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APWA comes to Chicago
Can catch basin maintenance lead to more mosquitoes?

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Just when many of us thought the fervor surrounding mosquitoes and West Nile virus (WNV) had finally gone away for good, in 2012 we saw the second highest number of human cases in the country since it was first found in the United States in 1999 (5,397 cases according to the Centers for Disease Control and Prevention). Because slightly over half of these cases were the rarer and more severe form of the disease generally believed to occur in about one in 150 of all WNV infections the actual number of people infected (but not tested) may well have been something closer to 430,000. Although 2012 may have reminded some people that WNV is still here it isn’t news to the mosquito control programs whose job it is to reduce numbers of mosquitoes that can transmit the disease.

Since early mosquito control efforts in the United States began over a century ago to combat malaria and yellow fever, mosquito control efforts have targeted the polluted waters of belowground catch basins and sumps, a common source of these pests. For example, in the Chicago, Ill., metropolitan region, storm drains and catch basins are the primary source of Culex mosquitoes (the main vector species or transmitter of WNV). As such, mosquito control efforts in this area focus almost exclusively treating hundreds of thousands of catch basins with larvicides (pesticides that target aquatic mosquito larvae and pupae). Aquatic mosquito stages (larvae and pupae) flourish catch basins in part because captured organic debris such as leaf litter and grass clippings can create food sources for them, yet the polluted waters also make it difficult for natural predators like mosquito fish and dragonfly nymphs to survive. To combat these “catch basin mosquitoes,” mosquito control programs often place a single briquette or tablet of larvicide in each basin, ideally only once or twice a season (Figure 1). Since these larvicides have been developed to theoretically last three to six months, they’re typically placed in basins in late spring and early summer to get the most coverage during the mosquito season.

But sometimes Mother Nature helps out too. Aside from routine larvicide treatments another thing that has been associated with fewer catch basin mosquitoes is rainfall. Immediately after several days of heavy rains far fewer mosquitoes tend to be found in these structures likely having been flushed out of the basins and through the stormwater conveyance systems. A caveat with this phenomenon is that although heavy rains may reduce mosquitoes they also increase the need for catch basin maintenance by inundating these and associated structures with runoff and debris. Generally the responsibility for maintenance is delegated to local public works departments to contract out or perform in-house. Commonly this comes in the form of vacuum-removal of water and debris by one or more vactor trucks (Figure 2).

Figure 1: A mosquito control technician applying a bacterial-based larvicide to a catch basin.

Figure 2: Maintenance of a catch basin with a vactor truck.
There is no doubt that routine catch basin cleaning is important for the continued function of local stormwater systems but it also can create difficulties for mosquito abatement. Recently a small study in a Chicago suburb investigating the efficacy of a catch basin larvicide provided further evidence of these challenges. For the first seven weeks of this 14-week study 20 larvicide-treated basins and 20 untreated basins were monitored for mosquito larvae and pupae. Not surprisingly treated basins consistently held fewer mosquito larvae and pupae than untreated basins. However, midway through the study and after a number of consecutive rainy days and street flooding the local village’s public works department initiated the cleaning of most of their catch basins. This included the 20 untreated basins and 14 of the treated basins of the study. A few days after cleaning, all 34 cleaned basins held water and 23 (about 68%) held mosquito larvae and pupae again (Figure 3). Results of the remaining seven weeks of monitoring saw mosquito numbers increase in treated basins that had been cleaned to levels statistically the same as untreated basins. It became quite obvious that during the catch basin maintenance the larvicide was removed along with the runoff and debris, essentially eliminating the months-long protection of the treatment. These results support what many mosquito control programs have believed for a long time: catch basin maintenance can indeed lead to more mosquitoes, likely depending on the time of year and location.

Obviously avoiding catch basin maintenance won’t solve this problem, particularly given the hugely important and necessary function catch basins and stormwater systems have in removing floodwaters. What has been suggested and seen success in some areas is an increase in communication and coordination among public works and mosquito control programs. This becomes particularly critical when mosquito control agencies service multiple municipalities (as many do) and need to interact with a number of different public works departments. Ideally, from the mosquito control perspective, catch basin cleaning should be performed early in the mosquito season (in the spring months) before mosquito numbers increase significantly. However, if coordinated with the local mosquito control agency and within a reasonable time frame, larvicide treatments may be postponed to later in the season until after maintenance occurs.

While clearly there will be circumstances that require emergency cleanings in addition to routine maintenance, coordination of both maintenance and larvicide treatments can save time, money and effort. Many public works departments and local mosquito control agencies already do this but it is important that this kind of collaborative work continues as West Nile virus has become established throughout the country. Often all it takes to get the process started is a simple phone call or e-mail to your local mosquito control program to get the conversation going. Just this simple gesture will be appreciated and help mosquito control and public works programs run more efficiently. You can find more about local mosquito programs from www.mosquito.org or from your local health departments.

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Figure 3: Results of monitoring 40 catch basins for mosquitoes in a Chicago suburb.