Public Health
MADISON & DANE COUNTY
Healthy people and places

West Nile Virus Surveillance in Madison and Dane County, 2010

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Summary

- Bird surveillance did not find positive evidence of West Nile virus (WNV) in bird reported and/or collected in 2010.
- A total of 8 sick or dead crows and blue jays were reported in 2010; this data represents a continuing decline in reported WNV activity in Dane county.
- Anecdotal reports of declines in local crow populations have been received but local monitoring data is not yet available to support these reports.
- The Public Health Department continued partnerships with other City of Madison agencies, six neighboring communities, and the University of Wisconsin campus to implement mosquito larvae monitoring and control activities in the Madison metropolitan area.
- Mosquito larvae monitoring determined that approximately17% of water sources in the Madison metropolitan area produced high numbers of *Culex* mosquitoes at least once in 2010; another 6% produced high numbers of *Aedes* larvae.
- No cases of encephalitis WNV illness was reported among Dane County residents in 2010.

Bird Surveillance

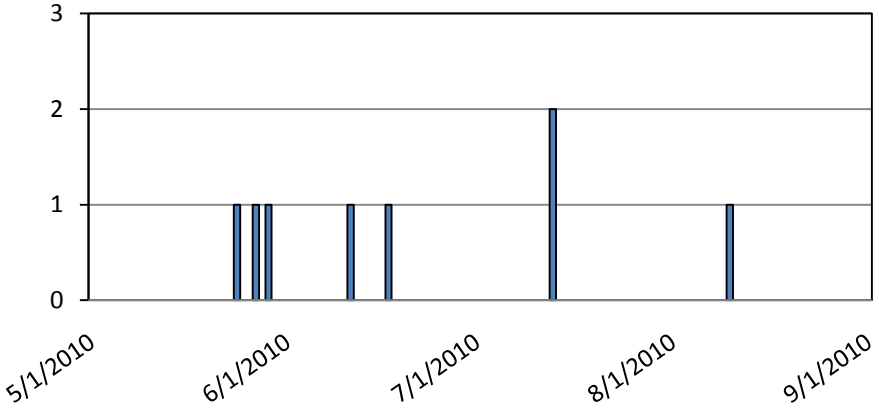
In 2010, Public Health Madison and Dane County (PHMDC) cooperated with statewide efforts to collect and test dead crows and blue jays for WNV. Table 1 provides a summary of the sick or dead bird surveillance data. In the current reporting year, a total of eight crows and blue jays were reported and/or collected; three birds were submitted for testing and none were reported positive for WNV.

Table 1. Results of sick/dead bird (crows and blue jays) surveillance in Dane County.

	2004	2005	2006	2007	2008	2009	2010
Date first bird reported	Apr 27	Apr 23	May 3	May 10	May 19	May 18	May 24
Date first WNV positive bird collected	May 28	May 19	Jun 5	Jun 13	Aug 6	N/A	N/A
Date WNV testing discontinued for the year	Jun 9	Jun 7	Jun 19	Aug 21	Aug 28	Sep 5	Aug 10
Total # WNV positive birds	6	2	7	2	2	0	0
Total # birds collected	52	9	15	2	5	6	3
Total # of sick or dead birds reported	389	283	365	106	55	17	8
Peak weekly average of sick/dead bird reports	7.7	8.3	5.4	2.4	1.1	0.4	0.7
Date of sick/ dead bird report peak	June 14	Aug 22	Aug 17	Jul 3	Jul 7	Aug 3	July 13

As in previous years, only a small percentage of the birds reported as sick or dead were collected for WNV analysis. In 2007, the Department changed procedures to focus on collecting sick birds. Prior to 2007, considerable effort was made to collect both sick and dead birds; however, we found that many dead birds reported for collection were not suitable for testing or clearly died from a cause other than WNV. Dead birds were still recorded during 2010 for monitoring purposes. Figure 1 shows the number and date of occurrence for all crows and blue jays reported and/or collected.

Figure 1. Number of sick or dead birds* reported in 2010



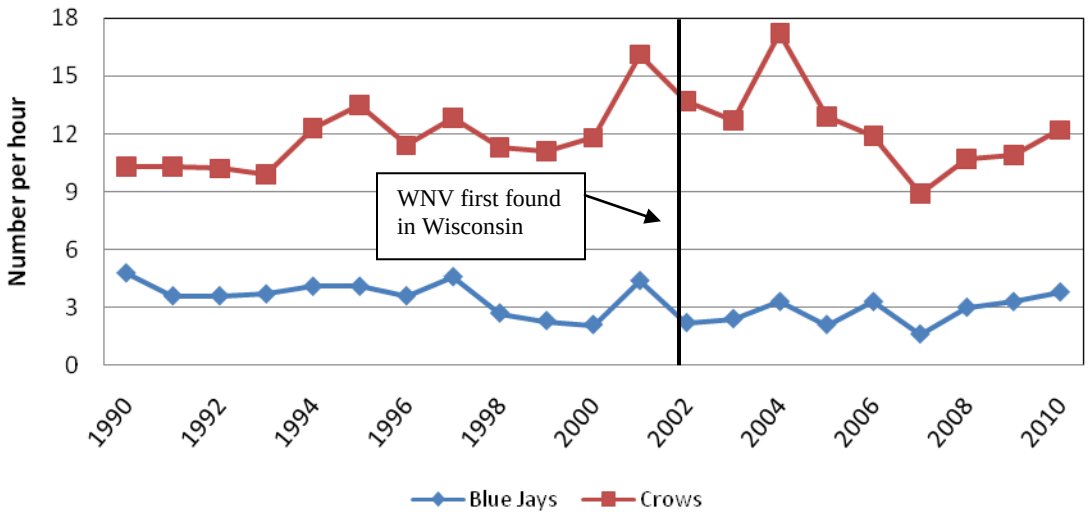
*only crows and blue jays

Reports of sick and dead bird (crows and blue jays) continue to decline in Dane County. In fact, 2010 had the lowest number of reports since the Department started tracking these numbers in 2002. It is unknown whether this continued decrease is a result of less WNV activity or decreased reporting by Dane County residents. One half of the birds reported came from Madison; the remaining reports originated from the surrounding communities of Sun Prairie, DeForest, and Fitchburg. According to bird reports, WNV activity was low throughout the season with the largest surge of sick or dead bird reports occurring in May and June of 2010. However, the peak average reports per week (0.7 reports) during this reporting timeframe remained low; continuing a trend observed since 2008. Similar to 2009, no positive WNV results was reported from any of the tested birds.

Bird deaths related to WNV infections may be having an impact on local bird populations. Anecdotal reports of population decreases have been received by PHMDC and other agencies and organizations including the National Wildlife Health Center and the Audubon Society. A report published in the journal Nature (LaDeau et al., 2007) estimates that crow populations across North America have dropped 45% since WNV was first observed. Local data on bird populations is limited to accurately evaluate this impact at the county level.

According to the Audubon Society's Christmas Bird Count, the number of Wisconsin of crows have begun to rebound following a sharp drop observed since 2004. However, it is not certain that this drop resulted from WNV infections. As shown in Figure 2, this decrease occurred several years after WNV was first seen in Wisconsin. Also, it is possible that winter bird counts, such as the Christmas Bird Count, are less indicative of the impacts of WNV; a disease that has its greatest impact on the population in late spring and summer. Other data sets such as eBird.org and the Great Backyard Bird Count may be useful in monitoring local bird populations; however, these data are based on volunteer reports, which may bias their results. Systematic population monitoring such as the North American Breeding Bird Survey provides higher quality data but is best suited to measuring bird populations regionally and is not able to identify changes in population at the local level.

Figure 2. Crows and blue jays counted per hour in Wisconsin during the Audubon Society's Christmas bird count



Mosquito Surveillance

Similar to previous years, PHMDC continued its partnership with the Town of Madison, Village of Maple Bluff, City of Middleton, City of Monona, the Village of Shorewood Hills, City of Sun Prairie, and the University of Wisconsin during 2010 to monitor and control the breeding activity of targeted mosquito species on public property. Mosquito surveillance consisted of adult mosquito trapping and larval mosquito sampling in water on public property; efforts that targeted mosquito species including the *Culex* group that routinely account for the majority of infected mosquitoes captured throughout the county in previous sampling years and are the most likely vector to spread WNV. Mosquito control involved public outreach to promote removal of water sources (source reduction) and larvicide applications when water sources were found to produce high levels of target mosquito larvae. The following summarizes mosquito monitoring and control during this reporting period. For additional information on these efforts for 2010, please refer to the full mosquito monitoring and control program reports for these years entitled "Mosquito Monitoring and Control – Madison Metropolitan Area"; a separate report is available for each year. These reports are available at: http://www.publichealthmdc.com/.

Table 2 summarizes the larval mosquito monitoring performed by the Department in 2010.

During 2010 (Table 2), department staff made 2,075 inspections of 591 water sources in the metro area. These inspections were made at ditches (257 sites), ponds (259 sites), and other surface water sources (75 sites). Approximately 17% of the sites inspected produced high numbers of *Culex* larvae at least once during the season; another 6% of the sites produced high numbers of *Aedes* larvae but not *Culex*. The only other mosquito species reported in high

Table 2. Summary results of 2010 mosquito larvae inspections in the Madison metropolitan area.

	City of Madison	City of Middleton	City of Monona	City of Sun Prairie	Town of Madison	UW – Madison	Village of Maple Bluff	Village of Shorewood Hills	Metro Area
High *Culex*	67	11	1	11	2	5	2	0	99
High *Aedes*	26	1	0	4	5	2	–	0	38
High other	0	0	0	1	0	5	0	0	1
Low larvae	131	33	1	52	5	0	2	0	238
No larvae	130	21	18	38	2	16	0	1	215
Total Accessible	354	66	20	106	14	28	4	1	591
% High *Culex*	18.9%	16.7%	5%	10.4%	14.3%	17.9%	50%	0%	16.8%
% High A*edes*	7.3%	1.5%	0%	3.8%	35.7%	7.1%	0%	0%	6.4%

numbers was *Uranotaenia sapphrina* in the water sources monitored; it was found only once in high numbers in a ditch in the City of Sun Prairie. Approximately 76% of the monitored sites did not produce high numbers of mosquito larvae.

Human Surveillance

Most humans (~80%) infected with WNV experience no adverse symptoms and less than 1% will have serious encephalitis or meningitis result from infection. As of December 28, 2010, a total of 981 cases of the disease (601 cases of neuroinvasive disease and 380 cases of non-neuroinvasive disease) were reported in the United States in 2010 including 45 deaths attributed to WNV; these disease-related deaths composed 4.6% of all reported cases during that year and 7.5% of those with neuroinvasive disease.

West Nile virus infection is a reportable illness in Wisconsin. PHMDC continues to conduct passive surveillance for human cases of WNV infection at the county level. Area providers are also encouraged to participate in Wisconsin's Enhanced Arbovirus Surveillance program, which tests serum and cerebrospinal fluid of patients who met specific clinical criteria. In 2010, a total of 2 cases were reported statewide; no cases were reported in Dane County last year. However, since 2002, surveillance has recorded a total of 14 cases of human WNV infection in Dane County. A breakdown of these cases is given in Table 3 below.

Table 3. Number of human WNV cases in Dane County.

	Cases Identified		
	2009	2010	Total since 2002
WNV Fever	0	0	8
WNV Encephalitis (non-fatal)	1	0	4
WNV Encephalitis (fatal)	0	0	2
Total	1	0	14

Public Outreach

At the beginning of each of the seasons reported above, a press release was issued that provided a written briefing to educate the media. In addition, PHMDC staff continued efforts to provide information to the public including the risks of WNV illness, mosquito bite prevention, the reduction of mosquito-breeding areas, and an annual report of WNV and mosquito activity in the county. This and additional information is available on the PHMDC website (http://www.publichealthmdc.com/disease/westNile/).

Conclusion

West Nile virus surveillance activities continue to indicate that WNV risk for humans in Madison and Dane County is low. No evidence of WNV activity was found in dead birds in or humans in 2010. Due to low numbers of mosquitoes and humans with WNV infection, collection of sick and dead bird reports continues to be the Department's best measure of WNV activity in the area. Adult mosquito surveillance also continues to be an important tool for measuring overall mosquito activity.

Based on activity trends demonstrated in the data, we can expect at least a low level of WNV infection in mosquitoes, birds, and humans in the future. Continued surveillance efforts are necessary to assess the intensity of this illness in our communities and provide recommendations on addressing the threat of illness. Program efforts planned for 2011 will include:

- Dead and sick bird surveillance and testing identifies when the virus is active in the community and provides a measure of severity between years.
- Mosquito larvae monitoring and control detects standing water that may provide breeding opportunity for WNV competent mosquitoes and provides a mechanism for responding to sites on public property shown to produce high numbers of mosquitoes. This also provides an example for area residents to follow in preventing water sources on their property from producing mosquitoes.
- Adult mosquito surveillance provides information on the level of mosquito activity.
- Human illness surveillance detects when WNV activity has moved from bird populations to humans.