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Mosquitoes and the Problems They Cause for Stormwater Quality

It is common knowledge that mosquitoes prefer to lay their eggs in stagnant water. This issue, among others, has driven researchers to investigate other means of stormwater runoff treatment control. With the intent of gathering more information about stormwater treatment controls currently in use and to expand the number of controls available, a study was begun at the University of New Hampshire Stormwater Center (UNHSC). UNHSC's data collected so far indicates that controls which treat stormwater by detention/retention and infiltration through a vegetated media are the most successful. The majority of these controls, however, require consideration of infiltration rates of soil media to properly design and account for potential mosquito issues. Based on the information from UNHSC's study, it appears that the most effective stormwater controls are those that have been closely related to mosquitoes.

Mosquitoes have been known to be in existence in North America for the last 100 million years. Worldwide, approximately 2,700 different species of mosquitoes exist and about 167 of these reside in the United States. The species vary in many aspects. Many types of mosquitoes prefer to lay their eggs in standing water. However, some will select areas that are dry but then inundated with flood waters after storm events. The flooding of these areas will cause the dormant eggs to hatch.

Issues of mosquitoes will also often arise due to erosion problems. The upstream erosion problems cause sediment to be carried downstream and deposited creating water impoundments, which create areas of standing water. Most government run maintenance departments will attest that resolving upstream issues, especially if they are outside of the entity's Right-of-Way, can be difficult. Most property owners are utilizing controls that detain or retain stormwater runoff from a site reducing the amount of flow discharging from the property. However, as with any control that holds stormwater for any amount of time, there lies the issue of mosquito control.

One method recommended to control mosquitoes, is providing a habitat that encourages native predators of mosquitoes. Various agencies, such as the Ohio Department of Natural Resources and the American Mosquito Control Association, have stated that a healthy mix of fish, birds, bats, insects and spiders known to eat mosquitoes can help to control the population. While this method does have its advantages, wetland ponds can be difficult to design and maintain. As recommended in one design guide, proper flow must be maintained in and out of the pond or a fountain should be installed to avoid stagnant water. Based partly upon the difficulties that are inherent with managing wetland ponds, many property owners are hesitant to use these controls.

Another method recommended by the various agencies to reduce mosquito breeding habitats, is by ensuring that areas of standing water are eliminated within 72 hours following a rain event. This recommendation is difficult to heed, considering that requirements are in place which require collected stormwater to be detained for up to 48 hours. With these timelines and the fact that some areas are not easily drained, it is difficult to ensure that a water detention pond will be fully discharged within 72 hours but not less than 48 hours.

References:

Floore, Tom (Printed November 10, 2010). Mosquito Information. Retrieved from http://www.mosquito.org/mosquito-information/control.aspx

United States EPA (April 4, 2007). Mosquito Control. Retrieved from http://www.epa.gov/pesticides/health/mosquitoes/about_mosquitos.htm

United States EPA & United States Center for Disease Control (April 10, 2007). Joint Statement on Mosquito Control in the United States from the U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control and Prevention (CDC). Retrieved from http://www.epa.gov/pesticides/health/mosquitoes/mosquitojoint.htm

Rey, Jorge R. (April 2006, revised August 2010). The Mosquito. Retrieved from http://edis.ifas.ufl.edu/in652

Ladd, Brent, & Frankenberger, Jane (June 2003). Management of Ponds, Wetlands, and Other Water Reservoirs to Minimize Mosquitoes. Retrieved from https://engineering.purdue.edu/SafeWater/Ponds/WQ-41-W.pdf

Metzger, Marco E. (January 2004). Managing Mosquitoes in Stormwater Treatment Devices. Retrieved from https://ucanr.org/freepubs/docs/8125.pdf

State of Ohio EPA (Effective Date: April 21, 2008). General Permit for Storm Water Discharge from Small and Large Construction Activities. Retrieved from http://epa.ohio.gov/LinkClick.aspx?fileticket=y8Ff9MECTVQ%3d&tabid=3466

Mathews, John (December 2006). Rainwater and Land Development: Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection (3rd ed.). Columbus, OH: Ohio Department of Natural Resources, Division of Soil and Water Conservation

O'Meara, G.F. (March 1993, revised September 1997, Reviewed May 2003). Mosquitoes Associated with Stormwater Detention/Retention Areas. Retrieved from http://edis.ifas.ufl.edu/mg338

University of New Hampshire Stormwater Center. (2010). 2009 Biannual Report. Durham, NH: University of New Hampshire Stormwater Center