

**Riverside County Department of Environmental Health, Vector Control Program,
Pesticide Application Plan (PAP) 2011**

Riverside County's Vector Control Program is an integral part of the County's Community Health Agency whose responsibilities are to reduce the risk of disease transmission by mosquitoes and other vectors, for the residents and visitors of the County. In meeting our responsibilities, it is our mission to utilize the most effective and efficient Best Management Practices (BMPs) to reduce mosquito breeding sources and to minimize the use of pesticides which may have an effect on the environment and waters of the United States.

Description of Target and Adjacent Areas

The service area includes Central, Southern, and Eastern portions of Riverside County. Main Waters of the United States include: the San Jacinto River, the Santa Ana River, and the Colorado River. Please refer to Attachment A for a map of the service area.

Factors Influencing the Decision to Utilize Pesticides for Mosquito Control

Riverside County is demographically diverse; comprised of urban, suburban, agricultural, and wetland environments. Due to this diversity, there are a multitude of factors that have to be considered prior to the application of pesticides for mosquito control purposes. Such as location and type of breeding source with regards to populated areas, biology and species of mosquito competent in vectoring mosquito-borne viruses to incidental hosts, larval densities and their respective developmental stages, and the analysis and risk assessment of surveillance data as outlined in the California Department of Public Health Mosquito-Borne Virus Surveillance and Response Plan. For example: If vegetation is dense or if the source may dry up, then biorationallarvicide applications may have to be considered.

Types of Pesticides Used and Their Respective Adjuvants and Surfactants

Please refer to the Attachment B for the list of pesticides.

Description of the Types and Locations of Mosquito Breeding Sources

Urban Areas

- Abandoned swimming pools/spas
- Residential development storm water BMP's
- Street storm drains
- Flood control channels and basins
- Sewage treatment facilities with tertiary treated holding ponds
- Seasonal creeks and streambeds

Suburban Areas

- Seasonal pools of standing water
- Depressions holding water in fields for agricultural purposes
- Drainage ditches along roadways
- Irrigation and return channels
- Dairy ponds
- Seasonal creeks and streambeds
- DFG operated wetlands

Alternative Methods Used in Mosquito Control and Their Limitations

With any mosquito or other vector source, our Vector Control Program's first goal is to look for ways to eliminate the source, or, if that is not possible, ways to reduce the vector potential. The most commonly used methods and their limitations are included in the Best Management Practices for Mosquito Control in California.

The most critical and important alternative method is the education of residents and public entities on how mosquitoes develop, their influence on public health, and practices to utilize in the removal of/or management of water and vegetation to establish a long term solution that will meet their needs and reduce the need for public health pesticide applications. A major limitation of the educational approach is the level of willingness of the public to realize the severity of the problem and whether or not they have the sincere desire to abate or incorporate water and vegetation management practices.



The County's Vector Control Program has a strong affinity towards the use of predacious fish (*Gambusiaaffinis*) in the control of mosquito larva in residential applications (ornamental ponds, abandoned swimming pools), and contained breeding sources in rural and urban environments where propagation of the species will enhance their biological control capabilities. However, evaluation of the breeding source in vegetation density, and water influx for fish survivability must be considered for maximizing their control capabilities. If vegetation is dense or if the source may dry up, then biorationallarvicide applications may have to be considered.

Approximate Amount of Annual Pesticide Use

(Amounts were determined based on product used in 2010.)

<u>Product</u>	<u>Ounces</u>
Agnique MMF	2,804
Agnique MMF G	6,377
Altosid 30 day Briquettes	620
Altosid Pellets	2,658
Altosid XR Briquettes	2,361
Altosid XRG Granules	5,164
Aqualuer20-20	580
Aqua Reslin	120
BVA 2 Oil	2,722
GB1111	539
Permanone	3,511
Pyrenone	183
VectobacG	14,170
VectolexCG	17,485
VectolexWSP	104
TeknarHPD	5,926

Representative Monitoring Locations and the Justification for Selecting These Locations

Please refer to the MVCAC NPDES Coalition Monitoring Plan.



Evaluation of Available BMPs to Determine Feasible Alternatives to the Pesticide Application Site that could Reduce Potential Water Quality Impacts

The Riverside County Vector Control Program shall continue to examine the possibility of alternatives to reduce the need for applying larvicide and adulticide agents. Such methods include:

- a. Evaluating the following management options, in which the impact to water quality, impact to non-target organisms, vector resistance, feasibility, and cost effectiveness should be considered:
 - No action
 - Prevention
 - Mechanical or physical methods (by the property owner)
 - Cultural methods
 - Biological control agents
 - Pesticides
- b. Applying pesticides only when vectors are present at a level that will constitute a nuisance
- c. Using the least intrusive method of pesticide application
- d. Public education efforts to reduce potential vector breeding habitat
- e. Applying a decision matrix concept to the choice of the most appropriate formulation

These actions describe our Vector Control Program's existing Integrated Vector Management (IVM) Program, as well as the practices described in the California Mosquito-borne Virus Surveillance and Response Plan and Best Management Practices for Mosquito Control in California. Locations where vectors may exist are assessed, and the potential for using alternatives to pesticides are determined on a case-by-case basis. Commonly considered alternatives include: 1) Eliminate artificial sources of standing water; 2) Ensure temporary sources of surface water drain within four days (96 hours) to prevent adult mosquitoes from developing; 3) Control plant growth in ponds, ditches, and shallow wetlands; 4) Design facilities and water conveyance and/or holding structures to minimize the potential for producing mosquitoes; and 5) Use appropriate biological control methods that are available. Additional alternatives to using pesticides for managing mosquitoes are listed in the Best Management Practices for Mosquito Control in California.

Implementing preferred alternatives depends on a variety of factors including availability of agency resources, cooperation with stakeholders, coordination with other regulatory agencies, and the anticipated efficacy of the alternative. If a pesticide-free alternative does not sufficiently reduce the risk of public health, pesticides are considered.

Description of the BMPs to be Implemented

With any mosquito or other vector source, our Vector Control Program's first goal is to look for ways to eliminate the source, or, if that is not possible, ways to reduce the vector potential. The most commonly used methods and their limitations are included in the Best Management Practices for Mosquito Control in California.

The most critical and important alternative method is the education of residents and public entities on how mosquitoes develop, their influence on public health, and practices to utilize in the removal of/or management of water and vegetation to establish a long term solution that will meet their needs and reduce the need for public health pesticide applications. A major limitation of the educational approach is the level of willingness of the public to realize the severity of the problem and whether or not they have the sincere desire to abate or incorporate water and vegetation management practices.

The County's Vector Control Program has a strong affinity towards the use of predacious fish (*Gambusia affinis*) in the control of mosquito larva in residential applications (ornamental ponds, abandoned swimming pools), and contained breeding sources in rural and urban environments where propagation of the species will enhance their biological control capabilities. However, evaluation of the breeding source in vegetation density, and water influx for fish survivability must be considered for maximizing their control capabilities. If vegetation is dense or if the source may dry up, then biorational larvicide applications may have to be considered.

Periodic Updates to the Existing PAP

The Riverside County Vector Control Program shall update the PAP periodically, and submit the revised PAP to the State Water Board for approval.

Developed BMPs and their Elements Utilized by the Riverside County Vector Control Program

The County's Vector Control Program BMPs are described in the Best Management Practices for Mosquito Control in California and the California Mosquito-borne Virus and Surveillance and Response Plan.

1. Identifying the Problem

Prior to the first pesticide application covered under this General Permit that will result in a discharge of residual pesticides to waters of the U.S., and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, the Riverside County Vector Control Program will do the following for each vector management area:

a. Establish densities for larval and adult vector populations to serve as action threshold(s) for implementing pest management strategies

Only those mosquito sources that Vector Control Staff determine to represent imminent threats to public health or quality of life are treated. The presence of any mosquito may necessitate treatment; however, higher thresholds may be applied depending on the Vector Control Program's resources, disease activity, or local needs. Treatment thresholds are based on a combination of one or more of the following criteria:

- Mosquito species present
- Mosquito stage of development
- Pest, nuisance, or disease potential
- Disease activity
- Mosquito abundance
- Flight range
- Proximity to populated areas
- Size of source
- Presence or absence of natural enemies or predators
- Presence of sensitive or endangered species.



b. Identify target vector species to develop species-specific pest management strategies based on developmental and behavioral considerations for each species

The target vectors within our jurisdiction are as follows: *Culextarsalis*, *Culexquinquefasciatus*, *Culexerythrothorax*, *Culexstigmatosoma*, *Aedesvexans* *Anopheles hermsi*, *Anopheles franciscanus*.

We utilize our IVM universally for all species of mosquito we encounter within our jurisdiction.

c. Identify known breeding areas for source reduction, larval control program, and habitat management

Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the Vector Control Program's preferred solution, and whenever possible the Vector Control Program works with property owners to effect long-term solutions to reduce or eliminate the need for continued pesticide applications as described in Best Management Practices for Mosquito Control in California.

d. Analyze existing surveillance data to identify new or unidentified sources of vector problems as well as areas that have recurring vector problems

The Riverside County Vector Control Program is an active participant in the California Vector-Borne Disease Surveillance Gateway System. This system has been designed to assist all districts and health agencies throughout California in the interpretation of surveillance results to determine the potential of epizootic events in viral transmission. Provided data is utilized by field staff members in the interpretation of existing BMP source reduction efforts as well as discovering new or potential mosquito breeding areas.

The Vector Control Program continually collects adult and larval mosquito surveillance data, dead bird reports, and sentinel chicken test results, and monitors regional mosquito-borne disease activity detected in humans, horses, birds, and /or other animals. This data is used to guide mosquito control activities.

2. Examine the Possibility of Alternatives

The Riverside County Vector Control Program shall continue to examine the possibility of alternatives to reduce the need for applying larvicide and adulticide agents. Such methods include:

- a. Evaluating the following management options, in which the impact to water quality, impact to non-target organisms, vector resistance, feasibility, and cost effectiveness should be considered:
 - No action
 - Prevention
 - Mechanical or physical methods (by the property owner)
 - Cultural methods
 - Biological control agents
 - Pesticides
- b. Applying pesticides only when vectors are present at a level that will constitute a nuisance

The Riverside County Vector Control Program follows an existing IVM program which includes practices previously described in this document.

A 'nuisance' is specifically defined in California Health and safety Code (HSC) §2002(j). This definition allows vector control agencies to address situations where even a low number of vectors may pose a substantial threat to public health and quality of life. In practice, the definition of a 'nuisance' is generally only a part of a decision to apply pesticides to areas covered under this permit. As summarized in the California Mosquito-borne Virus Surveillance and Response Plan, the overall risk to the public when vectors and/or vector-borne disease are present is used to select an available and appropriate material, rate, and application method to address that risk in the context of our IVM program.

- c. Using the least intrusive method of pesticide application
- d. Public education efforts to reduce potential vector breeding habitat
- e. Applying a decision matrix concept to the choice of the most appropriate formulation



These actions describe our Vector Control Program's existing Integrated Vector Management (IVM) Program, as well as the practices described in the California Mosquito-borne Virus Surveillance and Response Plan and Best Management Practices for Mosquito Control in California. Locations where vectors may exist are assessed, and the potential for using alternatives to pesticides are determined on a case-by-case basis. Commonly considered alternatives include: 1) Eliminate artificial sources of standing water; 2) Ensure temporary sources of surface water drain within four days (96 hours) to prevent adult mosquitoes from developing; 3) Control plant growth in ponds, ditches, and shallow wetlands; 4) Design facilities and water conveyance and/or holding structures to minimize the potential for producing mosquitoes; and 5) Use appropriate biological control methods that are available. Additional alternatives to using pesticides for managing mosquitoes are listed in the Best Management Practices for Mosquito Control in California.

Implementing preferred alternatives depends on a variety of factors including availability of agency resources, cooperation with stakeholders, coordination with other regulatory agencies, and the anticipated efficacy of the alternative. If a pesticide-free alternative does not sufficiently reduce the risk of public health, pesticides are considered.

3. Correct Use of Pesticides

Users of pesticides must ensure that all reasonable precautions are taken to minimize the impacts caused by pesticide applications. Reasonable precautions include the right application techniques and equipment, taking into account weather conditions, and the need to protect the environment.

a. Measures to prevent pesticide spill

The Vector Control Program's staff monitors application equipment on a daily basis to ensure it remains in proper working order. Spill mitigation devices are placed in all spray vehicles and pesticide storage areas to respond to spills. Employees are trained annually on spill prevention and response.

b. Measures to ensure that only a minimum and consistent amount is used

Spray equipment is calibrated each year and is a part of the MOU with CDPH.



- c. Plan to educate Discharger's staff and pesticide applicator on any potential adverse effects from the pesticide application.**

Applicators are required to complete annual pesticide training.

- d. Descriptions of specific BMPs for each spray mode, e.g. aerial spray, truck spray, hand spray, etc.; cease and desist order**

The Vector Control Program's staff will calibrate truck and hand larviciding equipment each year to meet application specifications. Supervisors review spray records daily to ensure appropriate amounts of material are being used. ULV equipment is calibrated for output and droplet size to meet label requirements. Aerial larvicide equipment is calibrated by a Contractor. Aerial adulticide equipment is calibrated by a Contractor and droplet size is monitored to ensure droplets meet label requirements. Airplanes used in urban ULV applications and the primary airplane used for rural ULV spraying is equipped with advanced guidance and drift management equipment to ensure the best available technology is being used to place product in the intended spray area.

- e. Descriptions of specific BMPs for each type of environmental setting (agriculture, urban, and wetlands).**

The Vector Control Program field staff will educate the landowner as to the proper ways of creating an unfavorable infrastructure to mosquito breeding for each type of environment. For agricultural areas, land manipulation by the landowner (i.e. the raising and lowering of standing water levels or grading fields to have an appropriate runoff to curtail mosquito breeding) is the most utilized and most effective tool.

Urban settings are less available to land manipulation and in the past few years have included an exponential increase in abandoned swimming pools. These pools are either drained by the city or bank that is handling their eventual sale, or minimum amounts of pesticides are applied on a regular basis to maintain control of any mosquito breeding. Mosquito fish can also be utilized in some urban settings where the water will exist for an extended amount of time, such as ornamental ponds.

When dealing with wetland environments, the Department of Fish and Game is consulted for the different types of approved mosquito abatement methods. These methods include: the raising and lowering of the water levels, the use of mosquito fish, Bti based larvicides, and ULV application of pesticides for adult mosquitoes as a last resort.

Pesticide Application Log

The Vector Control Program field staff will maintain a log for each pesticide application. The application log will contain, at a minimum, the following information, when practical, for larvicide or adulticide applications:

- 1. Date of application;**
- 2. Location of the application and target areas (e.g., address, GPS coordinates, or crossroads);**
- 3. Name of applicator;**
- 4. The names of the water bodies treated (i.e., canal, creek, lake, etc.);**
- 5. Applications details, such as application start and stop times, pesticide application rate and concentration, flow rate of the target area, surface area, pesticide(s) and adjuvants used by the technician, and volume or mass of each component discharged;**

This is an existing practice of the Vector Control Program as required to comply with DPR Regulations and our CDPH Cooperative Agreement requirements.

- 4. As required from NPDES General Permit Section VIII(b.), public notices can be found at:**

http://www.rivcoeh.org/opencms/rivcoeh/ProgServices/Food_Program/Vector.html.

References:

Best Management Practices for Mosquito Control in California. 2010. Available by download from the California Department of Public Health—Vector-Borne DiseaseSection at:

<http://www.cdph.ca.gov/HealthInfo/discond/Pages/MosquitoBorneDiseases.aspx> or <http://www.westnile.ca.gov/resources.php>

under the heading Mosquito Control and Repellent Information.



Copies may be also requested by calling the California Department of Public Health—Vector-Borne Disease Section at (916) 552-9730 or the Riverside County Department of Environmental Health, Vector Control Program at 951-766-9454

California Mosquito-borne Virus Surveillance and Response Plan. 2010. [Note: this document is updated annually by CDPH]. Available by download from the California Department of Public Health—Vector-Borne Disease Section at:

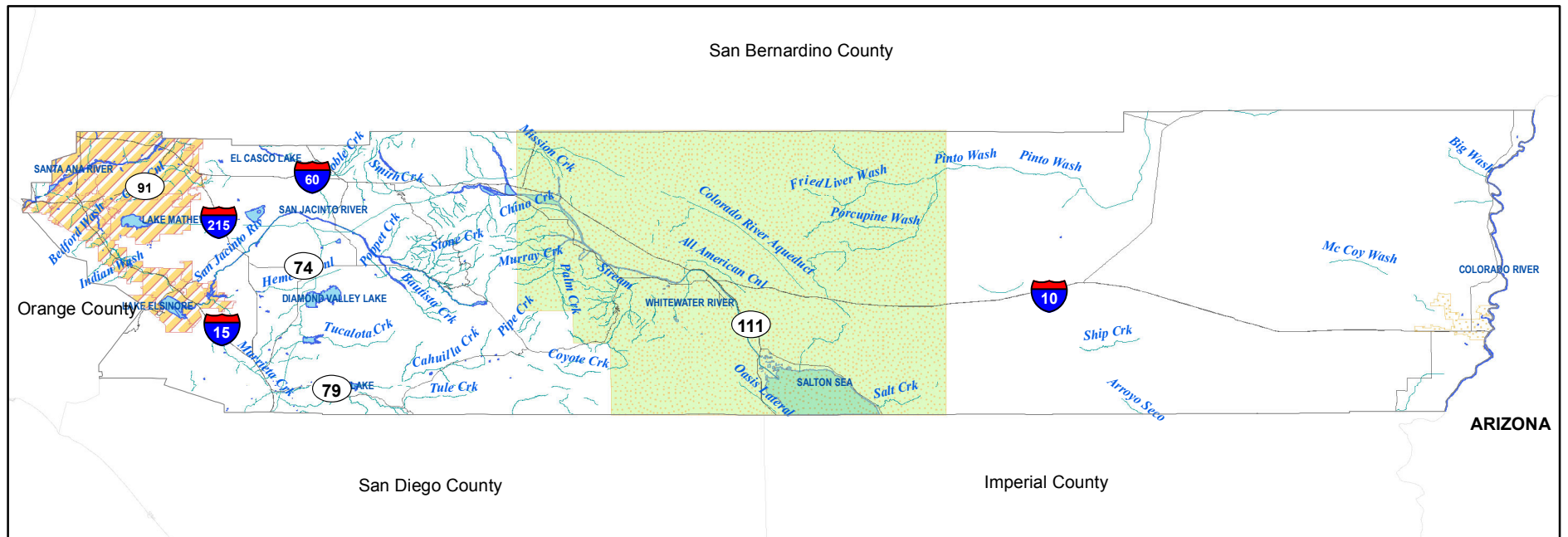
<http://www.cdph.ca.gov/HealthInfo/discond/Pages/MosquitoBorneDiseases.aspx> or <http://www.westnile.ca.gov/resources.php>






under the heading Response Plans and Guidelines. Copies may be also requested by calling the California Department of Public Health—Vector-Borne Disease Section at (916) 552-9730 or the Riverside County Department of Environmental Health, Vector Control Program at 951-766-9454

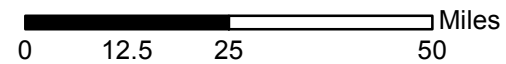
MVCAC NPDES Coalition Monitoring Plan. 2011.

ATTACHMENT A

Riverside County Department of Environmental Health Vector Control Service Area



-  COACHELLA VALLEY MOSQUITO VECTOR CONTROL DISTRICT
-  NORTHWESTERN MOSQUITO CONTROL DISTRICT
-  CITY OF BLYTHE
-  RIVERSIDE COUNTY BOUNDARY
-  RIVERS, LAKES, AND CANALS



ATTACHMENT B
RIVERSIDE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH
VECTOR CONTROL PROGRAM
PESTICIDES USED FOR MOSQUITO CONTROL

LARVICIDES

Active Ingredient	Trade Name	EPA Reg. No.	MFG.	Treatment Type App. Method	Adjuvant	Pesticide Classification	Application
Monomolecular film	Agnique MMF G	53263-30	Cognis Corp.	Surface Water Back Pack Blower	Inert Ingredient	Surface Film	Larvae and Pupae
Monomolecular film	Agnique MMF	53263-28	Cognis Corp.	Surface Water Truck Mounted Pro-Spray B&G Tank	Inert Ingredient	Surface Film	Larvae and Pupae
S-Methoprene	Altosid Briquet	2724-375	Wellmark-Zoecon	Standing/Running Water Hand App.	Inert Ingredient	IGR	Larvae
S-Methoprene	Altosid XR Briquet	2724-421	Wellmark-Zoecon	Standing/Running Water Hand App.	Inert Ingredient	IGR	Larvae
S-Methoprene	Altosid ALL	2724-392	Wellmark-Zoecon	Standing/Running Water Truck Mounted Pro-Spray B&G Tank	Inert Ingredient	IGR	Larvae
S-Methoprene	Altosid Pellets	2724-448	Wellmark-Zoecon	Standing/Running Water Back Pack Blower	Inert Ingredient	IGR	Larvae
S-Methoprene	Altosid Pellets WSP	2724-448	Wellmark-Zoecon	Standing/Running Water Hand App.	Inert Ingredient	IGR	Larvae
<i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bti)	B.t.i. Briquet	6218-47	Summit Chemical Co.	Surface Water Hand App.	Inert Ingredient	Biorational	Larvae
Petroleum oil	BVA 2 Larvicide Oil	70589-1	BVA Oils	Surface water Truck Mounted Pro-Spray B&G Tank	Inert Ingredient	Surface Film	Larvae and Pupae
<i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bti)	Teknar HP-D	73049-404	Valent BioSciences	Surface Water Truck Mounted Pro-Spray B&G Tank	Inert Ingredient	Biorational	Larvae
<i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bti)	VectoBac 12AS	73049-38	Valent BioSciences	Surface Water Truck Mounted Pro-Spray B&G Tank	Inert Ingredient	Biorational	Larvae
<i>Bacillus thuringiensis</i> var. <i>israelensis</i>	VectoBac G	73049-10	Valent BioSciences	Standing/Running Water Back Pack Blower	Inert Ingredient	Biorational	Larvae
<i>Bacillus sphaericus</i> (Bs)	VectoLex CG and WSP	73049-20	Valent BioSciences	Standing/Running Water Back Pack Blower Hand App.	Inert Ingredient	Biorational	Larvae

ADULTICIDES

Active Ingredient	Trade Name	EPA Reg. No.	MFG.	Treatment Type App. Method	Adjuvant	Pesticide Classification	Application
Permethrin	Aqualuer 20-20	769-985	VGS	Adult Mosquitoes ULV, Thermal & Barrier	PBo	Pyrethroid	Adults
Permethrin	Aqua-Reslin	432-796	Bayer	Adult Mosquitoes ULV, Mist Blowers, Hand held	PBo	Pyrethroid	Adults
Permethrin	Permone Ready-To-Use	432-1277	Bayer	Adult Mosquitoes ULV	PBo	Pyrethroid	Adults
Resmethrin	Scourge	432-716	Bayer	Adult Mosquitoes ULV	PBo	Pyrethroid	Adults