

WEST NILE VIRUS & STORMWATER MANAGEMENT

Prepared by Ramsey-Washington Metro Watershed District

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Recent media attention to the presence of West Nile Virus (WNV) in Minnesota has heightened concerns about human contraction of the infectious disease. The Ramsey-Washington Metro Watershed District (RWMWD) believes it is important to summarize and share basic information on this disease and how it relates to stormwater management. Below is a synopsis of the most recent information available from health and research organizations. Additional information can be obtained by contacting one of the agencies listed below or by calling the Watershed District office at (651)704-2089.

West Nile and the Stormwater Link

It is clear that mosquitoes are the vector of the West Nile virus and that they are dependent on standing water for life cycle development. The RWMWD uses ponds to hold back stormwater – this is a common tool that has both water quantity and quality benefits. A key question that has been raised to the RWMWD and several other water resource agencies is: “Are these stormwater ponds breeding areas for mosquitoes that carry the WNV?”

This main concern was posed and discussed with local experts on WNV from the MN Department of Health Infectious Disease Epidemiology, Prevention & Control Division and Metropolitan Mosquito Control District. The RWMWD also consulted a number of agency web sites devoted to providing accurate information about WNV -- sources, control and personal protection. Many of the findings are included here or can be viewed in the web sites noted at the end of this article.

Mosquitoes as Vectors

Out of some 2500 or more different mosquito species worldwide, approximately 50 can be found locally and only a few species are suspected as potential carriers of WNV, with research focusing on one primary carrier. It is believed that the two most common Minnesota mosquitoes, the *vexans* mosquito and common cattail mosquito, are not effective transmitters of WNV. The targeted *Culex spp.* of mosquitoes compose a very small percentage of the local population. They are a primary suspect because of their feeding preferences and ability to carry similar encephalitis diseases. Research indicates that less than 1% of all mosquitoes actually carry the WNV.

Human Risk

If bitten by an infected mosquito, less than 1% of people will become seriously ill. Approximately 80% of people infected with WNV will have no symptoms at all. People 50 years of age and older are at higher risk for serious illness. Minnesota has had occurrences of four

forms of encephalitis diseases; Lacrosse Encephalitis, Western Encephalitis, Eastern Encephalitis and West Nile Encephalitis. Information on each of these forms of encephalitis can be found on the web links below.

The West Nile Cycle

It is important to understand that the *Culex spp.*, or any other species of mosquito capable of carrying WNV, are not thought to be inherently born with WNV. West Nile Virus is known to be maintained in a transmission cycle between mosquitoes and birds. A mosquito must bite an infected bird to contract WNV, and only then can the mosquito transmit it to a human, horse or other mammals. Furthermore, it is important to note that the feeding preference of *Culex* mosquitoes is almost exclusively birds. Current research is focusing on which mosquitoes and birds are most important to this cycle.

Breeding Grounds

Determining the species and feeding patterns of mosquitoes that carry the WNV will prove essential in finding answers to these complex questions. Most critically, research will help in classifying the developmental environments of these mosquitoes. It is currently understood that the mosquito life cycle is reliant on water, and as long as there is water, the potential always exists for mosquitoes to reproduce. According to current research, ideal water conditions for mosquito development are found at the edges of semi-permanent wetlands or in wet meadows. These ideal environments consist of very shallow water conditions (1"-24"), thick vegetative cover, high levels of organic debris and fluctuating water levels, most of which contribute to bacterial growth through rotting vegetation. This bacteria acts as an important food source for the mosquito larvae.

Stormwater Ponds

Do stormwater ponds provide good habitat for WNV carrying mosquitoes? Generally, stormwater facilities tend not to support the conditions and characteristics that create prime mosquito breeding grounds. The typical stormwater pond has large areas of open water, and research points to these areas being poor habitat. Most of the stormwater pond edges in the RWMWD are managed in a way that promotes a variety of native plant species. This provides habitat for many species, including fish, birds, frogs, and other animals that feed on mosquitoes and their aquatic larvae. The RWMWD has not received complaints from citizens about ponds harboring excessive mosquito populations.

Ponds versus Natural Wetlands

In the RWMWD, natural wetlands compose an overwhelming majority of the mosquito breeding habitat. It is estimated that created ponds, specifically their edges, compose less than 0.01 percent of available habitat in the RWMWD. Additionally, in the Twin Cities metropolitan area, most of the ponds and wetlands are treated to limit mosquito reproduction. This work is

conducted by the Metropolitan Mosquito Control District. Specific information on their control practices is available on their web site listed below.

Current Management Approach

Based on current findings from the most prominent federal and local management and research organizations, it is reasonable to conclude that stormwater management ponds in the RWMWD do not substantially increase the habitat available for mosquitoes that are prone to carry WNV. Thus the RWMWD will continue to manage stormwater by using created ponds.

The RWMWD will continue to monitor new research on WNV. The RWMWD will also continue to work closely with other county, state, and regional public health and environmental agencies, and will provide further information as warranted. It is important to remember that research on WNV is still in its early stages. The RWMWD also discourages excessive or unnecessary application of pesticides which, while trying to control mosquito populations, could have potentially toxic effects on aquatic life and untargeted biological species. It appears the present state of understanding regarding WNV, in relation to stormwater facilities and in general, should not cause heightened fears for the residents of the RWMWD.

Individual Measures

There are important protection measures that all individuals can practice to limit the risk of WNV and reduce mosquito exposure in general. Most importantly we all need to limit the habitat for mosquito production on our own properties. This includes:

- Remove tires, buckets, and other water-holding objects.
- Drain standing water from flower pots and boxes, wading pools, and wheelbarrows, etc.
- Keep birdbaths and pet dishes clean.
- Clean and chlorinate swimming pools or drain and cover if not in use.
- Prevent water from accumulating on pool covers.
- Unclog gutters and down spouts.

There are also personal protection measures that can reduce your exposure to mosquito bites that are advised:

- Use insect repellents containing DEET (N,N-diethyl-meta-toluamide).
- Spray clothing with repellents because mosquitoes bite through thin clothing.
- Dawn and dusk are when mosquitoes are most active, stay indoors if you can or wear long-sleeved shirts, long pants, and socks when you go outdoors during these times or in wooded areas.
- Place mosquito netting over infant carriers when outdoors.
- Make sure screens fit tightly in doors and windows.

Additional Information

For further questions, more information on stormwater management or the Ramsey-Washington Metro Watershed District, please contact us at (651) 704-2089 or visit our website at www.rwmwd.org. For additional assistance on West Nile Virus, see below:

- Minnesota Department of Health, Infectious Disease Epidemiology, Prevention and Control Division (612) 676-5414: www.health.state.mn.us
- Metropolitan Mosquito Control District (651) 645-9149: www.mmcd.org
- U.S. Centers for Disease Control and Prevention (CDC): www.cdc.gov
- American Mosquito Control Association: www.mosquito.org
- USDA Animal and Plant Health Inspector Service: www.aphis.usda.gov
- USGS National Wildlife Health Center: www.nwhc.usgs.gov
- National Pesticide Information Center: www.npic.orst.edu
- U.S. Environmental Protection Agency: www.epa.gov
- New York State Department of Health, Center for Environmental Health: www.ci.nyc.ny.us
- Pennsylvania Health Department: www.westnile.state.pa.us
- National Biological Information Infrastructure: www.westnilevirus.nbii.gov
- Cornell University West Nile Virus Information: www.cfe.cornell.edu/erap/WNV
- St. Louis, Missouri, County West Nile Virus Information: www.scchealth.org