



CALIFORNIA UTILITY VAULTS ARE A MOSQUITO PRODUCTION SOURCE



MVCAC
Mosquito and Vector Control Association of California

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Water retention in utility vaults promotes development of mosquitoes that can spread West Nile virus, creating a serious risk to public health. The spread of invasive *Aedes* mosquitoes throughout the state has exacerbated the problem, as even small amounts of water retained in utility vaults can produce large numbers of these aggressively biting mosquitoes, which are capable of transmitting other human diseases. Mosquito and vector control districts face numerous challenges regarding these troublesome sources, including varying levels of maintenance and access, even limitations in obtaining the geographic locations of the vaults. Additionally, there are high costs and labor demand to obtain effective mosquito control in utility vaults.

STEPS TO PREVENT MOSQUITO PRODUCTION IN UTILITY VAULTS:

- 1 Facilitate statewide collaboration between mosquito and vector control districts and utility providers to reduce the production of mosquitoes and the threat of mosquito-transmitted diseases.
- 2 Establish a standardized protocol for utility providers to enable mosquito and vector control districts to identify, access, and treat problem sources.
- 3 Evaluate and incorporate design modifications to utility vaults to reduce water retention and prevent mosquito production.



Mosquito and vector control districts (MVCDs) are tasked with providing surveillance and control of disease vectors throughout the state. As mosquitoes can develop in even very small sources of stagnant water, control programs require comprehensive identification and control of a wide variety of water sources. Underground mosquito breeding sources often go undetected until more obvious sources in an area are eliminated. Among these cryptic sources, utility vaults provide a particular challenge due to restricted access and problematic designs.

UTILITY VAULTS PRODUCE LARGE NUMBERS OF MOSQUITOES INCLUDING SPECIES INVOLVED IN THE TRANSMISSION OF MOSQUITO-BORNE DISEASES.

Utility vaults have long been recognized as problematic sources for mosquito production, particularly in residential areas. In some regions, a high-water table may allow seepage into the vault and water to stagnate. In a majority of other regions, landscape irrigation or rain may deposit directly into the vaults or pool and flow into the vault. Female mosquitoes can detect this standing water and will deposit their eggs within the vault. Immature mosquitoes can develop into adults within a few days. Standing water in the vaults is typically shaded, which provides protection from evaporation, and limits access by predators, creating an ideal habitat for mosquitoes to develop and emerge.

MVCDs are discovering that utility vaults create a conducive environment for multiple species of mosquitoes to develop. Utility vaults that hold a moderate amount of water are known to produce the common house mosquito (*Culex pipiens/quinqüefasciatus*). These mosquitoes thrive in residential stagnant water sources and transmit West Nile and St. Louis encephalitis viruses each year in California. Since its arrival in California in 2003, West Nile virus has caused more than 7,000 reported illnesses and over 300 deaths.

In 2010, California saw the emergence of invasive mosquitoes that thrive in small man-made container water sources in suburban areas. Of these, the yellow fever mosquito, *Aedes aegypti*, proved particularly adaptive and has since spread throughout a large swath of California from Redding to San Diego. *Aedes aegypti* are aggressive daytime biters that are a significant public nuisance wherever they establish. They also have the potential to transmit debilitating human diseases such as dengue, chikungunya, and Zika, should these viruses be introduced into the state by travelers.

As MVCDs increased their focus on residential areas, detections continued even after neighborhoods had been intensively inspected and backyard sources eliminated. Water retained in utility vaults was ultimately identified as a major source of these mosquitoes. Mosquito production in utility vaults has been increasingly reported in areas where invasive *Aedes* mosquitoes have become established. In a survey of MVCDs across the state, 75% reported having issues with mosquito production in utility vaults.



INCONSISTENT ACCESS TO UTILITY VAULT INFORMATION LIMITS MVCDs ABILITY TO TREAT THE VAULTS.

MVCDs seeking to identify and control mosquito production in utility vaults have experienced varying levels of cooperation from utility providers. Some districts have received comprehensive data on vault locations and types and have been granted restricted access to the vaults with approved training and equipment.

MVCDs operating in other regions, but sometimes dealing with the same utility provider, have been denied location information for the utility vaults within their jurisdiction. Identifying the proper communication channels within the various utility providers can also be very difficult, often requiring considerable time and repeated communications. It is vital that MVCDs receive utility vault locations, consistent access, and a reasonable method to assess and treat those utility vaults that are proven or likely candidates for mosquito production. Were dengue, chikungunya, or Zika to be transmitted within California, the need to swiftly investigate, detect, and treat residential locations of mosquitoes would be even greater, as seen in Miami in 2016. Sharing this information now so MVCDs can incorporate it into their plans is necessary for an effective public health response.

EVEN WHERE ACCESS IS AVAILABLE, THE COST AND LABOR DEMAND OF TREATING PROBLEMATIC UTILITY VAULTS IS UNSUSTAINABLE AND DESIGN CHANGES TO MINIMIZE WATER RETENTION AND PREVENT MOSQUITO PRODUCTION ARE NECESSARY.

While allowing all MVCDs to locate and access utility vaults would facilitate more effective mosquito management, additional steps to reduce or eliminate mosquito production are necessary. Utility vaults are numerous and widespread throughout residential landscapes and can be costly to inspect and treat on a regular basis. The inability to fully access the vault for the purposes of assessing mosquito larval populations makes it difficult to accurately determine what level of intervention is needed, and costly residual control products must be used to reduce the need for repeated inspections and treatments. Even then, the inability to sample for mosquito larvae makes assessing the success of such treatments incredibly difficult. Without effective control, these vaults will continue to produce mosquitoes and increase public health risks. A long-term solution is needed to reduce the potential for mosquito production in these vaults. This can be accomplished by providing adequate drainage or preventing water flow into the vault, so that standing water does not persist for several days.

Where feasible, sealing or properly screening the vaults can help prevent access by egg-laying mosquitoes. As even very small amounts of water can be problematic, some combination of



these modifications would be ideal. MVCs are gathering more data on the various designs of utility vaults, and what correlation these may have to mosquito production. Studies performed by utility providers in conjunction with MVCs are necessary to develop a sustainable solution.

UTILITY PROVIDERS AND MVCs BOTH HAVE AN OBLIGATION TO PROTECT PUBLIC HEALTH BY WORKING TOWARDS ELIMINATION OF MOSQUITO PRODUCTION IN UTILITY VAULTS.

MVCs have a statutory obligation to protect public health by controlling mosquito populations. To this end, they are granted a wide range of powers to reduce or prevent mosquito production. Where certain sources pose a recurring nuisance and collaborative efforts fail, MVCs can pursue statutory abatement against the property owner (or controller) to recover costs of control and to assess civil penalties. Use of this abatement process varies between jurisdictions and by the particular situation, but most often manifests in cost-sharing agreements for ongoing mosquito control and/or land modification projects to prevent future mosquito production.



The concern for maintaining utility vaults in a manner that is protective of public health is equally reflected in Cal. Pub. Util. Code § 8055. This section prohibits accumulation of standing water in accessible utility vaults that contain electrical equipment. While likely focused on risks for electrocution, the statute could readily encompass a variety of threats to public health and safety posed by vaults that retain water. The production of potential disease-carrying mosquitoes poses a particular threat to public health that extends well beyond the constraints of the vault.

While there are multiple potential options to compel changes on local utility providers regarding this issue, MVCAC and its member agencies have a long history of working proactively with various industries to perform initial studies and develop feasible solutions to mosquito production issues. Many utilities providers may be unaware that this issue exists and even those that do may not know the extent of the problem. Consistent communication on this issue across the various types of utilities providers would be most efficiently achieved at a statewide level.