ponds (38.7%, 265 individual sites); however, other sites evaluated included, but not limited to, creeks, marshes, rivers, and rain gardens. In the metro area, 6.5% 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 (9.0%); high concentrations were also reported at sites in the Cities of

Sun Prairie (3.8%) and Middleton (2.9%). The City of Madison also reported the largest percentage of sites with high concentrations of *Aedes* larvae (2.1%) but high concentrations were also reported in the Cities of Middleton (1.4%) and Sun Prairie (0.9%).

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 2 - 10 (at the end of the report¹) identify the locations of the water sources that produced high numbers of *Culex* larvae.

		Total for site			High <i>Culex</i> in Site		High <i>Aedes</i> in site	
			#	#				
~	Site Group Name	# sites	Inspections	Acres*	# sites	# Acres	# sites	# Acres
City of	of Madison							
1	Atlas Avenue Retention Pond	1	13	7.1	1	7.1	0	0
2	Cherokee Greenway	2	27	1.5	1	0.6	0	0
3	Cherokee Country Club	1	3	-	0	0	1	_
4	Cottage Grove Amnicon Ditch	1	13	0.2	1	0.2	0	0
5	East Badger Mill Creek Greenway	14	78	7.8	3	2.3	0	0
6	East Starkweather - East Towne Greenway	22	39	20.1	1	0.7	1	2.3
7	Elver Park Greenway	13	54	17.3	2	1.2	0	0
8	Forest Hill Greenway	1	3	2.1	1	2.1	0	0
9	International Lane	1	4	0.1	1	0.1	0	0
10	Kottke Drive Detention Area	1	13	0.2	1	0.2	0	0
11	Maple Grove Greenway	8	23	5.9	1	0.2	0	0
12	Mendota - Pheasant Branch Greenway	26	108	21.5	5	5.4	1	0.1
13	Milwaukee Street - Greenway	9	67	6.8	3	1.3	1	0.3
14	Nob Hill Ponds	8	46	16.7	1	4.4	0	0
15	North Penito Creek - Greenway	5	26	9.7	1	2.2	1	2.2
16	Reindahl Park Ditch	1	3	0.8	0	0	1	0.8
17	Ridgewood Pond	3	13	0.5	0	0	1	0.5
16	Pontiac Trail Ditch	2	15	-	1	-	0	0
17	Starkweather - Olbrich Greenway	10	39	11.3	1	1.8	0	0
18	Sycamore Avenue Detention Pond	1	12	0.5	1	0.5	0	0
19	UW Campus	2	4	-	1	_	0	0
20	UW Research Park Pond	7	21	17.6	1	0.4	0	0
21	Warner Park Lagoon	10	79	33.7	3	1.3	0	0
22	Westchester Gardens Park	3	31	6.6	2	2.5	1	2.5
23	Westerfield Ponds	1	4	0.9	1	0.9	0	0

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

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

		Total for site			High <i>Culex</i> in Site		High <i>Aedes</i> in site	
	Site Croup Name	# =:*==	#	# ^ === = = *	# =:**=	#	# aitaa	#
C:+	Site Gloup Name	# sites	inspections	Acres	# sites	# Acres	# sites	# Acres
City	of Middleton	1						
24	Orchid Heights Park	13	62	4.7	1	-	1	0.1
25	Stricker's Pond	6	34	28.5	1	-	0	0
City of Sun Prairie								
26	Sheehan Park	1	4	0.9	1	0.9	0	0
27	Shonas Highlands	6	18	2.6	1	0.1	0	0
28	Uplands Neighborhood	1	3	-	0	0	1	7.44
29	Wyndam Hills Neighborhood	18	38	14.6	1	0.1	0	0

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

* 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 205 sites have been found to produce high numbers of *Culex* larvae in at least one season. Thirty-nine (19.0%) of these sites have been found to produce *Culex* larvae repeatedly (four or more years) over the past ten years.

The types of water sources that produced high numbers of larvae are generally consistent from year to year (Fig 1). In 2012, ditches continue to be the most important source of mosquitoes with 77.5% of all high *Culex* producing sites being classified as ditches. Detention/ retention ponds (22.5%) accounted for the remaining sources of the high *Culex*. A similar pattern was observed with sites reporting high numbers of *Aedes*; approximately 60% were derived from ditches and 3% from detention/retention ponds.

Since 2003, other types of sites have been found to be capable of producing high numbers of *Culex* mosquitoes including, but not limited to, marshes, creeks, and rain gardens. *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. However, in 2012 only ditches and detention/retention ponds were reported to have high numbers of mosquitoes and/or larvae.

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 1. Types of water sources producing high numbers of *Culex* larvae, 2003 – 2012.

Larvicide Applications

During the 2012 mosquito season, a total of 66 treatments were performed at 42 sites. An additional 3 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.













