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MOSQUITO AND VECTOR CONTROL ASSOCIATION OF CALIFORNIA

According to the Mosquito and Vector Control Association of California (MVCAC), the state's leading advocate for mosquito and vector control, new development projects that do not take into account vector breeding potential have created an increased threat to public health.

Public health experts believe that much more can be done to prevent mosquitoes, which are responsible for an estimated 725,000 deaths worldwide each year. There are a number of factors that play a role in this devastating figure, however, urbanization itself has become a significant risk factor as populations rise and infrastructure designed to accommodate dense populations is built. Current California Environmental Quality Act (CEQA) Statues and Guidelines neglect to directly address vector and mosquito threats.

While many local governments have done a good job improvising from existing CEQA guidelines and other planning tools to begin to address this issue, a significant gap exists between state regulations and the resources that most local planning agencies need to address vector issues in the planning process. To address this concern, MVCAC has developed the enclosed white paper, "How Better Planning and Use of the California Environmental Quality Act Can Prevent Mosquitoes and Vector-Borne Disease," that discusses the benefits for developers, natural resources and public health when adding vector control considerations to local government project planning and design.

MVCAC's White Paper presents a number of case studies that identify problems and recommended solutions specific to the local planning and CEQA review process and is intended to be a tool for local governments and other lead agencies to manage, analyze, and address the impacts of mosquito and vector breeding inherent in certain types of projects.

We encourage you to read this white paper to learn more about local proactive measures and best practices that can be employed to further protect public health. If you have any questions or comments, please let me know.

Sincerely,

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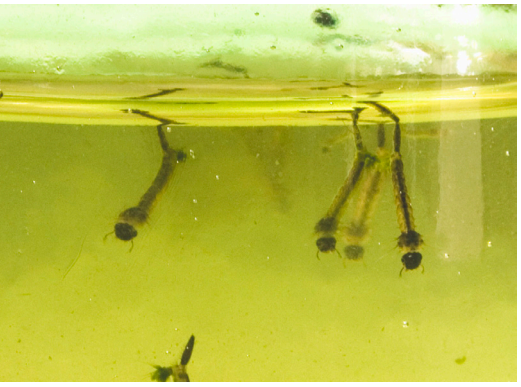
How Better Planning and Use of the California Environmental Quality Act Can Prevent Mosquitoes and Vector-Borne Diseases



Benefits for Developers, Natural Resources and Public Health

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MVCAC

Mosquito and Vector Control Association of California

Worldwide, the dramatic rise in the incidence of emerging and resurging vector-borne disease has been associated with ecological and climate change that favors increased vector densities (vectors are animals that can carry a disease agent from one person or animal to another, like mosquitoes transmitting malaria or West Nile virus). Urbanization itself has become a risk factor as populations rise and infrastructure designed to accommodate dense populations is built. International travel and global commerce daily connects disparate regions of the world providing avenues for introductions of new vector species and emerging vector-borne disease. Today, mosquitoes alone are responsible for an estimated 725,000 deaths worldwide each year.

California is not immune from these changes. In fact, recent introductions of new vector-borne diseases and invasive mosquito species have altered the public health landscape such that the 'status quo' must change. Development projects which affect the movement, collection, or management of water that do not account for vector breeding potential will negatively impact public health, and owners/managers of these projects are accountable.

California is home to one of the most extensive mosquito and vector control networks in the United States. Mosquito abatement and vector control districts are charged in Sections 2000-2067 of the California Health and Safety Code (HSC) with managing and controlling populations of mosquitoes and other vectors to protect residents from nuisance and disease. Historically, these districts have worked behind the scenes to manage vector populations as required; but as this White Paper documents, this approach is no longer sustainable nor is it in the best interest of the environment.

Proactive design and maintenance can dramatically reduce the risk of vector production and vector-borne disease transmission, improve water quality and habitat benefits, and result in more sustainable development in the long run. In California, significant mosquito and vector breeding habitat exists today which can be attributed to a correctable oversight in the California Environmental Quality Act (CEQA). Too often, the potential impacts on public health are overlooked in project planning stages and are not recognized in local General Plans, site Specific Plans, or other planning documents. According to Sections 2060-2067 of the HSC, property owners are ultimately responsible for the abatement of a public nuisance and may be held liable for all costs necessary to abate the nuisance, prevent its recurrence, and civil penalties of up to $1000 per day that the nuisance exists.

This White Paper is a tool for local governments and other lead agencies to manage, analyze, and address the impacts of mosquito and vector breeding inherent in certain types of projects subject to CEQA analysis. In this regard, consulting local vector control agencies on the front-end of planning and project approval is recommended to save time, resources, and improve the health of Californians.

Mosquito abatement and vector control districts use Integrated Vector Management (IVM) programs to implement the most environmentally-sound and economically feasible methods to control mosquitoes and other vectors. IVM programs incorporate education, physical control and source reduction, biological and chemical control, and favor integrated planning efforts to manage vector populations and disease risk.

The Mosquito and Vector Control Association of California (MVCAC) recommends that policy-makers, planning officials, and project proponents incorporate relevant considerations from the Best Management Practices for Mosquito Control publication into the planning and review process. This BMP guidance was developed by the California Department of Public Health in collaboration with MVCAC to reduce the spread of diseases and reduce the need to use pesticides. A copy of the most recent update (July 2012) can be viewed here: http://www.cdph.ca.gov/HealthInfo/discond/Documents/BMPforMosquitoControl07-12.pdf.

Issue:

Current CEQA Statutes and Guidelines neglect to specifically address public health pests or provide protections from mosquitoes and other important public health vectors. In some instances, this has led to an avoidable proliferation of project sites that breed mosquitoes and expose Californians, domestic animals, pets, and wildlife to disease risks including the dangerous West Nile virus and emerging threats such as dengue and chikungunya viruses. Some sites also provide harborage for other vectors and nuisance pests, including flies and rodents. ***This oversight has resulted in projects that fail to meet the design or land use objectives necessary for compliance with Sections 2000-2067 of the HSC.***

> Section 2060 Article 5 (b) of the HSC states:
>
> *The person or agency claiming ownership or title, or right to property or who controls the diversion, delivery, conveyance, or flow of water shall be responsible for the abatement of a public nuisance that is caused by, or as a result of, that property or the diversion, delivery, conveyance, or control of that water.*

A public nuisance is in the HSC Section 2002 is defined as:

(j) "Public nuisance" means any of the following:

(1) Any property, excluding water that has been artificially altered from its natural condition so that it now supports the development, attraction, or harborage of vectors. The presence of vectors in their developmental stages on a property is prima facie evidence that the property is a public nuisance.

(2) Any water that is a breeding place for vectors. The presence of vectors in their developmental stages in the water is prima facie evidence that the water is a public nuisance.

(3) Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors.

As a result, these non-compliant projects needlessly put the public, sensitive wildlife, water quality, and other resources at greater risk. Managing vectors from these sites has resulted in increased pesticide use, liability for project proponents, costly retrofits, fines to property owners, and disproportionate burden to taxpayers.

For example, countless stormwater BMPs have been designed and installed over the last 20 years to manage stormwater discharges without applying basic knowledge of vector ecology. Many poorly designed or inadequately maintained mitigation sites have unintentionally become significant sources of mosquito production, adversely impacting communities, businesses and recreational open spaces. These have also disrupted the balance and diversity of natural environments. Had these projects considered the long-term implications of mosquito production in the planning, design, and maintenance objectives at the onset, these deleterious impacts would have been largely avoided at little or no cost to the project proponent.

Solution:

Inclusion of appropriate language and considerations in local General Plans, local CEQA guidelines and planning guidelines will assist project planners to minimize or avoid mosquito and vector production in CEQA approved projects. This is increasingly essential in light of tightened pesticide regulations, the encroachment of development into wetlands and wildlands, on-site water retention required by Low Impact Development standards (LID) and grey-water recycling and water conservation efforts.

Discussion:

Under existing California law, property or water rights owners are responsible for public nuisances they create and are subject to abatement, including control costs and fines. Fortunately, Best Management practices (BMPs) have been developed to reduce or prevent vector production and harborage. It is also recognized that climate change may further enhance the spread of vectors and increase the outbreak of vector-borne diseases. With proactive planning and incorporation of BMPs into local planning guidelines, the entitlement process, and CEQA, abatement costs are avoided and public health is protected.

The failure to properly address this critical concern within the CEQA Statutes and Guidelines has resulted in the following problems:

Case Studies

Problem 1

Increased urbanization brings mosquitoes closer to where people live and work. Hardscape environments force everyday urban runoff to pool and stagnate in structures designed to convey storm flows and filter out pollutants. Many of these systems are old and in disrepair, especially gutters, retention basins and underground storm drain systems (USDS). Urban runoff from landscape and agriculture irrigation occurs year-round and increases in warmer months. These discharges stagnate and create favorable mosquito breeding conditions. The dispersal of blood-feeding mosquitoes from these sites into the surrounding urban environment increases the risk factor for humans, domestic animals, and wildlife for infection with diseases like West Nile virus.

For example: one northern California city utilizes natural streams and created detention facilities to accommodate pulse storm flows as well as upstream seasonal agricultural drainage and urban runoff. High beaver populations coupled with limited maintenance has allowed dense vegetation to create blockages allowing water to stagnate and breed mosquitoes near heavily used walking paths and residential properties. Each new housing project located along these stream corridors further impacts the drainage issues and contributes additional non-storm flows to the system already at full capacity.

Solution:

When new or redevelopment projects undergo a CEQA review, consideration should be given to the project's potential to produce mosquitoes or other vectors in 1) stormwater treatment/ conveyance structures, 2) year-round runoff flows from the project, 3) any other features (like ornamental lakes or creeks) designed to hold or convey water, and 4) cumulative impacts of projects on current or potential vector-borne disease risks in the area.

The HSC establishes that property and water rights owners are responsible for conditions that support a "public nuisance." Therefore, it is imperative to evaluate the potential of a proposed project to create or prevent such a nuisance. Under most circumstances production of mosquitoes, other vectors, and nuisance pests can be avoided or minimized through proper planning and design or maintenance elements. *The CEQA review process should require the project proponent to examine the potential that water holding or conveyance features may create a public nuisance and then seek the advice of vector control professionals as necessary and mitigate for any significant impacts.*

Problem 2

Under the National Pollution Discharge Elimination System (NPDES) permits, storm water BMPs and Low Impact Development (LID) features are mandated to improve water quality. Most often, these features are designed to capture and retain or infiltrate stormwater. Certain BMPs, like vortex separators, media filter chambers, treatment wetlands, underground storage tanks, and rain barrels hold water for extended periods, creating ideal mosquito breeding conditions, especially if not regularly maintained. Maintenance schedules rarely include recommendations to limit vector breeding. The sheer number of these features, lack of location data, lack of public awareness, and the proliferation of year-round runoff has created a complex and increasing challenge for public health mosquito and vector control programs. The few inches of highly organic water standing in these systems can produce thousands of mosquitoes every week.

Solution:

Few Multiple Separate Stormwater Sewer System (MS4) permits have requirements that address mosquito and vector production from these systems and, in those that do, the language and requirements are quite variable. *The State Water Board and regional water boards should seek state-wide consistency in addressing this issue.* Here is a link to an MS4 permit that got it right: http://www.waterboards.ca.gov/coloradoriver/board_decisions/adopted_orders/orders/2013/0011cv_ms4.pdf

Problem 3

State and federal resource management agencies require project proponents to mitigate project impacts to natural resources like wetlands, riparian creeks, or sensitive species. This mitigation is often in the form of a 2:1 ratio for habitat creation. Wetland/habitat mitigation sites are commonly incorporated as aesthetic elements into housing developments and commercial complexes.

Created wetlands/riparian features often have poor water quality and low species diversity since they are typically fed by urban runoff flows directed from the development. This creates ideal mosquito breeding habitat, often in close proximity to where people live and work. Conflicting resource agency management objectives often result in sites that are frequently not maintained and become filled in with sediment, invasive vegetation, and pestiferous mosquitoes. These conditions make mosquito inspection and treatment difficult and may require the property owner to acquire resource agency permits to have maintenance work performed, so that access and treatments can be effective. Consequently, when effective non-chemical control options such as water management or vegetation reduction cannot be—or are not—used, more frequent pesticide applications may be required to protect public health from mosquitoes and mosquito-borne diseases.

Solution:

If the potential for mosquito and vector production were addressed in the CEQA Statutes and Guidelines, project planners could effectively articulate what vector production avoidance measures would be incorporated into the site design and prescribe long-term maintenance measures. This consideration at the onset of the project is highly cost-effective for the project proponent and/or property owner who otherwise has to pay for expensive remediation and large scale maintenance costs that could have been "designed out" of the project.

Problem 4

Mosquito abatement and vector control programs often do not have discretionary approval or permitting authority, and are not routinely made aware of impending new projects within their jurisdictions by city/county planning or permitting departments. New sources of vectors are typically discovered after a complaint is filed by a member of the public, allowing vector populations to grow unchecked and requiring additional labor and often multiple pesticide applications.

Solution:

Having location and type data on potential new sources would allow mosquito control agencies to keep the sites under surveillance for mosquito production and proactively prevent breeding problems. This is another element that can be addressed by local planning guidelines as project planners would be made aware of these needs and directed to resources like the California Department of Public Health document, titled "Best Management Practices for Mosquito Control in California," a manual of cost-effective IVM guidelines and design parameters. Consulting vector control agencies when projects have certain features like holding water would also help address this problem.

Problem 5

Public health mosquito and vector control agencies often do not have safe access to sites for inspection and possible treatment. Some project sites have paths and access roads that are used for multiple purposes, but most do not. Routine maintenance and access to creek banks and flooded areas specifically for vector control often are not analyzed under CEQA or are not included in the management plans, thus complicating the local District's efforts for safe and permissive access especially during fire season.

Solution:

Access to properties could be readily planned into a project and integrated with its objectives. This is especially critical for large, vegetated water features. This can also be addressed at the local planning level as project proponents would be made aware of these needs and directed to resources like the California Department of Public Health document, titled "Best Management Practices for Mosquito Control in California," a manual of cost-effective IVM guidelines and design parameters.

Problem 6

Poorly designed projects often breed mosquitoes and other vectors. After installation, pesticide applications are often needed because of design flaws, lack of planning, lack of maintenance, etc. Even with planning, changes in projects can result in the need for coordination from mosquito control professionals.

For example, a sanitation district in southern California constructed wastewater treatment wetlands to treat primary treated wastewater prior to discharging it to a local river. The local mosquito control district consulted on the Initial Study and Mitigated Negative Declaration and entered into a Memorandum of Understanding with the sanitation district to prevent and control mosquito and midge (fly) breeding. The mosquito control district provides the sanitation district with information on its control efforts and coordinates on water flow strategies, vegetation management, and biological resources. In return, the sanitation district provides access to the wetlands, manages vegetation, allows for a chicken flock to be kept for disease surveillance on the property, maintains sprinklers at the edges of the ponds for spraying at dawn and dusk to reduce egg-laying by mosquitoes, and reimburses the mosquito control district for chemical products and supplies used to control mosquitoes in the wetlands. In order to reduce mosquito breeding, the sanitation district even switched to secondary treatment, using the wetlands to provide tertiary treatment of the water, which removes more bio solids and thus provides cleaner water. But poor design could not be overcome and the project has experienced ongoing mosquito activity at unacceptable levels. All of these measures were implemented post design of the project and thus were aimed at mitigation, not prevention.

In 2013, the mosquito control district used $22,068.03 of chemical products and supplies; the sanitation district spent another $100,000 on vegetation management. The wetlands require weekly treatments from March through November to control the mosquitoes and protect the residents from West Nile virus. The wetlands have also become a wild bird sanctuary which requires additional consideration for control product selection and use on the property. While this wild bird sanctuary is an attractive feature, it further complicates the application of chemicals to control mosquito populations.

Solution:

The IVM approach was not followed in the example above. As previously discussed, the IVM approach looks at all available options to manage mosquito and vector populations, and integrates the most effective options to protect public health. A key component of an effective IVM program is to prevent or minimize the need for ongoing control efforts, which reduces the amount of pesticide that is applied. Today, less pesticide would be used if more existing projects had considered mosquito and vector control issues during the design phase. Had this approach been taken in the design phase of the wetlands project in this example by reducing or eliminating features and conditions that would likely result in vector problem, there would have been a substantial savings of time, money and energy and a public health benefit of less mosquitos and reduced need for chemical usage. For example, designing the wetlands with consideration for how far land-based larval mosquito pesticide application equipment can effectively treat mosquitoes would have increased the efficacy of those applications, allowing for better protection of people and wildlife.

Problem 7

In neighborhoods with higher density residential and/or commercial property use, the activities of a redevelopment or construction project may disturb structures, debris and vegetation that have significant rodent populations. These rodent vectors disperse to the surrounding properties or buildings, to the disadvantage of the owner/occupants. There have been significant rodent infestations of neighborhoods caused when large rodent populations are dispersed from old buildings and/or neglected properties that are demolished or cleared.

Solution:

It would be appropriate for the cost of de-populating a vacant property of rodents prior to demolition to be borne by the property owners, saving the neighbors from the consequences of rodent dispersal. In projects where CEQA analysis is necessary, a vermin assessment and abatement plan should be considered and then applied when and where appropriate. Consulting vector control agencies when projects have rodent-dispersing potential would also help address this problem, as the agency could assess the site and propose a best management solution.

Problem 8

The Centers for Disease Control and Prevention reported that 2012 was the deadliest year on record, in the United States, for West Nile virus, reaching 286 fatalities and 5,674 reported infections; 51% of these patients had the neuroinvasive form of the disease, and many will endure long-lasting or permanent neurological impairment as a consequence of their illness. According to a 2006 study that examined the cost-effectiveness of a West Nile virus vaccine, the estimated baseline cost of a neuroinvasive disease was $27,500, and for each infection that resulted in a long-term disability, the cost averaged $210,000. The cost associated with each West Nile virus infection includes health care, lost wages, loss of productivity, and other significant economic ramifications.

Solution:

Reducing the number of potential mosquito and vector breeding sources through cost-effective planning measures may reduce the number of human disease cases and reduce healthcare and other cost burdens both public and private.

Needed Action

The inclusion of mosquito and vector control considerations as a preventive planning measure in the CEQA Statutes and Guidelines, specifically in Appendix G – Environmental Checklist Form will address the aforementioned problems with state-wide consistency. This will also help to synchronize multiple state resource agency objectives, better protect Californians from vectors and vector-borne diseases, reduce costs for project proponents and property owners, and save taxpayer resources.

Below is an example of mosquito and vector related questions that should be considered in a project's CEQA analysis. These can be included as a stand-alone addition to a lead agency's Initial Study Checklist or modified to fit under an existing section of the checklist like Public Services, Biological Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, or Mandatory Findings of Significance depending on the nature of the project:

> *Vector Control — The analysis for a project must consider evidence of potential environmental impacts, even if such impacts are not specifically listed on the Appendix G checklist. [State CEQA Guidelines, § 15063(f)] To determine whether Public Health & Safety may be significantly impacted, lead agencies should refer to the California Health & Safety Code § 2000-2093 for definitions and liabilities associated with the creation of habitat conducive to vector production and to guidance provided by the local mosquito and vector control districts/agencies in their determination of environmental impacts.* ***Would the project:***
>
> *a) Increase the potential exposure of the public to disease vectors (e.g., mosquitoes, flies, ticks, and rats)?*
>
> *b) Increase potential mosquito/vector breeding habitat (i.e., areas of prolonged standing/ponded water like wetlands or stormwater treatment control BMPs and LID features)?*

Having these public health vector control considerations added to lead agency CEQA environmental checklists would be an important first step in ensuring that vector issues are appropriately addressed early in the project planning process in environmental documents. This has been done successfully by the County of San Diego, Department of Planning and Land Use, since 2007. When enacted it translates into preventive planning, compatible design, and effective long-term maintenance that avoids or reduces vectors. Beyond the important benefit to public health, it also results in a substantial cost savings to taxpayers and reduces pesticide applications into the environment.

The MVCAC believes that taking these proactive measures will correct a pervasive planning oversight and better ensure protection of the environment and the public health for the citizens of California.

A Short History of Mosquito Control in California – How It Began

The first recorded mosquito control efforts in California were under the direction of University of California professors and employed against the salt marsh mosquitoes of the San Francisco Bay marshlands at San Rafael (1904) and at Burlingame (1905). The devastating effects of malaria in California's Central Valley in 1908 led to an education and demonstration program on malaria and anopheline mosquito control conducted by professor William B. Herms of the University of California, Berkeley, and sponsored by the Southern Pacific Railway. The first organized anti-malaria program was undertaken at Penryn in the Sacramento Valley in 1910, and later the same year an anti-malaria program was started in nearby Oroville.

Abatement Agencies

Enabling legislation for the creation of organized mosquito control agencies was passed May 29, 1915, when the State Legislature approved the Mosquito Abatement Act. Legislation authorizing the creation of pest abatement districts was passed in 1935, but only a few such districts have been formed for mosquito control. In pest abatement districts, the powers and legal bases are very similar to mosquito abatement districts, but the former provide for abatement of "any plant, animal, insect, fish, or other matter or material" as deemed a pest.

Role of the State Department of Public Health

The State Department of Public Health (Department of Health Services) created a Bureau of Vector Control (Environmental Management Branch) in 1946. The Branch was staffed with experts who assisted in the formation of many new mosquito abatement districts. The Branch also provided a number of technical services including disease surveillance and research studies throughout California. Today, CDPH, Infectious Diseases Branch, Vector-Borne Disease Section continues this mission of providing technical assistance and research that promotes vector-borne disease prevention.

Status of Mosquito Abatement and Vector Control Agencies

As of 2012, there were 82 organized mosquito and vector control agencies; these agencies had a combined operating budget totaling 75.8 million dollars. They provide control measures against mosquitoes, chaoborids (phantom midges), chironomids (non-biting midges), yellow jackets, black flies, red imported fire ants, rodents, and other pests and vectors for 37.3 million California residents. The state association that represents these agencies is the Mosquito and Vector Control Association of California (MVCAC). MVCAC is the leading advocate for mosquito and vector control in the California Legislature, among regulatory agencies and for the general public.