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DISTRICT MANAGER
MICHAEL G. HEARST

Victoria Whitney
Deputy Director, Division of Water Quality
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

RECEIVED

JUN 20 2011

DIVISION OF WATER QUALITY

June 16, 2011

RE: TRANSMITTAL OF NOTICE OF INTENT TO COMPLY WITH THE
TERMS OF WATER QUALITY ORDER NO. 2011-0002-DWQ STATEWIDE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT FOR BIOLOGICAL AND RESIDUAL PESTICIDE DISCHARGES TO
WATERS OF THE OF THE UNITED STATES FROM VECTOR CONTROL
APPLICATIONS (GENERAL PERMIT) NO. CAG 990004

Dear Ms. Whitney:

Please find attached a Notice of Intent to comply with the terms of the above-listed Statewide General Permit for Vector Control Applications. Additionally, you will find enclosed the required Pesticide Application Plan. We have also attached two checks, warrant nos. #11639 and #11640 for payment of the application fee(s) each in the amount of \$136.00 for enrollment in Region 8 (Santa Ana) and Region 9 (San Diego). Copies of the NOI have been transmitted to both the Santa Ana and San Diego Regional Water Quality Control Boards under whose jurisdiction we operate.

If you have any questions or require further information please contact me at (714) 971-2421 ext.140.

Sincerely,

Amber Semrow
Biologist, OCVCD

As/rc

Enc. (1) NOI Application Package

"An Independent Special District Serving Orange County Since 1947"

The mission of the Orange County Vector Control District is to provide the citizens of Orange County with the highest level of protection from vectors and vector-borne diseases.

ATTACHMENT G – NOTICE OF INTENT

WATER QUALITY ORDER NO. 2011-0002-DWQ
GENERAL PERMIT NO. CAG 990004

STATEWIDE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT
FOR BIOLOGICAL AND RESIDUAL PESTICIDE DISCHARGES
TO WATERS OF THE UNITED STATES
FROM VECTOR CONTROL APPLICATIONS

I. NOTICE OF INTENT STATUS (see Instructions)

Mark only one item ☒ A. New Applicator ☐ B. Change of Information: WDID# _____
☐ C. Change of ownership or responsibility: WDID# _____

II. DISCHARGER INFORMATION

A. Name Orange County Vector Control District			
B. Mailing Address 13001 Garden Grove Blvd.			
C. City Garden Grove	D. County Orange	E. State CA	F. Zip Code 92843
G. Contact Person Larry Shaw	H. Email address lshaw@ocvcd.org	I. Title Director of Operations	J. Phone 714-971-2421

III. BILLING ADDRESS (Enter Information only if different from Section II above)

A. Name			
B. Mailing Address			
C. City	D. County	E. State	F. Zip Code
G. Email address	H. Title	I. Phone	

IV. RECEIVING WATER INFORMATION

A. Biological and residual pesticides discharge to (check all that apply)*:

1. Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.

☐ Name of the conveyance system: _____

2. Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.

☒ Owner's name: various private and government ownership

Name of the conveyance system: all water conveyance systems in Orange County

3. Directly to river, lake, creek, stream, bay, ocean, etc.

☒ Name of water body: Waters of the US, all waters that breed vectors

* A map showing the affected areas for items 1 to 3 above may be included.

(See supplemental attachment to IV.)

B. Regional Water Quality Control Board(s) where application areas are located

(REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 8 and 9

(List all regions where pesticide application is proposed.)

See Exhibits 1-3

A map showing the locations of A1-A3 in each Regional Water Board shall be included.

V. PESTICIDE APPLICATION INFORMATION

A. Target Organisms: ☒ Vector Larvae ☒ Adult Vector

B. Pesticides Used: List name, active ingredients and, if known, degradation by-products

See Table 1 in Pesticide Application Plan.

C. Period of Application: Start Date Jan 1 End Date Dec 31 (Continuous For permit term)

D. Types of Adjuvants Added by the Discharger: water and mineral oil

VI. PESTICIDES APPLICATION PLAN

A. Has a Pesticides Application Plan been prepared?*

☒ Yes ☐ No

If not, when will it be prepared? _____

* A copy of the PAP shall be included with the NOI.

B. Is the applicator familiar with its contents?

☒ Yes ☐ No

VII. NOTIFICATION

Have potentially affected governmental agencies been notified?

☒ Yes ☐ No

* If yes, a copy of the notifications shall be attached to the NOI.

VIII. FEE

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?

☒ Yes ☐ NO ☐ NA

IX. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. Additionally, I certify that the provisions of the General Permit, including developing and implementing a monitoring program, will be complied with."

A. Printed Name: Michael G. Hearst

B. Signature: M.G. Hearst

Date: 6/8/11

C. Title: District Manager

X. FOR STATE WATER BOARD USE ONLY

WDID:	Date NOI Received:	Date NOI Processed:
Case Handler's Initial:	Fee Amount Received: \$	Check #:

NOI Supplemental Attachment - IV. Receiving Water Information

Below is a list of the receiving waters in Orange County. These features, their tributaries, lakes, reservoirs, marshes, unnamed drainages, ditches and the water conveyances and infrastructure throughout the county can be subject to mosquito control applications by the Orange County Vector Control District (see associated map).

List of Orange County Receiving Waters by Water Quality Control Board Regions

Santa Ana Region 8

Anaheim Bay-Huntington Harbor

- Bolsa Chica Channel
- Bolsa Chica Wetlands
- East-Garden Grove Wintersburg Channel
- Westminster Channel

Newport Bay

- Big Canyon Wash
- Costa Mesa Channel
- Santa Isabella Channel
- Santa Ana Delhi

San Diego Creek

- Peters Canyon Wash

Newport Coast

- Muddy Creek

San Gabriel River

- Coyote Creek
- Carbon Creek

Santa Ana River

- Santiago Creek

San Diego Region 9

Aliso Creek

- Wood Canyon
- Sulphur Creek
- Aliso Hills Channel
- English Channel

Dana Point Harbor

Salt Creek

Laguna Canyon Creek

- Boat Canyon Drainage
- Blue Bird Canyon Drainage
- Rim Rock Canyon Drainage
- Hobo Canyon Drainage
- Emerald Canyon Drainage

Prima Deshecha Canada

Prima Deshecha

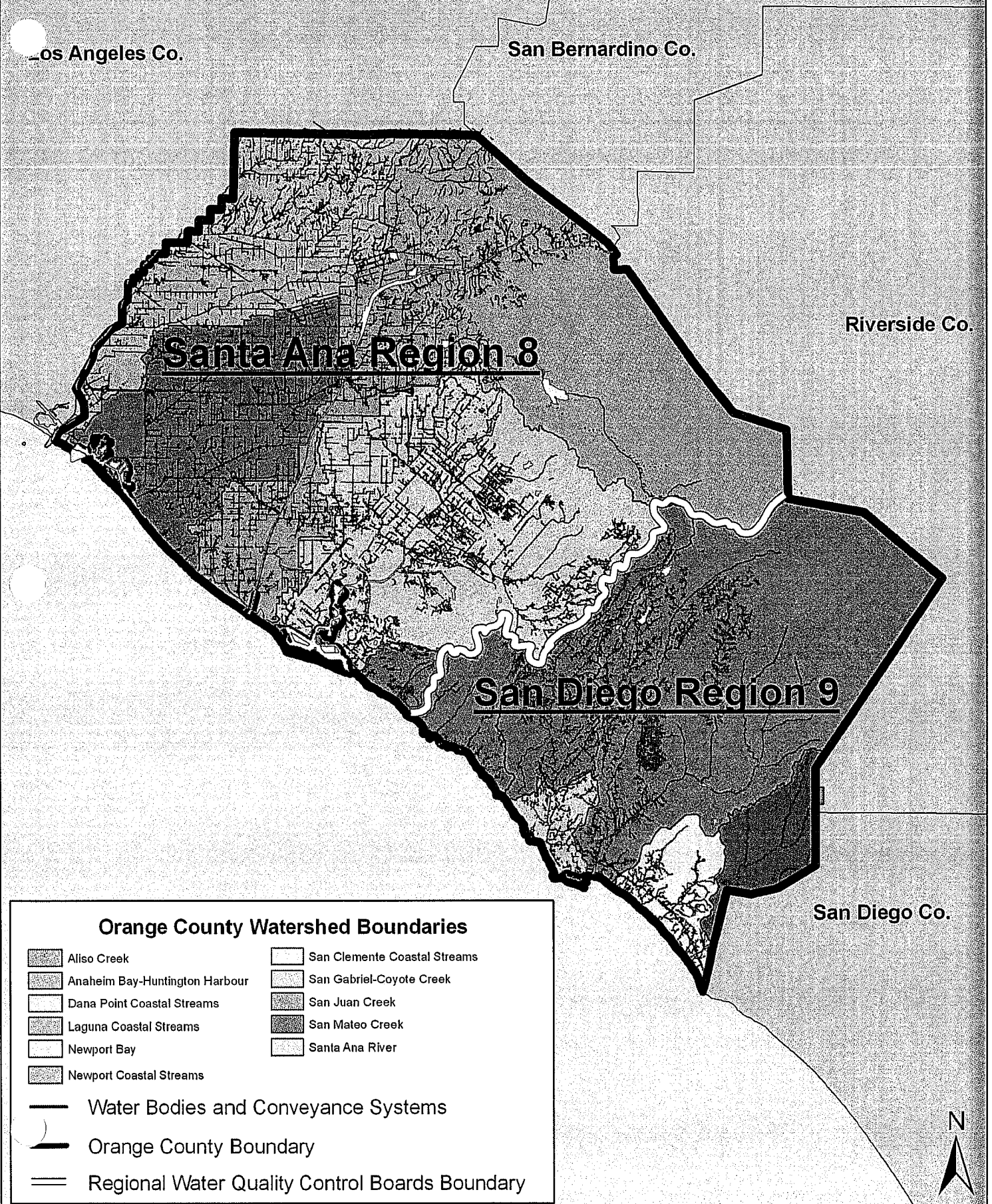
Segunda Deshecha Canada

San Juan Creek

- Arroyo Trabuco
- Oso Creek

San Mateo Creek

Regional Water Quality Boards within Orange County, Ca



PESTICIDE APPLICATION PLAN

For the Biological and Residual Pesticide Discharges to Surface Waters of
the US by the Orange County Vector Control District

**FOR WATER QUALITY ORDER NO. 2011-0002-DWQ STATEWIDE NATIONAL
POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR
BIOLOGICAL AND RESIDUAL PESTICIDE DISCHARGES TO WATERS OF THE OF
THE UNITED STATES FROM VECTOR CONTROL APPLICATIONS (GENERAL
PERMIT) NO. CAG 990004**

June 16, 2011

Prepared for:

State Water Resources Control Board
Santa Ana Regional Water Quality Control Board (Region 8)
San Diego Regional Water Quality Control Board (Region 9)

Prepared by:

Orange County Vector Control District
13001 Garden Grove Blvd.
Garden Grove, CA 92843
Contact: Larry Shaw, Director of Operations
Telephone: (714) 971-2421
Fax: (714) 971-3940

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Exhibit 2 – Map of Anticipated Larvicide Locations within Water Conveyance Systems
Exhibit 3 – Map of Anticipated Adulticide Locations
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Appendix 2 – <i>California Mosquito-Borne Virus Surveillance & Response Plan</i>
Appendix 3 – <i>Best Management Practices for Mosquito Control in California</i>
Appendix 4 – <i>OCVCD Vector Reduction Manual: Procedures and Guidelines</i>
Appendix 5– Public Notice to Potentially Affected Governmental Agencies

List of Acronyms and Abbreviations

The District	Orange County Vector Control District
The County	Orange County
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resource Control Board
MVCAC	Mosquito and Vector Control Association of California
BMP	Best Management Practice
IVM	Integrated Vector Management
NPDES	National Pollutant Discharge Elimination System
CDPH	California Department of Public Health
DPR	Department of Pesticide Regulation
CDPH	California Department of Public Health
General Permit	General Permit No. CAG 990004, Permit for Vector Control

Introduction

The Orange County Vector Control District (the District) is a public health agency charged with protecting the citizens of Orange County from vectors and vector-borne disease under Division 3 (Pest Abatement) of the California Health and Safety Code (CAL. HSC. § 2000-2910). The District is an Independent Special District that carries out its mission with a balanced approach focused on protecting public health and the environment. The District's operations are based out of the city of Garden Grove, California, and service all 789 square miles of Orange County, home to more than three million residents. Service is provided to all 34 cities within Orange County as well as unincorporated areas, federal and state lands. The District operates year-round to control mosquitoes, other flies, red imported fire ants (RIFA), and rats.

The District is within the jurisdiction of the Santa Ana Regional Water Quality Control Board (Region 8) and the San Diego Regional Water Quality Control Board (Region 9), and is seeking coverage under the General Permit No. CAG 990004 as "a public entity" that applies biological and residual pesticides for vector control in or near waters of the United States (Exhibit 1). The District has previously obtained coverage under General Permit Order No. 2004-0008-DWQ for application of aquatic pesticides (larvicides) for vector control. This new Order No. 2011-0002-DWQ replaces Order No. 2004-0008-DWQ and covers adulticides (pesticides used to control adult mosquitoes) in addition to larvicides (pesticides used to control aquatic larval stages of immature mosquitoes).

The District utilizes an Integrated Vector Management (IVM) Program strategy to control the production of mosquitoes, filth flies and black flies, red imported fire ants (RIFA), and rats. The IVM Program consists of the following activities: 1) Surveillance for vectors, vector habitats, and associated pathogens/diseases-this includes field and laboratory analysis of vectors in order to evaluate populations and emerging disease threats; 2) Source reduction to limit breeding by vectors; this includes management of vegetation, land, and water with appropriate landowners to minimize vector production; 3) Education and outreach efforts targeted toward the public and private landowners in ways to facilitate source reduction and minimize disease-carrying vectors; 4) Distribution of mosquito fish (*Gambusia affinis*), a biological control measure used to reduce mosquito production isolated aquatic features, such as neglected residential swimming pools; and 5) Application of pesticides to minimize vector populations and reduce the threat of potential vector-borne disease transmission to humans.

The District is a member of the Mosquito and Vector Control Association of California (MVCAC), a statewide association of over 60 mosquito and vector control agencies. The District has joined the MVCAC NPDES Coalition Monitoring Program in an effort to meet water quality testing requirements set forth in this General Permit.

As required under Section VIII. Pesticide Use Requirements. C., of the General Permit, the District is submitting this document as its Pesticide Application Plan for review and approval by the State Water Resources Control Board (SWRCB).

Excerpts from Section VIII. Pesticide Use Requirements. C. Pesticide Application Plan., are included in ***bold italics***.

1 Description of Target Areas

Description of the ALL target areas and adjacent areas, if different from the water body of the target area, in to which larvicides and adulticides pesticides are being planned to be applied or may be applied to control vectors. The description shall include adjacent areas, if different from the water body of the target areas.

Orange County (the County) is a coastal county comprised of approximately 789 square miles. It is bordered on the southwest by the Pacific Ocean, on the north by Los Angeles County, on the northeast by San Bernardino County and Riverside County, and on the southeast by San Diego County. The northwestern part of the county lies on the coastal plain of the Los Angeles Basin, while the southeastern end rises into the foothills of the Santa Ana Mountains. With a Mediterranean climate, Orange County has a diversity of land uses ranging from urban/metropolitan centers, agricultural croplands, and residential communities as well as regional parks and national forests. The County also has nearly 40 miles of the Pacific Ocean coastline.

The District applies pesticides for the purpose of vector control to locations within the jurisdiction of two different Regional Water Quality Control Boards (RWQCBs): Santa Ana, Region 8 and San Diego, Region 9 (Exhibit 1). Watersheds of Orange County include the larger Santa Ana River, San Gabriel-Coyote Creek, Anaheim Bay-Huntington Harbor, Newport Bay, Aliso Creek, San Juan Creek, San Mateo Creek, and the smaller San Clemente Coastal Streams, Dana Point Coastal Streams, Laguna Coastal Streams, and Newport Coastal Streams watersheds (County of Orange, 2008) (See Supplemental Attachment to NOI). All watersheds in Orange County are potentially subject to treatment applications if threshold levels of target vectors are present.

The receiving water systems in Orange County which are subject to pesticide applications by the District include any and all navigable waters and their tributaries, waters of the State, and waters of the US in Orange County and any adjacent to District boundaries that breed mosquitoes, black flies, or midges (See Supplemental Attachment to NOI). This includes water features like the Santa Ana River and its tributaries, any and all flood control channels, basins, storm drains, gutters, roadside low spots, backyard pools, ponds, wetlands and any stagnant water feature found to be breeding mosquitoes exceeding threshold numbers.

For more specific application areas/sites see Section 4 of this document.

Discussion of the factors influencing the decision to select pesticide applications for mosquito vector control.

Treatment thresholds are based on the following criteria: mosquito species present, mosquito stage of development, nuisance or disease potential, mosquito abundance, flight range, proximity to populated areas, size of source, presence/absence of natural enemies or predators, and presence of sensitive/endangered species.

Considerations are also drawn from and in accordance with the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

3 Types of Pesticide Products

Please see Attachments E and F within NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the U.S. for Vector Control Applications. Products may be applied by hand, truck, hand can, helicopter, or airplane according to label directions. The types of pesticides used in mosquito control and the methods of applications are also discussed in detail and listed in the Best Management Practices for Mosquito Control in California (Appendix 3).

The District plans to use the pesticides listed in attached Table 1 below and reserves the right to use any product approved under the terms of this General Permit.

Table 1. Planned Pesticides for Use by Orange County Vector Control District.

PESTICIDES USED FOR MOSQUITO CONTROL AT ORANGE COUNTY VECTOR CONTROL DISTRICT

Active Ingredient	Trade Name	EPA Reg. No.	Manufacturer	Formulation	Active Ingredient	Application	Pesticide Classification
Bacillus thuringiensis israelensis (Bti)	VectoBac 12AS	73049-38	Valent BioSciences Corporation	Liquid	11.61%	Larvae	Biorational
Bacillus thuringiensis israelensis (Bti)	VectoBac G	73049-10	Valent BioSciences Corporation	Granules	2.80%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex CG	73049-20	Valent BioSciences Corporation	Granules	7.5%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex WSP	73049-20	Valent BioSciences Corporation	Water Soluble Pouches	7.5%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex WDG	73049-57	Valent BioSciences Corporation	Water Dispersible Granules	51.2%	Larvae	Biorational
Bacillus sphaericus (Bs) 6% Bacillus thuringiensis israelensis (Bti) 1%	FOURSTAR	83362-3	Fourstar Microbials	Briquet	7.0%	Larvae	Biorational
Spinosad	Natular 2EC	8329-82	Clarke Mosquito Control Products, Inc.	Liquid	21%	Larvae	Biorational
Monomolecular Film	Agnique MMF	53263-28	Cognis Corporation	Liquid	100%	Larvae & Pupae	Surface Film
Monomolecular Film	Agnique MMF-G	53263-30	Cognis Corporation	Granules	32%	Larvae & Pupae	Surface Film
Aliphatic Petroleum Hydrocarbons	Mosquito Larvicide GB-1111	8329-72	Clarke Mosquito Control Products, Inc.	Liquid	98.7%	Larvae & Pupae	Surface Film
Highly refined petroleum distillate	BVA 2	70589-1	BVA OILS	Liquid	97.0%	Larvae & Pupae	Surface Film
S-Methoprene	Altosid Briquets	2724-375	Wellmark International Zoecon	Briquet	8.62%	Larvae	IGR
S-Methoprene	Altosid XR Extended Residual Briquets	2724-421	Wellmark International Zoecon	Briquet	2.1%	Larvae	IGR
S-Methoprene	Altosid Liquid Larvicide Concentrate	2724-446	Wellmark International Zoecon	Liquid	20%	Larvae	IGR
S-Methoprene	Altosid Pellets Mosquito Growth Regulator	2724-448	Wellmark International Zoecon	Pellet-type Granules	4.25%	Larvae	IGR
Sumithrin 10% Piperonyl Butoxide 10%	Aqua Anvil	1021-1807-8329	Clarke Mosquito Control Products, Inc.	Liquid	20.00%	Adult	Pyrethroid
Etofenprox 20%	Zenivex E20	2724-791	Wellmark International Zoecon	Liquid	20.00%	Adult	Pyrethroid

4 Description of Application Areas

Description of ALL the application areas and the target areas in the system that are being planned to be applied or may be applied. Provide a map showing these areas.*

Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible the District works with property owners to affect long-term solutions to reduce or eliminate the need for continued applications as described in Best Management Practices for Mosquito Control in California (Appendix 3).

The targets for application projects are primarily the immature aquatic stages of insect vectors, including mosquitoes, midges, and black flies, which predominantly breed in standing or slow-moving water. These insect disease vectors may pose a threat to human public health, especially due to the risk they may spread West Nile virus, and require treatment to eliminate or minimize the health risks. Using the District's IVM Plan (Appendix 1) decision matrix, District personnel use pesticides as a last resort to treat water features that have undesirable insect pest vectors exceeding threshold levels. Larvicides are applied at larval mosquito development sites which can include drainage channels, riparian areas, wetlands, roadside ditches, neglected swimming pools, ornamental ponds, catch basins, detention/retention basins, and potentially, any aquatic site or low lying area that has standing water for longer than 96 hours. Many of these applications take place in urban watershed storm water conveyance systems. Exhibit 2 depicts the anticipated larviciding application areas within water conveyance systems throughout the County based on 2010 treatment application data. Additional application areas include breeding locations within the coastal wetlands, and intermittent or ephemeral streams.

Areas requiring larvicide applications are treated, as necessary, primarily from spring to late fall during the warmest months (approximately March – November). However, if vectors are a persistent problem at some locations, applications may be made year-round. Pesticides are applied only when a vector is present at threshold levels, and to water that will be present for at least 96 hours.

Directing our main efforts at controlling mosquito larvae allows the District to localize treatments and use the least toxic alternatives. Adult mosquitoes may occasionally be targeted for control. However, since pesticides must be applied over a greater area and are less selective, the District avoids using them wherever possible. Currently, there are four sites in the County that are receive adulticide treatment when they exceed threshold levels due to persistent mosquito breeding conditions and their proximity to human populations (Exhibit 3).

5 Other Control Methods Used

Other control methods used (alternatives) and their limitations.

With any mosquito or other vector source, the District's first goal is to look for ways to eliminate the source, or, if that is not possible, for 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 (Appendix 3). In addition, the District has recently formalized its agency-specific Vector Reduction Program by developing and adopting the Vector Reduction Manual: Procedures & Guidelines (the VRM) (Appendix 4). This document describes how the District aims to work with property owners to reduce or eliminate vector-favorable conditions by encouraging the implementation of Vector Reduction Guidelines, which are based on IVM techniques and strategies.

Some specific methods used by the District include educating residents that mosquitoes develop in standing water and encouraging them to remove sources of standing water on their property, working with property owners to find long-term water/environmental management strategies that meet their needs while minimizing the need for public health pesticide applications, and use of non-pesticide biological control agents like mosquito fish, *Gambusia affinis*, when appropriate.

6 Anticipated Product Amounts

Approximately how much product is needed/anticipated to be used and how this amount was determined.

The need to apply product is determined by surveillance. Actual use varies annually depending on mosquito abundance. The total amounts of mosquito control pesticides applied by the District from January 2010 – December 2010 are shown in Table 2 below. These amounts serve as an approximation of the amount of product anticipated for annual future use. Several factors influence the amounts of pesticides applied, which can include rainfall, weather patterns, disease outbreak, and availability of products. Other public health pesticides in addition to those listed below may be used as part of the District's best management practices.

Table 2. Pesticide Usage for Mosquito Control by OCVCD (January 2010 – December 2010).

Jan 2010 – Dec 2010			
Product	Amount	Unit	No. of Applications
Altosid Pellets	816.79	pounds	518
Altosid Briquets	50.82	pounds	559
Altosid XR Briquets	1,158.54	pounds	2,945
GB-1111	948.72	gallons	2,529
BVA-2	1,351.72	gallons	220
Aquaprene XL Briquets	30.00	pounds	3.0
Aquaprene XL Granules	19.00	pounds	2.0
Agnique MMF	4,426.30	ounces	823
Agnique MMF-G	157.00	pounds	19
Vectobac G	42,619.50	pounds	2,085
Vectobac 12AS	138.26	gallons	542
Vectolex CG	1,444.00	pounds	4.0
Vectolex WDG	294.56	pounds	121
Aqua Anvil	98.39	gallons	181

Please note that the District intends to discontinue the use of Golden Bear (GB-1111), as this product is no longer being manufactured. Additionally, the District, as of June 2011 has discontinued the use of Aquaprene XL Briquets and Aquaprene XL Granules.

7 Monitoring Locations

Representative monitoring locations and the justification for selecting these monitoring locations.*

The District is a member of the MVCAC NPDES Coalition Monitoring Program (the Coalition). Please refer to the MVCAC NPDES Monitoring and Reporting Plan post on the State Water Resources Control Board website.

8 Evaluation of Available BMPs

Evaluation of available BMPs to determine if there are feasible alternatives to the selected pesticide application project that could reduce potential water quality impacts.

The District uses BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

Prior to each pesticide application, all feasible alternatives are evaluated. Protocol for these evaluations are discussed in the aforementioned documents.

9 Description of BMPs

Description of the BMPs to be implemented. The BMPs shall include, at the minimum.

The District uses BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

9.1 Measures to Prevent Pesticide Spill

District 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 on spill prevention and response annually. All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.2 Measures to Ensure Minimum and Consistent Amount Used

Spray equipment is calibrated each year and is a part of stipulation of the Cooperative Agreement, a Memorandum of Understanding with the California Department of Public Health. All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.3 Applicator Education on Adverse Effects of Pesticide Application

The California Vector Control Technician Certification and Continuing Education Guidelines (CPDH, 2007) describes all topics that vector control technicians are trained and certified in. Applicators are required to complete pesticide and safety training annually which will include NPDES Permit training.

9.4 Descriptions of Specific BMPs for Each Application Mode

The District calibrates truck-mounted and handheld larviciding equipment each year to meet application specifications. Supervisors review application records daily to ensure appropriate amounts of material are used. Ground-based Ultra Low Volume (ULV) application equipment is calibrated for output and droplet size to meet label requirements. Aerial larviciding equipment is calibrated by the Contractor. Although the District does not typically make airplane applications, if needed, aerial adulticide equipment will be calibrated regularly and droplet size will be monitored by the agency to ensure droplets meet label requirements. If airplanes used in urban ULV applications and the primary airplane used for rural ULV application will be equipped with advanced guidance and drift management equipment to ensure the best available technology is being used to place product in the intended area. If a secondary airplane is used in rural ULV applications it will be equipped with an advanced guidance system.

All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.5 BMPs for Pesticide Products Used

Please see the Best Management Practices for Mosquito Control in California (Appendix 3) for general pesticide application BMPs, and the current approved pesticide labels for application BMPs for specific products.

9.6 BMPs for Environmental Setting

The District uses environmental setting, specific BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

10 Identification of the Problem

Prior to first pesticide application covered under this General Permit that will result in a discharge of biological and residual pesticides to waters of the US, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, the Discharger must do the following for each vector management area:

10.1 Establishment of Vector Populations

If applicable, Establish densities for larval and adult vector populations to serve as action threshold(s) for implementing pest management strategies;

Only those mosquito sources that District 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 District'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/absence of natural enemies or predators, and presence of sensitive/endangered species or habitats. This is discussed in detail in the District's IVM Plan (Appendix 1).

10.2 Identification of Target Vector Species

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

The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2) that are used by this agency.

10.3 Identification of Known Breeding Areas

Identify known breeding areas for source reduction, larval control programs and habitat management;

Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible, the District works with property owners to implement long-term solutions to reduce or eliminate the need for continued applications. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

10.4 Analysis of Surveillance Data

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

The District continually collects adult and larval mosquito surveillance data, dead bird reports, avian seroprevalence test results, and uses them to guide mosquito control activities. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

11 Examination of Alternatives to Treatments

Dischargers shall continue to examine alternatives to pesticide use to reduce the need for applying larvicides that contain temephos and for spraying adulticides. 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, cultural methods, biological control agents, or pesticides.

If there are no alternatives to pesticides, dischargers shall use the least toxic pesticide necessary to control the target pest.

b. Applying pesticides only when vector 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 criteria are described in the District's existing Integrated Vector Management Program. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

12 Correct Use of Pesticides

Users Coalition's or Discharger's use of pesticides must ensure that all reasonable precautions are taken to minimize the impacts caused by pesticide applications. Reasonable precautions include using the right spraying techniques and equipment, taking account of weather conditions and the need to protect the environment.

This is an existing practice of the District, and is required to comply with the Department of Pesticide Regulation's (DPR) requirements and the terms of our California Department of Public Health (CDPH) Cooperative Agreement. All pesticide applicators receive annual safety and spill training in addition to their regular continuing education. All errors in application and spills are reported to the proper authority.

13 Public Notices

Specify a website where public notices, required in Section VIII.B, may be found.

Attached as Appendix 5 is the Public Notice the District will distribute to potentially affected government agencies and post on its website (www.ocvcd.org).

14 References

Best Management Practices for Mosquito Control in California. 2010. Available by download from the California Department of Public Health—Vector-Borne Disease Section at <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 Orange County Vector Control District at (714) 971-2421.

California Department of Public Health. 1989. The California Vector Control Technician Certification and Continuing Education Guidelines (2007 Revision). Accessed 3/03/2011 <http://www.cdph.ca.gov/certlic/occupations/Documents/VCTCEGuide.pdf>

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.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 Orange County Vector Control District at (714) 971-2421.

County of Orange. 2008. Orange County General Plan 2005 (2008 Revision). Accessed 3/03/2011 <http://www.ocplanning.net/GeneralPlan2005.aspx>

MVCAC NPDES Coalition Monitoring Plan. 2011. [In development at the time of this draft]

State Water Resources Control Board (SWRCB), 2011, Water Quality Order No. 2011-0002-DWQ, Statewide General National Pollutant Discharge Elimination System Permit For Biological and Residual Pesticide Discharges to Waters of Waters Of The United States From Vector Control Vector Control Applications (General Permit No. CAG 990004).

PESTICIDE APPLICATION PLAN

For the Biological and Residual Pesticide Discharges to Surface Waters of
the US by the Orange County Vector Control District

**FOR WATER QUALITY ORDER NO. 2011-0002-DWQ STATEWIDE NATIONAL
POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR
BIOLOGICAL AND RESIDUAL PESTICIDE DISCHARGES TO WATERS OF THE OF
THE UNITED STATES FROM VECTOR CONTROL APPLICATIONS (GENERAL
PERMIT) NO. CAG 990004**

June 16, 2011

Prepared for:

State Water Resources Control Board
Santa Ana Regional Water Quality Control Board (Region 8)
San Diego Regional Water Quality Control Board (Region 9)

Prepared by:

Orange County Vector Control District
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Appendix 4 – <i>OCVCD Vector Reduction Manual: Procedures and Guidelines</i>
Appendix 5– Public Notice to Potentially Affected Governmental Agencies

List of Acronyms and Abbreviations

The District	Orange County Vector Control District
The County	Orange County
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resource Control Board
MVCAC	Mosquito and Vector Control Association of California
BMP	Best Management Practice
IVM	Integrated Vector Management
NPDES	National Pollutant Discharge Elimination System
CDPH	California Department of Public Health
DPR	Department of Pesticide Regulation
CDPH	California Department of Public Health
General Permit	General Permit No. CAG 990004, Permit for Vector Control

Introduction

The Orange County Vector Control District (the District) is a public health agency charged with protecting the citizens of Orange County from vectors and vector-borne disease under Division 3 (Pest Abatement) of the California Health and Safety Code (CAL. HSC. § 2000-2910). The District is an Independent Special District that carries out its mission with a balanced approach focused on protecting public health and the environment. The District's operations are based out of the city of Garden Grove, California, and service all 789 square miles of Orange County, home to more than three million residents. Service is provided to all 34 cities within Orange County as well as unincorporated areas, federal and state lands. The District operates year-round to control mosquitoes, other flies, red imported fire ants (RIFA), and rats.

The District is within the jurisdiction of the Santa Ana Regional Water Quality Control Board (Region 8) and the San Diego Regional Water Quality Control Board (Region 9), and is seeking coverage under the General Permit No. CAG 990004 as "a public entity" that applies biological and residual pesticides for vector control in or near waters of the United States (Exhibit 1). The District has previously obtained coverage under General Permit Order No. 2004-0008-DWQ for application of aquatic pesticides (larvicides) for vector control. This new Order No. 2011-0002-DWQ replaces Order No. 2004-0008-DWQ and covers adulticides (pesticides used to control adult mosquitoes) in addition to larvicides (pesticides used to control aquatic larval stages of immature mosquitoes).

The District utilizes an Integrated Vector Management (IVM) Program strategy to control the production of mosquitoes, filth flies and black flies, red imported fire ants (RIFA), and rats. The IVM Program consists of the following activities: 1) Surveillance for vectors, vector habitats, and associated pathogens/diseases-this includes field and laboratory analysis of vectors in order to evaluate populations and emerging disease threats; 2) Source reduction to limit breeding by vectors; this includes management of vegetation, land, and water with appropriate landowners to minimize vector production; 3) Education and outreach efforts targeted toward the public and private landowners in ways to facilitate source reduction and minimize disease-carrying vectors; 4) Distribution of mosquito fish (*Gambusia affinis*), a biological control measure used to reduce mosquito production isolated aquatic features, such as neglected residential swimming pools; and 5) Application of pesticides to minimize vector populations and reduce the threat of potential vector-borne disease transmission to humans.

The District is a member of the Mosquito and Vector Control Association of California (MVCAC), a statewide association of over 60 mosquito and vector control agencies. The District has joined the MVCAC NPDES Coalition Monitoring Program in an effort to meet water quality testing requirements set forth in this General Permit.

As required under Section VIII. Pesticide Use Requirements. C., of the General Permit, the District is submitting this document as its Pesticide Application Plan for review and approval by the State Water Resources Control Board (SWRCB).

Excerpts from Section VIII. Pesticide Use Requirements. C. Pesticide Application Plan., are included in ***bold italics***.

1 Description of Target Areas

Description of the ALL target areas and adjacent areas, if different from the water body of the target area, in to which larvicides and adulticides pesticides are being planned to be applied or may be applied to control vectors. The description shall include adjacent areas, if different from the water body of the target areas.

Orange County (the County) is a coastal county comprised of approximately 789 square miles. It is bordered on the southwest by the Pacific Ocean, on the north by Los Angeles County, on the northeast by San Bernardino County and Riverside County, and on the southeast by San Diego County. The northwestern part of the county lies on the coastal plain of the Los Angeles Basin, while the southeastern end rises into the foothills of the Santa Ana Mountains. With a Mediterranean climate, Orange County has a diversity of land uses ranging from urban/metropolitan centers, agricultural croplands, and residential communities as well as regional parks and national forests. The County also has nearly 40 miles of the Pacific Ocean coastline.

The District applies pesticides for the purpose of vector control to locations within the jurisdiction of two different Regional Water Quality Control Boards (RWQCBs): Santa Ana, Region 8 and San Diego, Region 9 (Exhibit 1). Watersheds of Orange County include the larger Santa Ana River, San Gabriel-Coyote Creek, Anaheim Bay-Huntington Harbor, Newport Bay, Aliso Creek, San Juan Creek, San Mateo Creek, and the smaller San Clemente Coastal Streams, Dana Point Coastal Streams, Laguna Coastal Streams, and Newport Coastal Streams watersheds (County of Orange, 2008) (See Supplemental Attachment to NOI). All watersheds in Orange County are potentially subject to treatment applications if threshold levels of target vectors are present.

The receiving water systems in Orange County which are subject to pesticide applications by the District include any and all navigable waters and their tributaries, waters of the State, and waters of the US in Orange County and any adjacent to District boundaries that breed mosquitoes, black flies, or midges (See Supplemental Attachment to NOI). This includes water features like the Santa Ana River and its tributaries, any and all flood control channels, basins, storm drains, gutters, roadside low spots, backyard pools, ponds, wetlands and any stagnant water feature found to be breeding mosquitoes exceeding threshold numbers.

For more specific application areas/sites see Section 4 of this document.

2 Pesticide Selection Factors

Discussion of the factors influencing the decision to select pesticide applications for mosquito vector control.

The District's Board of Trustees adopted an Integrated Vector Management & Response Plan (the IVM Plan) in May of 2010 (Appendix 1). The District's IVM Plan outlines surveillance and control measures for vectors in Orange County. The purpose of the IVM Plan is to provide guidelines to the District's staff and information to stakeholders regarding the various responses made to prevent and control disease vectors as well as introduced diseases and vectors in Orange County. This document details the roles and responsibilities of Management, Administration, Communications, Scientific/Technical, and Operations staff in responding to vector-borne disease threats. The responses are organized by vector species that cause illnesses in humans, domestic animals, and wildlife. The IVM Plan includes guidelines for surveillance for vectors and disease, site assessment, source reduction, biorational and chemical control methods, and public education. The IVM Plan establishes specific thresholds for the initiation of physical and chemical control based on numbers and species of vectors and the presence or absence of infective agents. Treatment thresholds are established for mosquito developmental sites in the IVM Plan where potential disease vector and/or nuisance risks are evident. Only those sources that represent imminent threats to public health or quality of life are treated.

Treatment thresholds are based on the following criteria: mosquito species present, mosquito stage of development, nuisance or disease potential, mosquito abundance, flight range, proximity to populated areas, size of source, presence/absence of natural enemies or predators, and presence of sensitive/endangered species.

When thresholds are exceeded, an appropriate control strategy is implemented. Control strategies are selected to minimize potential environmental impacts while maximizing efficacy. The method of control is based on the above threshold criteria but also habitat type, water conditions and quality, weather conditions, cost, site accessibility, size of site and a number of other factors as specified in the IVM Plan.

Considerations are also drawn from and in accordance with the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

3 Types of Pesticide Products

Please see Attachments E and F within NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the U.S. for Vector Control Applications. Products may be applied by hand, truck, hand can, helicopter, or airplane according to label directions. The types of pesticides used in mosquito control and the methods of applications are also discussed in detail and listed in the Best Management Practices for Mosquito Control in California (Appendix 3).

The District plans to use the pesticides listed in attached Table 1 below and reserves the right to use any product approved under the terms of this General Permit.

Table 1. Planned Pesticides for Use by Orange County Vector Control District.

PESTICIDES USED FOR MOSQUITO CONTROL AT ORANGE COUNTY VECTOR CONTROL DISTRICT

Active Ingredient	Trade Name	EPA Reg. No.	Manufacturer	Formulation	Active Ingredient	Application	Pesticide Classification
Bacillus thuringiensis israelensis (Bti)	VectoBac 12AS	73049-38	Valent BioSciences Corporation	Liquid	11.61%	Larvae	Biorational
Bacillus thuringiensis israelensis (Bti)	VectoBac G	73049-10	Valent BioSciences Corporation	Granules	2.80%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex CG	73049-20	Valent BioSciences Corporation	Granules	7.5%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex WSP	73049-20	Valent BioSciences Corporation	Water Soluble Pouches	7.5%	Larvae	Biorational
Bacillus sphaericus (Bs)	VectoLex WDG	73049-57	Valent BioSciences Corporation	Water Dispersible Granules	51.2%	Larvae	Biorational
Bacillus sphaericus (Bs) 6% Bacillus thuringiensis israelensis (Bti) 1%	FOURSTAR	83362-3	Fourstar Microbials	Briquet	7.0%	Larvae	Biorational
Spinosad	Natular 2EC	8329-82	Clarke Mosquito Control Products, Inc.	Liquid	21%	Larvae	Biorational
Monomolecular Film	Agnique MMF	53263-28	Cognis Corporation	Liquid	100%	Larvae & Pupae	Surface Film
Monomolecular Film	Agnique MMF-G	53263-30	Cognis Corporation	Granules	32%	Larvae & Pupae	Surface Film
Aliphatic Petroleum Hydrocarbons	Mosquito Larvicide GB-1111	8329-72	Clarke Mosquito Control Products, Inc.	Liquid	98.7%	Larvae & Pupae	Surface Film
Highly refined petroleum distillate	BVA 2	70589-1	BVA OILS	Liquid	97.0%	Larvae & Pupae	Surface Film
S-Methoprene	Altosid Briquets	2724-375	Wellmark International Zoecon	Briquet	8.62%	Larvae	IGR
S-Methoprene	Altosid XR Extended Residual Briquets	2724-421	Wellmark International Zoecon	Briquet	2.1%	Larvae	IGR
S-Methoprene	Altosid Liquid Larvicide Concentrate	2724-446	Wellmark International Zoecon	Liquid	20%	Larvae	IGR
S-Methoprene	Altosid Pellets Mosquito Growth Regulator	2724-448	Wellmark International Zoecon	Pellet-type Granules	4.25%	Larvae	IGR
Sumithrin 10% Piperonyl Butoxide 10%	Aqua Anvil	1021-1807-8329	Clarke Mosquito Control Products, Inc.	Liquid	20.00%	Adult	Pyrethroid
Etofenprox 20%	Zenivex E20	2724-791	Wellmark International Zoecon	Liquid	20.00%	Adult	Pyrethroid

4 Description of Application Areas

Description of ALL the application areas and the target areas in the system that are being planned to be applied or may be applied. Provide a map showing these areas.*

Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible the District works with property owners to affect long-term solutions to reduce or eliminate the need for continued applications as described in Best Management Practices for Mosquito Control in California (Appendix 3).

The targets for application projects are primarily the immature aquatic stages of insect vectors, including mosquitoes, midges, and black flies, which predominantly breed in standing or slow-moving water. These insect disease vectors may pose a threat to human public health, especially due to the risk they may spread West Nile virus, and require treatment to eliminate or minimize the health risks. Using the District's IVM Plan (Appendix 1) decision matrix, District personnel use pesticides as a last resort to treat water features that have undesirable insect pest vectors exceeding threshold levels. Larvicides are applied at larval mosquito development sites which can include drainage channels, riparian areas, wetlands, roadside ditches, neglected swimming pools, ornamental ponds, catch basins, detention/retention basins, and potentially, any aquatic site or low lying area that has standing water for longer than 96 hours. Many of these applications take place in urban watershed storm water conveyance systems. Exhibit 2 depicts the anticipated larviciding application areas within water conveyance systems throughout the County based on 2010 treatment application data. Additional application areas include breeding locations within the coastal wetlands, and intermittent or ephemeral streams.

Areas requiring larvicide applications are treated, as necessary, primarily from spring to late fall during the warmest months (approximately March – November). However, if vectors are a persistent problem at some locations, applications may be made year-round. Pesticides are applied only when a vector is present at threshold levels, and to water that will be present for at least 96 hours.

Directing our main efforts at controlling mosquito larvae allows the District to localize treatments and use the least toxic alternatives. Adult mosquitoes may occasionally be targeted for control. However, since pesticides must be applied over a greater area and are less selective, the District avoids using them wherever possible. Currently, there are four sites in the County that are receive adulticide treatment when they exceed threshold levels due to persistent mosquito breeding conditions and their proximity to human populations (Exhibit 3).

5 Other Control Methods Used

Other control methods used (alternatives) and their limitations.

With any mosquito or other vector source, the District's first goal is to look for ways to eliminate the source, or, if that is not possible, for 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 (Appendix 3). In addition, the District has recently formalized its agency-specific Vector Reduction Program by developing and adopting the Vector Reduction Manual: Procedures & Guidelines (the VRM) (Appendix 4). This document describes how the District aims to work with property owners to reduce or eliminate vector-favorable conditions by encouraging the implementation of Vector Reduction Guidelines, which are based on IVM techniques and strategies.

Some specific methods used by the District include educating residents that mosquitoes develop in standing water and encouraging them to remove sources of standing water on their property, working with property owners to find long-term water/environmental management strategies that meet their needs while minimizing the need for public health pesticide applications, and use of non-pesticide biological control agents like mosquito fish, *Gambusia affinis*, when appropriate.

6 Anticipated Product Amounts

Approximately how much product is needed/anticipated to be used and how this amount was determined.

The need to apply product is determined by surveillance. Actual use varies annually depending on mosquito abundance. The total amounts of mosquito control pesticides applied by the District from January 2010 – December 2010 are shown in Table 2 below. These amounts serve as an approximation of the amount of product anticipated for annual future use. Several factors influence the amounts of pesticides applied, which can include rainfall, weather patterns, disease outbreak, and availability of products. Other public health pesticides in addition to those listed below may be used as part of the District's best management practices.

Table 2. Pesticide Usage for Mosquito Control by OCVCD (January 2010 – December 2010).

Jan 2010 – Dec 2010			
Product	Amount	Unit	No. of Applications
Altosid Pellets	816.79	pounds	518
Altosid Briquets	50.82	pounds	559
Altosid XR Briquets	1,158.54	pounds	2,945
GB-1111	948.72	gallons	2,529
BVA-2	1,351.72	gallons	220
Aquaprene XL Briquets	30.00	pounds	3.0
Aquaprene XL Granules	19.00	pounds	2.0
Agnique MMF	4,426.30	ounces	823
Agnique MMF-G	157.00	pounds	19
Vectobac G	42,619.50	pounds	2,085
Vectobac 12AS	138.26	gallons	542
Vectolex CG	1,444.00	pounds	4.0
Vectolex WDG	294.56	pounds	121
Aqua Anvil	98.39	gallons	181

Please note that the District intends to discontinue the use of Golden Bear (GB-1111), as this product is no longer being manufactured. Additionally, the District, as of June 2011 has discontinued the use of Aquaprene XL Briquets and Aquaprene XL Granules.

7 Monitoring Locations

Representative monitoring locations and the justification for selecting these monitoring locations.*

The District is a member of the MVCAC NPDES Coalition Monitoring Program (the Coalition). Please refer to the MVCAC NPDES Monitoring and Reporting Plan post on the State Water Resources Control Board website.

8 Evaluation of Available BMPs

Evaluation of available BMPs to determine if there are feasible alternatives to the selected pesticide application project that could reduce potential water quality impacts.

The District uses BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

Prior to each pesticide application, all feasible alternatives are evaluated. Protocol for these evaluations are discussed in the aforementioned documents.

9 Description of BMPs

Description of the BMPs to be implemented. The BMPs shall include, at the minimum.

The District uses BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

9.1 Measures to Prevent Pesticide Spill

District 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 on spill prevention and response annually. All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.2 Measures to Ensure Minimum and Consistent Amount Used

Spray equipment is calibrated each year and is a part of stipulation of the Cooperative Agreement, a Memorandum of Understanding with the California Department of Public Health. All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.3 Applicator Education on Adverse Effects of Pesticide Application

The California Vector Control Technician Certification and Continuing Education Guidelines (CPDH, 2007) describes all topics that vector control technicians are trained and certified in. Applicators are required to complete pesticide and safety training annually which will include NPDES Permit training.

9.4 Descriptions of Specific BMPs for Each Application Mode

The District calibrates truck-mounted and handheld larviciding equipment each year to meet application specifications. Supervisors review application records daily to ensure appropriate amounts of material are used. Ground-based Ultra Low Volume (ULV) application equipment is calibrated for output and droplet size to meet label requirements. Aerial larviciding equipment is calibrated by the Contractor. Although the District does not typically make airplane applications, if needed, aerial adulticide equipment will be calibrated regularly and droplet size will be monitored by the agency to ensure droplets meet label requirements. If airplanes used in urban ULV applications and the primary airplane used for rural ULV application will be equipped with advanced guidance and drift management equipment to ensure the best available technology is being used to place product in the intended area. If a secondary airplane is used in rural ULV applications it will be equipped with an advanced guidance system.

All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

9.5 BMPs for Pesticide Products Used

Please see the Best Management Practices for Mosquito Control in California (Appendix 3) for general pesticide application BMPs, and the current approved pesticide labels for application BMPs for specific products.

9.6 BMPs for Environmental Setting

The District uses environmental setting, specific BMPs described in its own IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

10 Identification of the Problem

Prior to first pesticide application covered under this General Permit that will result in a discharge of biological and residual pesticides to waters of the US, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, the Discharger must do the following for each vector management area:

10.1 Establishment of Vector Populations

If applicable, Establish densities for larval and adult vector populations to serve as action threshold(s) for implementing pest management strategies;

Only those mosquito sources that District 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 District'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/absence of natural enemies or predators, and presence of sensitive/endangered species or habitats. This is discussed in detail in the District's IVM Plan (Appendix 1).

10.2 Identification of Target Vector Species

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

The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2) that are used by this agency.

10.3 Identification of Known Breeding Areas

Identify known breeding areas for source reduction, larval control programs and habitat management;

Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible, the District works with property owners to implement long-term solutions to reduce or eliminate the need for continued applications. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

10.4 Analysis of Surveillance Data

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

The District continually collects adult and larval mosquito surveillance data, dead bird reports, avian seroprevalence test results, and uses them to guide mosquito control activities. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

11 Examination of Alternatives to Treatments

Dischargers shall continue to examine alternatives to pesticide use to reduce the need for applying larvicides that contain temephos and for spraying adulticides. 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, cultural methods, biological control agents, or pesticides.

If there are no alternatives to pesticides, dischargers shall use the least toxic pesticide necessary to control the target pest.

b. Applying pesticides only when vector 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 criteria are described in the District's existing Integrated Vector Management Program. The District address this practice as discussed in its IVM Plan (Appendix 1) and Vector Reduction Manual (Appendix 4), as well as practices in accordance with state guidelines from the Best Management Practices for Mosquito Control in California (Appendix 3) and the California Mosquito-borne Virus and Surveillance & Response Plan (Appendix 2).

12 Correct Use of Pesticides

Users Coalition's or Discharger's use of pesticides must ensure that all reasonable precautions are taken to minimize the impacts caused by pesticide applications. Reasonable precautions include using the right spraying techniques and equipment, taking account of weather conditions and the need to protect the environment.

This is an existing practice of the District, and is required to comply with the Department of Pesticide Regulation's (DPR) requirements and the terms of our California Department of Public Health (CDPH) Cooperative Agreement. All pesticide applicators receive annual safety and spill training in addition to their regular continuing education. All errors in application and spills are reported to the proper authority.

13 Public Notices

Specify a website where public notices, required in Section VIII.B, may be found.

Attached as Appendix 5 is the Public Notice the District will distribute to potentially affected government agencies and post on its website (www.ocvcd.org).

14 References

Best Management Practices for Mosquito Control in California. 2010. Available by download from the California Department of Public Health—Vector-Borne Disease Section at <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 Orange County Vector Control District at (714) 971-2421.

California Department of Public Health. 1989. The California Vector Control Technician Certification and Continuing Education Guidelines (2007 Revision). Accessed 3/03/2011 <http://www.cdph.ca.gov/certlic/occupations/Documents/VCTCEGuide.pdf>

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.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 Orange County Vector Control District at (714) 971-2421.

County of Orange. 2008. Orange County General Plan 2005 (2008 Revision). Accessed 3/03/2011 <http://www.ocplanning.net/GeneralPlan2005.aspx>

MVCAC NPDES Coalition Monitoring Plan. 2011. [In development at the time of this draft]

State Water Resources Control Board (SWRCB), 2011, Water Quality Order No. 2011-0002-DWQ, Statewide General National Pollutant Discharge Elimination System Permit For Biological and Residual Pesticide Discharges to Waters of Waters Of The United States From Vector Control Vector Control Applications (General Permit No. CAG 990004).

Orange County Vector Control District Jurisdictional Map

Los Angeles Co.

San Bernardino Co.

Riverside Co.

Santa Ana Region 8

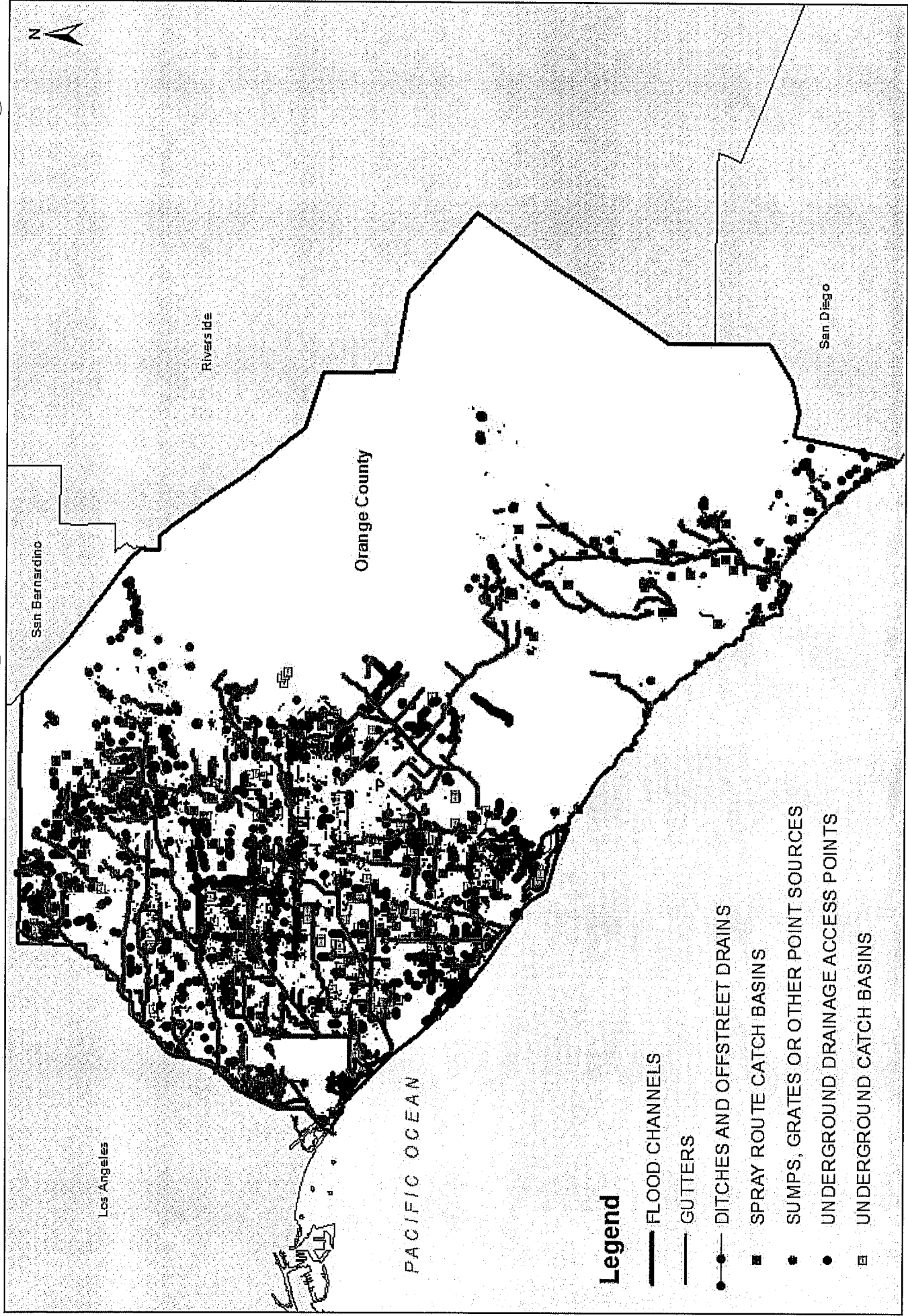
San Diego Region 9

San Diego Co.

- Orange County Boundary
- Regional Water Quality Control Boards Boundary
- Orange County Vector Control District Jurisdiction

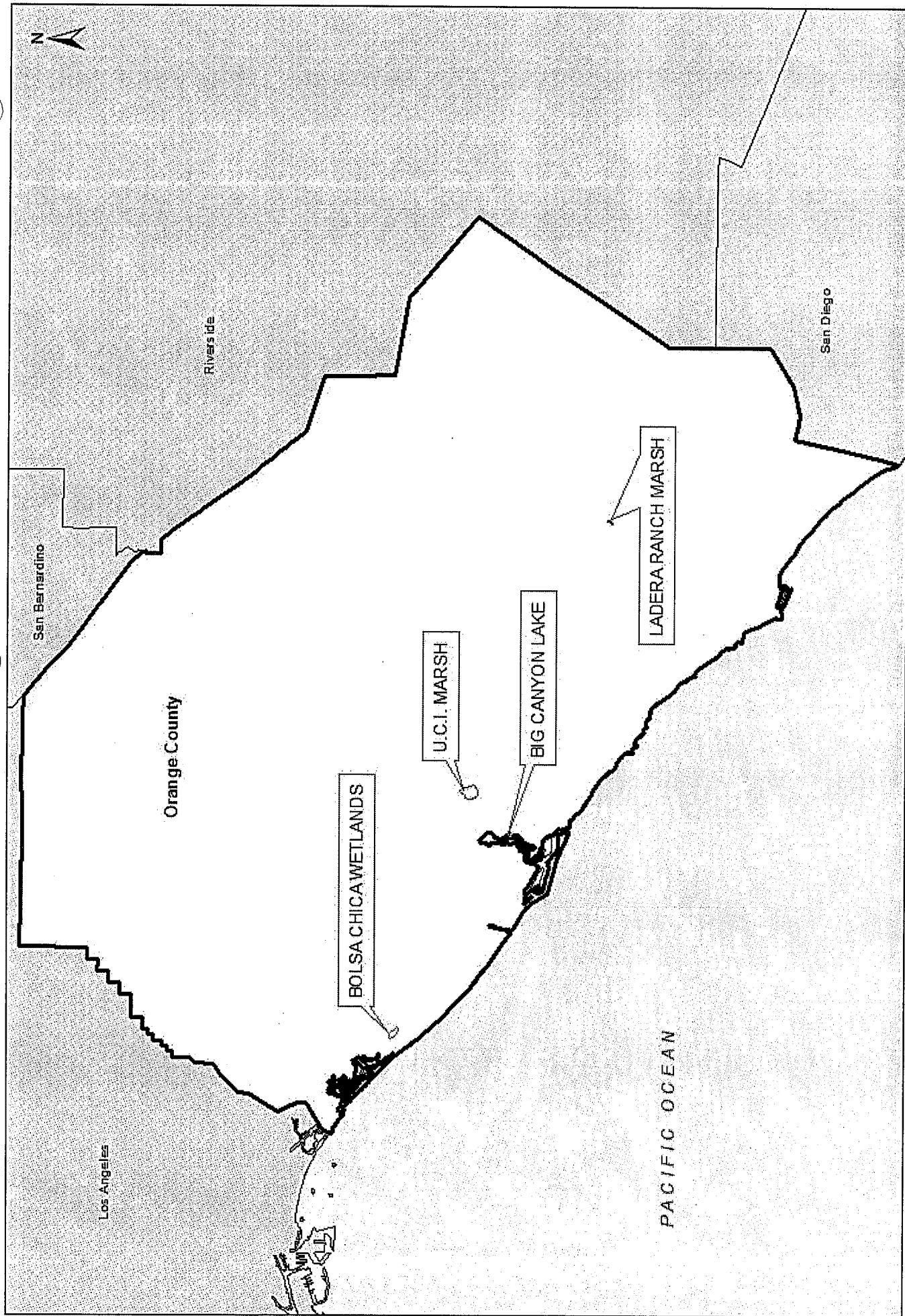


ANTICIPATED LARVICIDING LOCATION WITHIN WATER CONVEYANCE SYSTEMS



ORANGE COUNTY VECTOR CONTROL

ANTICIPATED ADUL MOSQUITO BREEDING LOCATIONS



ORANGE COUNTY VECTOR CONTROL



Integrated Vector Management & Response Plan

May 11, 2010

Integrated Vector Management & Response Plan

Preface

The purpose of the Integrated Vector Management and Response Plan is to provide guidelines to Orange County Vector Control District (District) staff and information to stakeholders regarding the various responses made to prevent and control disease vectors as well as introduced diseases and vectors in Orange County. A vector is any insect or arthropod, rodent or other animal of public health significance capable of harboring or transmitting the causative agents of human disease, or capable of causing human discomfort or injury. This document details the roles and responsibilities of Management, Administration, Public Information, Laboratory, and Operations staff in responding to vector-borne disease threats. The responses are organized by vector species that cause illnesses in humans, domestic animals, and wildlife. This Response Plan also includes contingencies for targeting control of newly introduced disease vectors that are nonnative in Orange County. The formation of this document is guided by the following principles: The application of professional knowledge and judgment for the protection of public health, the use of integrated vector management (IVM) concepts, partnerships with stakeholders, and continuous assessment and improvement.

Protection of Public Health

The mission of the Orange County Vector Control District is to provide the citizens of Orange County with the highest level of protection from vectors and vector-borne diseases. This mission is achieved by being proactive in response to current and future vector threats; responding effectively and courteously to the needs of the public; informing and educating the public about the shared responsibility of vector control; utilizing the most effective and safest methods available for the control of vectors; and providing vector control services in the most cost-effective manner.

Integrated Vector Management

The District's vector control activities are based solely on Integrated Vector Management principles. These principles serve as the foundation for developing vector control activities. Vector population and pathogen monitoring are integral to the control program and are used to generate criteria to implement mosquito management. The District recognizes that utilizing IVM principles will reduce the use of pesticides.

Professional Knowledge and Judgment

The District applies professional knowledge and judgment when necessary. Although this document represents the District's best efforts to delineate the District's response for reasonably foreseeable situations, it is recognized that management of vector populations and vector diseases is part of a natural process; and, therefore, very complex and not completely understood. In addition, site specific and incident specific conditions are highly variable and unpredictable. Therefore, District management and staff are allowed and expected to exercise professional knowledge and judgment in implementation of these policies and procedures. Deviation from these guidelines is, therefore, allowable when deemed necessary by District management or

authorized staff, based on available information and conditions, to meet the District's primary goal of protecting the public from vector-borne diseases.

Stakeholder Partnerships

The District works actively and cooperatively with stakeholder groups to help ensure that vector production is avoided or minimized; and, when necessary, controlled to protect both human and environmental health. The District aims to engage the public in the shared responsibility of vector control. The District identifies Federal Government agencies, State of California, Orange County, incorporated city and local government officials and agencies, agricultural producers, environmental groups, community groups and leaders, and citizens within the District's jurisdiction as stakeholders.

Continuous Improvement

The District regularly researches and tests new and innovative vector monitoring and management techniques. Staff is encouraged to investigate methods to improve vector and vector-borne disease management tools and incorporate them into activities as necessary. For this purpose, this document will be reviewed as necessary by District staff and approved by the Board of Trustees.

The effective cooperation and communication among collaborative agencies is critical to the success of these responses to prevent or stop the spread of vector-borne disease. Included in this response as an appendix is the "California Mosquito-Borne Virus Surveillance and Response Plan" prepared jointly by the California Department of Public Health, Mosquito and Vector Control Association of California, and the University of California.

Integrated Vector Management Response & Guidelines
Orange County Vector Control District

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List of Abbreviations

BMP	–	Best Management Practice for stormwater and urban runoff.
CAC	–	County Agricultural Commissioner Office.
CDC	–	Center for Disease Control and Prevention.
CDPH	–	California Department of Public Health.
CO ₂	–	Carbon dioxide.
GIS	–	Geographical Information System.
HCPS	–	Hantavirus Cardiopulmonary Symptom.
IVM	–	Integrated Vector Management.
OCHCA	–	Orange County Health Care Agency.
OCVCD	–	Orange County Vector Control District.
PCO	–	Pest Control Operator.
PHP	–	Public Health Pesticide.
RIFA	–	Red Imported Fire Ant.
SLE	–	St. Louis Encephalitis.
ULV	–	Ultra Low Volume.
USDS	–	Underground Storm Drain System.
WEE	–	Western Equine Encephalitis.
WNV	–	West Nile virus, On-Going Mosquito Control Activities.

Integrated Vector Management Response Plan

On-Going Mosquito Control Activities

Standard mosquito control activities follow the Immature Mosquito Management Guidelines and the Adult Mosquito Management Guidelines and generally consist of the components listed below. This level is equivalent to the "California Mosquito-Borne Virus Surveillance and Response Plan" Level 1 – Normal Season.

- Increase public education and awareness through the regular distribution of media releases, attendance at public events, public lectures, and other similar outreach mechanisms.
- Monitor mosquito, mosquito-borne disease, and public health pesticide efficacy surveillance activities using the following:
 - a. Mosquito and insect identification.
 - b. CDC/CO₂-baited traps.
 - c. Gravid traps.
 - d. Encephalitis virus testing in mosquitoes, dead birds, and wild birds.
 - e. Sentinel chicken testing.
 - f. Develop GIS maps.
 - g. Monitor Public Health Pesticide Efficacy.
- Conduct routine immature mosquito identification and management (See Immature Mosquito Management Guidelines).
 - a. Evaluate sites for immature mosquito threshold densities by species.
 - b. Maintain continuous surveillance for potential mosquito development sites.
 - c. Conduct aerial surveillance for residential green pools.
 - d. Evaluate environmental and regulatory conditions and requirements.
 - e. Determine the possibility of source reduction by drainage or modification of site.
 - f. Introduce biological control measures (such as mosquito fish) if appropriate.
 - g. Apply public health pesticides when necessary.
 - h. Maintain larval treatment cycle time between 7-30 days.
- Routine adult mosquito management (See Adult Mosquito Management Guidelines).
 - a. Control in urban areas will be on an as needed basis, as determined by the Director of Operations and resident requests.
 - b. Initiate adult mosquito management when threshold criteria are met or exceeded.
 - c. Utilize historical mosquito distribution and abundance data to make control decision.

Detection of a Dead Bird/Mosquito Pool/ Sentinel Chicken/Animal with a Mosquito-borne Virus

The following responses are initiated when the District's Scientific and Technical Services Laboratory detects a mosquito-borne virus (WNV, WEE, SLE) or when CDPH notifies the District of a mosquito-borne virus from dead bird(s), mosquito pool(s), sentinel chicken(s), or animal(s) within District boundaries. This level is equivalent to the "California Mosquito-Borne Virus Surveillance and Response Plans" Level 2 Normal Season and Emergency Planning Rating.

Management Responsibility Notify the District Board of Trustees. Evaluate District staffing and program needs.	Communications Department Responsibility Distribute a News Release.
Scientific and Technical Services Responsibility Notify County Public Health Officials. Notify County and City Animal Services. Provide additional localized disease surveillance to determine scope of virus activity. Continue to collect mosquito pools for isolation of virus as scheduled. Continue to bleed sentinel chickens as scheduled. Provide GIS maps.	Control Operations Management Responsibility Prepare for controlling adult mosquitoes when initiation criteria are met.
Control Operations Zone Responsibility Inspect and treat mosquito larval development sites. Investigate mosquito service requests from the public. Assess adult mosquito populations. Inspect known green pool locations in area.	Control Operations Special Services Responsibility Inspect flood channels in area. Inspect problem underground water storage devices and BMPs in the area. Inspect possible breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect historical breeding sites. Inspect other tracked sources in the area.

Locally Acquired Human Case of a Mosquito-borne Virus

The following responses are initiated when the OCHCA, or CDPH notifies the District that a human has acquired a mosquito-borne infection(s) within Orange County. This level is equivalent to the "California Mosquito-Borne Virus Surveillance and Response Plans" Level 3 Emergency Planning and Epidemic Rating.

Management Responsibility Notify the District Board of Trustees. Evaluate District staffing and program release needs.	Communications Department Responsibility Coordinate the distribution of a news with OCHCA.
Scientific and Technical Services Responsibility Coordinate with County Public Health USDS Officials. Determine scope of virus activity to support control efforts. Continue to collect mosquito pools for isolation of virus as scheduled. Continue to bleed sentinel chickens as scheduled. Provide GIS maps.	Control Operations Management Responsibility Consider reducing the spray route and cycle time to 8-10 days. Consider controlling adult mosquitoes when initiation criteria are met.
Control Operations Zone Responsibility Inspect and treat mosquito larval development sites. Investigate mosquito service requests from the public. Assess adult mosquito populations. Inspect known green pool locations in area.	Control Operations Special Services Responsibility Inspect flood channels in area. Inspect problem underground water storage devices and BMPs in the area. Inspect possible breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect historical breeding sites. Inspect other known sources in the area.

Epidemic Conditions of a Mosquito-borne Virus

The following responses are initiated when OCHCA or CDPH officials notify the District that multiple infections have occurred within a specific area, or there is evidence that an epidemic condition exists. The epidemic area is defined as the geographic region in which human cases are clustered (incorporated city, community, neighborhood, or Zip Code). This level is equivalent to the "California Mosquito-Borne Virus Surveillance and Response Plans" Level 2 Normal Season and Emergency Planning Rating.

Management Responsibility Consider holding a special Board of Trustee meeting. Shift District staffing and resources to meet program needs.	Communications Department Responsibility Distribute a News Release. If truck mounted ULV is necessary, include additional information in News Release.
Scientific and Technical Services Responsibility Coordinate with County Public Health Officials. Determine scope of virus activity to support control efforts. Continue to collect mosquito pools for isolation of virus as scheduled. Continue to bleed sentinel chickens as scheduled. If truck mounted ULV is appropriate, evaluate the control program. Provide GIS maps.	Control Operations Management Responsibility Consider reducing the treatment cycle time below 8-10 days. Consider controlling adult mosquitoes when initiation criteria are met. Delineate and map the treatment area. As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Inspect and treat mosquito larval development sites. Investigate mosquito service requests from the public. Assess adult mosquito populations. Inspect known green pool locations in area. Provide educational materials to affected area. Distribute information to collaborating agencies and stakeholders in the area.	Control Operations Special Services Responsibility Inspect flood control channels in area. Inspect problematic underground water storage devices and BMPs in the area. Inspect possible breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect historical breeding sites. Inspect other known sources in the area.

Response to Imported Malaria Case

The following responses are initiated when OCHCA notifies the District of an imported malaria case(s) within the District boundaries. District response to a reported malaria case(s) is determined by the vector activity period, difference between the date of diagnosis and the current date, mosquito population, and the date of the reported case.

Scientific and Technical Services Responsibility Determine scope of activity. Identify adult mosquitoes collected. Determine if <i>Anopheles</i> spp. are infected with malaria parasites.	Control Operations Management Responsibility Determine if adult mosquito control is necessary if initiation criteria are met in area. Delineate treatment area, as necessary.
Control Operations Zone Responsibility Inspect <i>Anopheles</i> mosquito development sites in area. Assess adult mosquito population.	Control Operations Special Services Responsibility Inspect <i>Anopheles</i> breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect problem underground water storage devices and BMPs in the area. Inspect other known sources in the area.

Response to a Locally Acquired Malaria Case and/or Infected Mosquitoes

The following responses are initiated when Orange County Health Care Agency notifies the District of a locally acquired malaria case(s) and or when *Anopheles* spp. are found infected with malaria parasites within the District boundaries. District response is determined by the vector activity period, difference between the date of diagnosis and the current date, mosquito population, and the date of the reported case.

Management Responsibility Notify District Board of Trustees President. Evaluate District staffing and program needs.	Communications Department Responsibility Prepare educational materials. Coordinate the distribution of a news release with OCHCA. Consider a region-wide press conference.
Scientific and Technical Services Responsibility Determine scope of activity. Identify adult mosquitoes collected. Analyze climate and meteorological data to determine if conditions are favorable for Anopheline development. Determine if <i>Anopheles</i> are infected with malaria parasites. Provide GIS maps.	Control Operations Management Responsibility Contact County Agricultural Commissioner. Delineate and map the treated area. Coordinate response with other local vector control agencies.
Control Operations Zone Responsibility Inspect <i>Anopheles</i> mosquito development sites in area. Assess adult mosquito population. Conduct surveillance for <i>Anopheles</i> at local airports. Distribute educational materials.	Control Operations Special Services Responsibility Inspect <i>Anopheles</i> breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect problem underground water storage devices and BMPs in the area. Inspect historical breeding sites. Inspect other known sources in the area.

5/11/10

Critical Response to the Detection of an Introduced, Non-Native Disease or Disease Vector Within Orange County

The following response is initiated when the District detects an introduced, nonnative disease, or disease vector within Orange County. The District recognizes that a quick, efficacious response is necessary to prevent the vector or disease from becoming established in Orange County and Southern California.

Management Responsibility Notify District Board of Trustees. Contact and coordinate response with other stakeholders.	Communications Department Responsibility Conduct a press conference and distribute a news release. Prepare educational materials. If truck mounted ULV spraying is necessary, include additional information in news release.
Scientific and Technical Services Responsibility Notify County Public Health Officials. Train District staff about the disease or disease vector. Identify insect vectors and develop a surveillance strategy. Determine scope of infestation. Sample vectors for the presence of disease organism. If truck mounted ULV is necessary, evaluate the control program. Provide GIS maps.	Control Operations Management Responsibility Contact County Agricultural Commissioner. Determine a control strategy. Delineate and map the treatment area. Coordinate control of disease vector when initiation criteria are met. As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Assess adult population. Conduct a thorough inspection for and treat mosquito development sites. Control adult mosquitoes. Distribute educational materials.	Control Operations Special Services Responsibility Inspect flood control channels in area. Inspect problem underground water storage devices and BMPs in the area. Inspect possible breeding sites (Canyon Drains\Marshes\Reservoirs) in area. Inspect other known sources in the area.

Black Fly Control Operations

Standard black fly activities follow Black Fly Management Guidelines and generally consist of the components listed below.

- Routine public education and awareness through the distribution of media releases, attendance at public events, public lectures, and other similar outreach mechanisms.
- Routine black fly and public health pesticide efficacy surveillance activities.
Occurrence of black flies may also be noted by resident complaints.
 - a. Black fly Identification.
 - b. CDC/CO₂-baited traps.
 - c. Prepare GIS maps.
 - d. Conduct posttreatment surveillance.
- Routine immature black fly management.
 - a. Evaluate the site for immature black fly habitat.
 - b. Evaluate environmental and regulatory conditions and requirements.
 - c. If appropriate, apply PHP.
 - d. Apply PHP again, if needed, at time interval noted on PHP label.

Fly Control Operations

Fly control is initiated when the District is notified of an infestation occurring within District boundaries. The response follows Fly Control Guidelines. The District only uses pesticides to control fly infestations where source reduction is not possible, in situations that are deemed significant, and considered a threat to public health and safety.

- Fly control is instigated only after a thorough evaluation of the site is conducted and should include:
 - a. Identification of pest fly species and estimation of population density.
 - b. Identification of larval breeding source.
 - c. Reduction of larval breeding source through habitat and source reduction, when possible.
- If reduction of larval breeding source is conducted, but a significant population of flies remains, the use of a public health pesticide may be necessary to control the population.

Scientific and Technical Services Responsibility Identify fly species and estimate population density. Determine scope of infestation. Conduct posttreatment evaluation of fly population. If necessary, provide GIS maps detailing surveillance and control activities.	Control Operations Management Responsibility Determine a control strategy. Delineate treatment area. As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Distribute educational materials.	Control Operations Special Services Responsibility Distribute educational materials. Assist in source removal, if necessary. Apply pesticides to control flies, if necessary.

Response to a Flea-borne Typhus Case

The following responses are initiated when the District is notified of a human case of flea-borne typhus occurring within Orange County. The District recognizes that a quick response is necessary to instigate a reduction of the flea population in the area.

- A comprehensive flea-borne typhus risk evaluation of the area is warranted and should include:
 - a. Notification of surrounding residents that a flea-borne typhus case has occurred in the area and what can be done to reduce the flea population in the area (use of flea control measures on pets).
 - b. Live-trapping of opossums to determine the flea species and flea load per animal and the collection of whole blood for assessment of transmission activity.
 - c. Assessing the flea abundance on backyard wildlife and pets.
 - d. Assessing the potential for humans to be exposed to vector fleas.
 - e. Reviewing the past history of flea-borne typhus activity and/or flea-borne typhus cases in the region.

Management Responsibility Notify District Board of Trustees. Contact and coordinate response with other stakeholders.	Communications Department Responsibility Conduct a press conference and distribute a news release.
Scientific and Technical Services Responsibility Notify County Public Health Officials. Conduct comprehensive flea-borne typhus risk assessment. Determine scope of infestation. Sample vectors for the presence of disease organism. Provide GIS maps detailing surveillance and control activities.	Control Operations Management Responsibility As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Distribute educational materials and assist with surveillance activities. Assist with comprehensive flea-borne typhus risk assessment.	

Response to a Tick-borne Disease Case (Lyme Disease, Rocky Mountain Spotted Fever, Tularemia)

The following responses are initiated when the District is notified of a human case of tick-borne disease occurring within Orange County.

- A comprehensive tick-borne disease risk evaluation of the area is warranted and should include:
 - a. Live-trapping (flagging) ticks to estimate tick density and the presence and/or prevalence of pathogens within the tick population.
 - b. Assessing the potential for humans to be exposed to ticks.
 - c. Reviewing the past history of tick populations and tick-borne disease in the area.
 - d. Distribution of tick-borne disease educational materials to landholders and/or the affected population.

Ongoing RIFA Activities

Standard RIFA control activities follow Red Imported Fire Ant Guidelines and generally consist of the components listed below.

- Routine public education and awareness through the distribution of educational DVDs and flyers and attendance at public events. Education of maintenance staff at infested sites, such as schools, parks, golf courses, and nurseries. Distribution of educational material to residents in affected neighborhoods.
- Routine RIFA surveillance activities and public health pesticide efficacy.
 - a. Insect identification.
 - b. Inspection for mounds, foraging ants, and other signs of RIFA infestation around residential treatment sites and adjacent to large treatment sites.
 - c. Placement of RIFA surveillance lures.
 - d. Evaluation of new sites in Orange County for RIFA populations.
 - e. Monitor pesticide efficacy.
- Routine RIFA Residential Site Management (Residential RIFA Treatment Cycle).
 - a. Initial report is followed up by District staff who conduct RIFA surveillance and identification, and apply a pesticide ant bait.
 - b. 2nd Residential treatment is conducted by a local Pest Control Operator (PCO) after 3 months of initial treatment.
 - c. 3rd Residential treatment is conducted by the same PCO after 3 months of the 2nd treatment.
 - d. Posttreatment survey is conducted at selected sites by the District. If RIFA are identified, the site begins the treatment cycle again.
 - e. If a residence reports RIFA activity while on a RIFA treatment cycle, the District will respond and treat the site.
- Routine RIFA Large-Site Management (Large-Site RIFA Treatment Cycle)
 - a. Specific guidelines are in place for large sites such as sites >1 acre, parks, schools, golf courses, and rights-of-way.
 - b. Initial report is followed up on by District staff who conduct RIFA surveillance, identification, and apply a pesticide ant bait.
 - c. 2nd, 3rd, and posttreatment surveys are conducted by District staff.
 - d. If a large site reports RIFA activity while on a RIFA treatment cycle, the District will respond and treat the site.

5/11/10

RIFA Activities in Response to a Stinging Incident

The following response is instigated when the District is notified of a RIFA stinging incident within county boundaries. The District recognizes that a quick and efficacious response is necessary.

- RIFA treatment in response to a stinging incident.
 - a. The District will respond to a stinging incident as quickly as possible.
 - b. Advise persons to stay away from the area and post area conspicuously to keep others away.
 - c. Staff will identify ant species and bring a sample to the District for confirmation.
 - d. Staff will treat the mound.
 - e. If ants are confirmed as RIFA, a residential or large site RIFA treatment cycle will be initiated.

Ongoing Rat Control Activities

Standard rat control activities (*Rattus* spp.) follow the Rat Management Guidelines and generally consist of the components listed below.

- Routine public education and awareness through the education of residents by responding to service requests, attendance at public events, public lectures, and other similar outreach mechanisms.
- Rat inspections and control.
 - a. Inspections for rat activity around residences, businesses, parks, schools, city, county, state, and federal lands in Orange County.
 - b. Recommendations to abate rat harborage, food sources, and modify rat entry points in homes and structures.
 - c. Placement of rodenticide in tamper-resistant bait stations around exterior of residences.

Ongoing Rodent Surveillance Activities

Standard rodent surveillance activities generally consist of the components listed below.

- Routine rodent and rodent-borne disease surveillance and rodenticide efficacy.
 - a. Rodent trapping and identification (rats, mice, and ground squirrels).
 - b. Rodent parasite identification.
 - c. Testing of rodents for rodent-borne diseases, such as bubonic plague, Hantaviruses, and additional diseases as needed.
 - d. Testing of squirrels for WNV.
 - e. Monitoring rodenticide efficacy.

Response to a Human or Animal Plague Case

The following response is initiated when the District is notified of a human or rodent plague case within county boundaries. The District recognizes that a quick and efficacious response is necessary to control rodents and their parasites that can further transmit the pathogen. This response is equivalent to recommendations set forth in the "California Department of Public Health 2008 Compendium for Plague Control."

- A comprehensive plague risk evaluation of the area is warranted and should include:
 - a. Live-trapping rodents to estimate the population densities of known plague-amplifying species and the collection of serum specimens for assessment of plague transmission activity.
 - b. Assessing the extent and phase of the outbreak.
 - c. Evaluating the abundance and infectivity of known vector fleas (flea index and flea pools for plague testing).
 - d. Assess the potential for humans to be exposed to vector fleas.
 - e. Review the past history of plague activity and/or human plague cases in the region.
 - f. Collaborate with CDPH and the County Agricultural Commissioner's Office.
- A decision to suppress vector fleas on rodents or rodents is based on:
 - a. The presence and prevalence of susceptible rodents and vector fleas in areas of human activity.
 - b. A high potential for humans to be exposed to vector fleas.
 - c. Confirmation of plague activity among susceptible rodents and/or fleas in areas of human activity.
 - d. A history of plague activity and/or human cases in the area.

Management Responsibility Notify District Board of Trustees. Contact and coordinate response with other stakeholders.	Communications Department Responsibility Conduct a press conference and distribute a news release. Prepare educational materials. If burrow dusting flea control is necessary, include additional information in news release.
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Cont'd. on next page

Response to a Human or Animal Plague Case - cont'd.

Scientific and Technical Services Responsibility Notify County Public Health Officials. Conduct comprehensive plague risk assessment. Train staff about the disease and disease vector. Identify fleas and develop a surveillance strategy. Determine scope of infestation. Sample vectors for the presence of disease organism. If burrow dusting flea control is necessary, conduct a posttreatment evaluation. Provide GIS maps detailing surveillance and control activities.	Control Operations Management Responsibility Contact County Agricultural Commissioner. Determine a control strategy with Scientific and Technical Services. Delineate and map the treatment area. Coordinate burrow dusting flea control as necessary. As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Distribute educational materials. Assist with comprehensive plague risk assessment.	Control Operations Special Services Responsibility Distribute educational materials. Assist with burrow dusting flea control as necessary.

5/11/10

Response to a Human Hantavirus Cardiopulmonary Symptom (HCPS) Case

The following response is initiated when the District is notified of a human HCPS case within county boundaries. The District recognizes that a quick response is necessary to educate the public and determine the prevalence of the virus in vector species. This response is equivalent to recommendations set forth in the "California Department of Public Health "Guidelines for conducting surveillance for hantavirus in rodents in California, 2004."

- A comprehensive HCPS risk evaluation of the area is warranted and should include:
 - a. Live-trapping rodents to estimate the population densities of known HCPS amplifying species and the collection of specimens for assessment of HCPS prevalence.
 - b. Assessing the extent and phase of the infestation.
 - c. Assessing the potential for humans to be exposed to rodent vectors.
 - d. Reviewing the past history of HCPS activity in the region.
- A decision to suppress rodents is based on:
 - a. The presence and prevalence of susceptible rodents in areas of human activity.
 - b. A high potential for humans to be exposed to rodents.
 - c. Confirmation of HCPS activity among susceptible rodents in areas of human activity.
 - d. A history of HCPS activity in the area.

Management Responsibility Notify District Board of Trustees. Contact and coordinate response with other stakeholders.	Communications Department Responsibility Conduct a press conference and distribute a news release. Prepare educational materials including transmission and prevention information. If rodent suppression is necessary, include additional information in news release.
Scientific and Technical Services Responsibility Notify County Public Health Officials. Conduct comprehensive HCPS assessment. Train staff about the disease and hosts. Determine scope of infestation. Sample hosts for the presence of disease organism. If rodent suppression is necessary, conduct a posttreatment evaluation. Provide GIS maps detailing surveillance and control activities.	Control Operations Management Responsibility Contact County Agricultural Commissioner. Determine a control strategy with Scientific and Technical Services. As necessary, contact and coordinate with other local agencies.
Control Operations Zone Responsibility Distribute educational materials. Assist with comprehensive HCPS risk assessment.	Control Operations Special Services Responsibility Distribute educational materials.

Integrated Vector Management Immature Mosquito Guidelines

Definitions

Catch basin – Curbside opening that collects water runoff from streets and serves as an entry point to the storm drain system.

Endangered Species – This is a list of animals found within California or off the coast of the State that have been classified as Endangered or Threatened by the California Fish & Game Commission (State list) or by the U.S. Secretary of the Interior or the U.S. Secretary of Commerce (Federal list).

Environmentally sensitive habitats – Wetlands, riparian areas, organic producers, State, Federal, local wildlife area, or other areas posted as such.

Flood control channel - Open waterway that is designed to carry large amounts of rain water.

Freeway drain – A ditch or drain used to collect water from freeways.

Green pool – A pool that is not serviced, allowing for mosquito larvae development.

Gutter – The edge of a street (below the curb) designed to drain water runoff from streets, driveways, parking lots, etc., into catch basins. Area formed by the curb and the street to prevent flooding by channeling runoff to the storm drains.

Mosquito breeding site – A location where mosquitoes can complete their lifecycle.

Public Health Pesticide (PHP) – A pesticide registered by the Environmental Protection Agency and the California Department of Pesticide Regulation for use against insects of public health importance in California.

Underground Storm Drain System (USDS) – A network of conveyance systems that includes catch basins, grates, gutters, underground pipes, creeks, or open channels designed to transport rain from developed areas and discharged to a receiving body of water.

Larvicide - General term used to describe immature mosquito control.

Additional Technical Considerations

USDS, Flood Channels, and Freeway Drains

These sites have unique properties that make it impossible to conduct surveillance for immature mosquitoes prior to every treatment. During the breeding season, nighttime temperature, historical surveillance data, response to arboviral activity, and complaints by residents initiate larval treatment.

Larval Sampling

Due to the skittish nature of some larval species, such as *Cx. erythrothorax*, visual counts of larvae on the water surface, instead of collections, are considered acceptable to consider larvicide applications.

PHP Use and Resistance Management

The PHP's label must be consulted prior to every treatment. PHPs will be rotated at the Operations Director's discretion. If resistance is suspected in the field, laboratory and operations staff should be notified for follow-up.

Cont'd. on next page

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Immature Mosquito Guidelines - cont'd.

Factors or conditions that may modify the Immature Mosquito Management Guidelines

Human malaria or encephalitis occurrence.

Encephalitis or malaria mosquito pool isolation.

Sentinel chicken seroconversion.

Cluster of dead animals indicating arboviral activity.

Unforeseen biological or environmental conditions.

Introduction of an invasive disease vector.

Legislation, regulation or precedential legislation.

Availability of District funding, resources, or equipment.

Availability of suitable larvicides.

Susceptibility of immature mosquito populations to larvicides.

Environmental condition not listed in the program.

Continued occurrence of immatures in a development site.

Natural Disasters.

Integrated Vector Management Immature Mosquito Guidelines

Site Assessment

Criteria	Evaluation	Decision
Is site a historical mosquito producer?	Yes→	Collect mosquito larvae samples. Consider source reduction .
No ↓		
Is site a mitigation wetland?	Yes→	Consult with Supervisor and District Biologist prior to treatment. Consider larvae sampling criteria .
No ↓		
Is breeding site an USDS, flood channel, or freeway drain?	Yes→	See technical considerations for USDS, flood channels, and freeway drains .
No ↓		
Environmentally sensitive habitat?	Yes→	Consult supervisor about habitat. Avoid damage to sensitive areas. Consider larvae sampling criteria .
No ↓		
Are there active bird nests?	Yes→	Do not disturb habitat. Consult with District Biologist.
No ↓		
Are endangered species present?	Yes→	Consult Supervisor about habitat. Avoid taking endangered species.
No ↓		
Vernal pool?	Yes→	Consult Supervisor about habitat. Avoid taking endangered species.
No ↓		
Will mosquitoes develop in the habitat?	No→	Consult Supervisor about habitat. Consider reducing site surveillance. Consider source reduction .
Yes ↓		
Sample mosquito breeding site and then consider source reduction .		

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Integrated Vector Management Immature Mosquito Guidelines

Source Reduction

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Can I eliminate the mosquito breeding site? Can I remove the water? Can I drain the mosquito breeding site?	Yes →	Institute necessary source reduction .
No ↓		
Can habitat be modified to reduce mosquito breeding?	Yes →	Consult with Special Services Institute necessary source reduction .
No ↓		
Consider biorational control measures .		

Integrated Vector Management Immature Mosquito Guidelines

Biorational Control Measures

Criteria	Evaluations	Decision
Will habitat support immature mosquitoes?	No →	Do not apply biorationals. Set a return inspection date.
Yes ↓		
Time water will remain in breeding site?	< 96 hours →	Consider larvae sampling criteria .
Semi-permanent or permanent (> 96 hours)		
Yes ↓		
Environmentally sensitive habitat?	Yes →	Consult with supervisor before release of mosquitofish or larvicide application .
No ↓		
Water quality?	Highly organic →	Consider larvae sampling criteria . Consider stocking mosquito fish. Consider larvicide application .
Fresh ↓		
Swimming pool or backyard pond?	Yes →	Can stock mosquitofish. Add to pool list and set a return inspection date.
No ↓		
Can apply mosquito fish if applicable. Set a return inspection date. Consider larvae sampling criteria .		

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Integrated Vector Management Immature Mosquito Guidelines

Larvae Sampling Criteria		Criteria	Evaluation	Decision
Mosquito stages present?			none →	Do not treat. Set a return inspection date.
		eggs to pupa ↓		
Number of immature mosquitoes?				
		<i>Anopheles</i> spp. ≥ 1 immature/40 dips <i>Culex</i> spp. ≥ 1 immature/20 dips <i>Aedes</i> spp. or <i>Culiseta</i> spp. ≥ 1 immature/10 dips ↓	<i>Anopheles</i> spp. = 0 immature/40 dips → <i>Culex</i> spp. = 0 immature/20 dips → <i>Aedes</i> spp. or <i>Culiseta</i> spp. = 0 immature/10 dips →	Do not treat. Set a return inspection date.
Mosquitofish present with immature mosquitoes?				
		<i>Anopheles</i> spp. ≥ 2 immatures/40 dips <i>Culex</i> spp. ≥ 2 immatures/20 dips <i>Aedes</i> spp. or <i>Culiseta</i> spp. ≥ 2 immatures/10 dips ↓	<i>Anopheles</i> spp. ≤ 1 immature/40 dips → <i>Culex</i> spp. ≤ 1 immature/20 dips → <i>Aedes</i> spp. or <i>Culiseta</i> spp. ≤ 1 immature/10 dips →	Do not treat. Set a return inspection date.
Consider larvicide application.				

Integrated Vector Management Immature Mosquito Guidelines

Larvicide Application

Criteria	Evaluation	Decision
Is development site an USDS, flood channel, or freeway drain?	Yes →	See technical considerations for USDS, flood channels, and freeway drains.
No ↓		
Mosquito development site size?	more than 1 acre →	Consult with Special Services for treatment.
less than 1 acre ↓		
Water quality	moderate to highly organic <i>Culex</i> spp. →	Apply appropriate larvicide and consider treatment methods.
Fresh ↓		
Majority of immature stages present?	late 4th to pupae stages →	Apply appropriate larvicide and consider treatment methods.
eggs to early 4th larval stages ↓		
Vernal pool?	Yes →	Consult supervisor and consider treatment methods.
No ↓		
Fairy shrimp present?	Yes →	Consult supervisor and consider treatment methods.
No ↓		
Apply appropriate larvicide and consider treatment methods.		

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Integrated Vector Management Immature Mosquito Guidelines

Treatment Method

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Distribution of immatures?	Isolated locations →	Treat selective areas.
Throughout source ↓		
Treat entire mosquito development site.		

Integrated Vector Management Immature Mosquito Guidelines

USDS, Catch Basin and Freeway Drain Treatment Criteria

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Historical mosquito breeding site?	Consult historical records, if yes →	Treat with appropriate larvicide every 10-14 days during mosquito season
No ↓		
Standing water present and/or water flowing into site?	Yes →	Treat with appropriate larvicide and schedule inspection in 10-14 days.
No ↓		
Adult mosquitoes seen leaving system.	Yes →	Adulticide storm drain and schedule additional treatment for 10-14 days.
No ↓		
Inspect channel every 10-14 days during mosquito breeding season and consider ecologic criteria.		

Flood Channel Treatment Criteria

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Historical mosquito breeding site?	Consult historical records, if yes →	Collect and identify larvae from site at beginning of mosquito season. Treat with appropriate larvicide every 10-14 days during mosquito season.
No ↓		
Standing water present?	Yes →	Consider ecologic criteria. Treat with appropriate larvicide and schedule inspection in 10-14 days.
No ↓		
Inspect channel every 10-14 days during mosquito breeding season and consider ecologic criteria.		

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Integrated Vector Management Adult Mosquito Guidelines

Definitions

Adult Mosquito Control

The management of adult mosquitoes may consist of application of a PHP by ultra low volume (ULV) application equipment or direct application (barrier treatments) to residences, outbuildings, other structures and mosquito resting sites.

Continuance Criteria

Criteria that trigger additional applications in an area that has previously attained an initiation criterion. These criteria are considered until a termination criterion is achieved for a treatment area.

Initiation Criteria

Criteria that when achieved trigger the initial adult mosquito application measures. At present, the District recognizes eight separate conditions to be adult mosquito control application triggers.

Termination Criteria

Criteria that conclude adult mosquito application measures in a treatment area until initiation criteria are again achieved.

Additional Technical Information

1. Adult Mosquito Surveillance Devices

Each year, a surveillance device and/or method may be selected to measure the adult mosquito population. This device and/or method can be altered at the discretion of the Operations Manager and/or Laboratory Director.

2. USDS, Catch basins, and Freeway Drains.

Adult mosquito control is initiated year round in these habitats when adult mosquitoes are seen flying from manhole covers upon inspection, and based on historical surveillance data.

3. Evidence of a non-native, mosquito disease vector within District boundaries.

In the event a non-native, mosquito disease vector is introduced into Orange County the District will consider a single female specimen the trigger point for adult mosquito management.

4. Delineate treatment area

The Operations Manager has the flexibility to delineate the treatment area for adult mosquito control when mosquito trigger points have been reached. Knowledge gained from surveillance and research can change the phased response recommendations. In the District treatment area, the primary goal of the adult mosquito management program is to maintain *Cx. tarsalis*, *Cx. quinquefasciatis*, *Cx. Stigmatostoma*, and *Cx. erythrothorax* populations below disease transmission levels. These species are the primary target for control because they vector mosquito-borne arboviruses like West Nile virus (WNV), western equine encephalitis (WEE), Saint Louis encephalitis (SLE), or California encephalitis (CE) in Southern California, and may play a role in other diseases, such as dog heartworm.

Anopheles freeborni is targeted for management because it is a vector of malaria. These additional species are targeted because their biting habits also create a public nuisance. The boundaries of the area to be treated are determined by the mosquito species that achieved the

Adult Mosquito Guidelines - cont'd.

criterion, species biology and flight range, and the infested area. Defining a boundary does not imply that all or part of that area can or will be treated and that the mosquito species targeted will be eradicated within those boundaries.

Public Health Pesticide Use and Resistance Management

1. Consult Public Health Pesticide (PHP) label before treatment.
2. Apply PHPs within the same class or mode of activity on a rotational basis as determined by the Director of Operations.
3. If resistance is suspected in the field, laboratory and operations staff should be notified for follow-up.

Factors That May Influence the Implementation or Modify the Program

1. Availability of a suitable adulticiding material.
2. Susceptibility of mosquito populations to adulticiding materials.
3. Environmental conditions not listed in the program.
4. Availability of District funding or resources.
5. Legislation, regulation or precedential case authority.
6. Unforeseen biological conditions.
7. Presence or absence of mosquito-borne disease.
8. Introduction of an invasive disease vector of public health importance.

Integrated Vector Management Adult Mosquito Guidelines

Meteorological Conditions for Ground Applications

Temperature inversion?	Absent→	Delay Instituting Adult Mosquito Management.
Present ↓		
Wind Speed?	Exceeds PHP label recommendations→	Delay Instituting Adult Mosquito Management.
Less than maximum PHP label recommendations ↓		
Institute Adult Mosquito Management with Appropriate Public Health Pesticide.		

Integrated Vector Management Adult Mosquito Guidelines

Delineate Treatment Area

Is the initiation or continuance criteria met?

Yes →

Define the boundaries of the Treatment Area and consider Agricultural and Land Use Practices.

Agricultural and Land Use Practices

Are endangered or threatened species present?

No ↓

Yes →

Consider the presence of Endangered or Threatened Species, then consider Meteorological Conditions within the Delineated Treatment Area.

Environmentally sensitive habitat?

No ↓

Yes →

Consider treatments compatible with an environmentally sensitive habitat, then consider Meteorological Conditions within the Delineated Treatment Area.

Organically grown crops?

No ↓

Yes →

Consider treatments that meet Organic Standards, then consider Meteorological Conditions within the Delineated Treatment Area.

Consider Meteorological Conditions within the Delineated Treatment Area.

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Integrated Vector Management Adult Mosquito Guidelines

USDS, Catch Basin and Freeway Drain Treatment Criteria

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Historical mosquito breeding site?	Consult historical records, if yes →	Treat with appropriate larvicide every 10-14 days during mosquito season
No ↓		
Standing water present and/or water flowing into site?	Yes →	Treat with appropriate larvicide and schedule inspection in 10-14 days.
No ↓		
Adult mosquitoes seen leaving system.	Yes →	Adulticide storm drain and schedule additional treatment for 10-14 days.
No ↓		
Inspect channel every 10-14 days during mosquito breeding season and consider ecologic criteria.		

Flood Channel Treatment Criteria

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Historical mosquito breeding site?	Consult historical records, if yes →	Collect and identify larvae from site at beginning of mosquito season. Treat with appropriate larvicide every 10-14 days during mosquito season.
No ↓		
Standing water present?	Yes →	Consider ecologic criteria. Treat with appropriate larvicide and schedule inspection in 10-14 days.
No ↓		
Inspect channel every 10-14 days during mosquito breeding season and consider ecologic criteria.		

Integrated Vector Management Adult Mosquito Guidelines

Initiation Criteria

Criteria	Evaluation	Decision
#1 Human illness caused by a mosquito-borne pathogen within the District boundaries?	Yes →	Determine level of mosquito activity.
No ↓		
#2 Mosquito-borne pathogen detected in a dead or live bird or another animal within the District boundaries?	Yes →	Determine level of mosquito activity.
No ↓		
#3 Evidence of a recent serological conversion by a mosquito-borne pathogen in a sentinel chicken or other animal within the District boundaries?	Yes →	Determine level of mosquito activity.
No ↓		
#4 Mosquito-borne pathogen isolated from a mosquito within the District boundaries.	Yes →	Determine level of mosquito activity.
No ↓		
#5 Evidence of a non-native, introduced mosquito species within District boundaries.	Yes →	Determine level of mosquito activity.
No ↓		
#6 CDC/CO ₂ trap or Gravid Trap collection within the District boundaries of: 50 female <i>Cx. tarsalis</i> , and/or less than 75 female <i>Cx. erythrothorax</i> , <i>Cx. stigmatostoma</i> , <i>Cx. quinquefasciatus</i> or <i>Anopheles</i> per collection per trap nights, and/or less than 5 female of any <i>Aedes</i> or 10 of a <i>Culiseta</i> species per collection per trap nights, and/or less than 100 or more total female mosquitoes per collection per trap nights.	50 or more female <i>Cx. tarsalis</i> , and/or 75 female <i>Cx. quinquefasciatus</i> , <i>Cx. stigmatostoma</i> <i>Cx. erythrothorax</i> , or <i>Anopheles</i> per collection per trap nights, and/or → 5 or more female of any <i>Aedes</i> or 10 of a <i>Culiseta</i> species per collection per trap nights, and/or → 100 or more total female mosquitoes per collection per trap nights →	Delineate treatment area and consider treatment method.
#7 Presence of adult mosquitoes in an USDS, catch basin, or freeway drain.	1 or more <i>Culex</i> species →	USDS Treatment Criteria.
↓		
#8 Mosquitoes creating a public health nuisance at a residence.	1 or more female mosquito(s) collected by a homeowner or on a homeowner's property →	Delineate treatment area and consider treatment method.
↓		
Adult mosquito sample not collected.		
Do Not Initiate Adult Mosquito Management		

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Integrated Vector Management Adult Mosquito Guidelines

Continuance Criteria

Criteria	Evaluation	Decision
CDC/CO ₂ trap or Gravid Trap collection with	25 or more female <i>Cx. tarsalis</i> , <i>Cx. erythrorhox</i> , <i>Cx. stigmatostoma</i> , <i>Cx. quinquefasciatus</i> , or <i>Anopheles</i> per collection per trap night, and/or →	Consider Meterological Conditions in the Treatment Area.
	5 or more female of any <i>Aedes</i> or 10 <i>Culiseta</i> per collection per trap night, and/or →	
less than 25 female <i>Cx. tarsalis</i> , <i>Cx. erythrorhox</i> , <i>Cx. stigmatostoma</i> , <i>Cx. quinquefasciatus</i> , or <i>Anopheles</i> per collection per trap night, and/or less than 5 female of any <i>Aedes</i> or 10 <i>Culiseta</i> per collection per trap night, and/or less than 25 total female mosquitoes per collection per trap night ↓	25 or more total female mosquitoes per collection per trap night →	
Presence of adult mosquitoes in an USDS, catch drains ↓	1 or more <i>Culex</i> species →	USDS Treatment Criteria.
Do Not Institute Adult Mosquito Management		

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Integrated Vector Management Adult Mosquito Guidelines

Termination Criteria

Criteria	Evaluation	Decision
Date?	after December 1st →	Terminate Adult Mosquito Control Applications within the delineated treatment area.
before December 1st ↓		
CDC/CO ₂ Light trap or Gravid Trap collection with	less than 15 or more female <i>Cx. tarsalis</i> , <i>Cx. quinquefasciatus</i> , <i>Cx. erythrothorax</i> , or <i>Cx. stigmastoma</i> , or <i>Anopheles</i> per collection for per trap night, and/or → less than 1 female of any <i>Aedes</i> or 5 <i>Culiseta</i> species per collection for per trap night, and/or → less than 25 total female mosquitoes per collection for per trap night →	Terminate Adult Mosquito Control Applications within the delineated treatment area.
15 or more female <i>Cx. tarsalis</i> , <i>Cx. quinquefasciatus</i> , <i>Cx. erythrothorax</i> , or <i>Cx. stigmastoma</i> per collection per trap night, and/or 1 or more female of any <i>Aedes</i> or 5 <i>Culiseta</i> species per collection per trap night, and/or 25 or more total female mosquitoes per collection per trap night ↓		
Environmental conditions?	10 consecutive nights unfavorable for ULV treatments →	Terminate Adult Mosquito Control Applications within the delineated treatment area.
Favorable for adult mosquito management ↓		
Continue to Consider Continuance Criteria		

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Integrated Vector Management Adult Mosquito Guidelines

Determine Level of Mosquito Activity

Criteria	Evaluation	Decision
Malaria case? Mosquito Not Present ↓ Do Not Initiate Adult Mosquito Management	<i>Anopheles freeborni</i> present in a trap within 1/4 mile radius of human case	Delineate Treatment Area.
WNV, WEE, SLE, or other mosquito-borne virus case? Mosquito Not Present ↓ Do Not Institute Adult Mosquito Management	<i>Cx. tarsalis</i>, <i>Cx. quinquefasciatus</i>, or another mosquito species that can vector a virus pathogen within a one mile radius of a human case.	Delineate Treatment Area.
Collection of an invasive disease vector within District boundaries.	1 specimen of a female invasive disease vector.	Delineate Treatment Area.

Integrated Vector Management

Surveillance Indicators

WNV, SLE or, WEE

<i>Criteria</i>	<i>Critical Value</i>
Positive mosquito pool	Ct value <30 for E Primer set or < 35 for NS1 Primer set
Positive dead bird (kidney)	Ct value <30 for E Primer set or < 37 for NS1 Primer set
Positive dead bird (BIC)	Ct value <30 for E Primer set or < 37 for NS1 Primer set
Wild bird seroconversion rate	> 5% of population sampled from a site
Human infection/blood donor	Determined by OCHCA and reported to OCVCD

Malaria

<i>Criteria</i>	<i>Critical Value</i>
Malaria parasite.	1 <i>Plasmodium</i> spp. as determined by appropriate analysis.

Mosquito Abundance

<i>Criteria</i>	<i>Definition</i>
Historical mosquito breeding site.	Consistent mosquito collections at a site in previous years.
Trap night	One trap set for one night. Ten trap nights equals one trap set for ten nights or ten traps set for one night.

Integrated Vector Management Black fly Guidelines

Black Fly Site Assessment

Criteria	Evaluation	Decision
Have black flies been identified by laboratory staff?	No→	Do not treat.
Yes ↓		
Does development site contain black fly habitat (flowing water)?	No→	Do not treat.
Yes ↓		
Are their active bird nests?	Yes→	Do not disturb habitat. Consult with District Biologist.
No ↓		
Are endangered species present?	Yes→	Consult supervisor about habitat. Avoid taking endangered species. Sample development site.
No ↓		
Environmentally sensitive habitat?	Yes→	Consult supervisor about habitat. Avoid damage to sensitive areas. Sample development site.
No ↓		
Consider black fly treatment		

Integrated Vector Management Black fly Guidelines

Black Fly Site Treatment

<i>Criteria</i>	<i><u>Evaluation</u></i>	<i>Decision</i>
Does development site contain black fly habitat (flowing water)?	No →	Do not treat.
Yes ↓ Water quality		
Fresh ↓		
Apply appropriate Public Health Pesticide.		

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Integrated Vector Management Fly Control Guidelines

Fly Site Assessment

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Have fly larvae been identified from source?	No →	Collect larvae at source for identification.
Yes ↓		
Can source be modified or reduced?	No →	Treat with PHP.
Yes ↓		
Modify or reduce fly source. Return to monitor fly production in 3-5 days.		

Integrated Vector Management Red Imported Fire Ant Control Guidelines

Definitions

Large treatment site – A RIFA treatment site that is > 1 acre: school, park, golf course, rights-of-way, or multiple family housing such as apartments, duplexes, townhomes, condominiums, or mobile homes.

Mound treatment – A pesticide application of ant bait that eliminates a RIFA colony within 1-3 days.

Mound drench treatment – A pesticide application of a liquid residual insecticide that eliminates a RIFA colony immediately.

PCOs – A Pest Control Operator as licensed by the California Department of Consumer Affairs, Structural Pest Control Board.

Residential site – A single-family home RIFA treatment site.

Stinging incident – An incident where a person is stung multiple times by ants.

Additional Technical Considerations

RIFA Treatment Manual

The RIFA Treatment Manual contains more details and technical specifications for RIFA surveillance, site assessment and treatment. The Manual is provided to all technicians treating for RIFA and is available from the Operations Department on request.

RIFA Public Health Pesticide Use and Resistance Management

1. Consult pesticide label before treatment.
2. Apply pesticides on a rotational basis, as determined by the Director of Operations.
3. If resistance and/or bait aversion is suspected in the field, laboratory and operations staff should be notified for follow-up.

Factors That May Influence the Implementation or Modification of the Program

1. Availability of suitable pesticide bait.
2. Susceptibility of RIFA populations to pesticide bait.
3. Environmental conditions not listed in the guidelines.
4. Availability of District funding or resources.
5. Legislation, regulation, or precedential case authority.
6. Unforeseen biological conditions.
7. Presence or absence of swarming ants and/or a stinging incident.
8. Introduction of an invasive disease vector of public health importance.

Integrated Vector Management Red Imported Fire Ant Control Guidelines

RIFA Site Assessment & Treatment

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Is property adjacent to waters of the United States?	Yes	Conduct surveillance for RIFA, refer to RIFA treatment manual, and consult management before treatment
No ↓		
Is property considered an environmentally sensitive site or adjacent to an environmentally sensitive site?	Yes	Conduct surveillance for RIFA, refer to RIFA treatment manual, and consult management before treatment
No ↓		
Are endangered species present?	Yes	Conduct surveillance for RIFA, confirm identification of RIFA, refer to RIFA treatment manual, and consult management before treatment.
No ↓		
Is property a single-family residence?	Yes	Conduct surveillance for RIFA, confirm identification of RIFA, refer to RIFA treatment manual, and apply PHPs according to residential treatment guidelines.
No ↓		
Is property a large treatment site (> 1 acre): park, golf course, apartment complex, or condominium complex?	Yes	Conduct surveillance for RIFA, confirm identification of RIFA, consult RIFA treatment manual, and apply PHPs according to large treatment site guidelines.
No ↓		
Is property a school?	Yes	Conduct surveillance for RIFA, confirm identification of RIFA, consult RIFA treatment manual, and apply PHPs according to school treatment site guidelines.
No ↓		
Conduct surveillance for RIFA and consult manager for site treatment protocol.		

Integrated Vector Management Red Imported Fire Ant Control Guidelines

RIFA Surveillance

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Fire ant mounds visible at site	Yes	Collect a sample and submit to laboratory for identification.
No ↓		
Foraging ants visible at site	Yes	Collect a sample and submit to laboratory for identification.
No ↓		
Place RIFA surveillance lure to collect foraging ants.	Ants on lure	Collect a sample and submit to laboratory for identification.
No ants found on lure ↓		
Site considered free of RIFA		

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Integrated Vector Management Red Imported Fire Ant Control Guidelines

Residential Treatment

Criteria	Evaluation	Decision
Is site a single-family residence?	No	Refer to District RIFA program.
Yes ↓		
The District RIFA Program conducts initial inspection and treatment within 3 business days.		Conduct site assessment . Collect ant sample to confirm RIFA identification by the District. Broadcast treatment with RIFA pesticide ant bait in accordance with pesticide label.
↓		
Referral to PCO for 2nd treatment (month 3)		Broadcast treatment with RIFA pesticide ant bait in accordance with pesticide label.
↓		
RIFA complaint by resident		
	Yes	OCVCD conducts treatment in accordance with pesticide label.
No ↓		
3rd treatment by PCO (month 6)		Broadcast treatment with RIFA pesticide ant bait in accordance with pesticide label.
↓		
The District post-treatment survey (month 9-12).		
RIFA present ↓	RIFA Absent	Site is removed from the residential treatment cycle.
Begin Residential Treatment Cycle		

Integrated Vector Management Red Imported Fire Ant Control Guidelines

Large Area RIFA Treatment

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Is site > 1 acre: school, golf course, park, apartment, condominium or rights-of-way?	No	The District RIFA staff will investigate site and determine treatment protocol.
Yes ↓		
Conduct site assessment & RIFA surveillance.	RIFA not present	Provide education to property owner.
RIFA present at site ↓		
Initial treatment ↓		Collect sample to confirm identification. Apply RIFA pesticide bait according to label specifications.
2nd treatment ↓		Apply RIFA pesticide bait according to label specifications.
3rd treatment ↓		Apply RIFA pesticide bait according to label specifications.
The District posttreatment survey (month 9-12). RIFA present ↓	RIFA Absent	Site is removed from the RIFA Large Site Treatment Cycle.
Begin RIFA Large-Site Treatment Cycle.		

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Integrated Vector Management Rat Control Guidelines

Additional Technical Considerations

Bait Station Placement – Generally, only two bait stations are placed on a property after the property owner has been instructed to abate rodent harborage and food sources, and signed a Release of Liability form (Appendix I). Bait stations should be placed outside of structures in areas accessible only to rodents. Bait stations should be appropriately labeled and tamper-proof in accordance with rodenticide label requirements. Bait stations should be serviced every six months.

Rat Control & Rodent Disease Surveillance – The District only provides control for rats (*Rattus* spp.) to residents in Orange County. The District conducts surveillance for rodent-borne diseases in Orange County.

Environmentally Sensitive Areas - When properties are adjacent to environmentally sensitive areas, traps should be used prior to bait station placement.

Rodenticide Use and Resistance Management

1. Consult rodenticide label before treatment.
2. Apply rodenticides on a rotational basis as determined by the Director of Operations.
3. If resistance is suspected in the field, laboratory and operations staff should be notified for follow-up.

Factors That May Influence the Implementation or Modify the Program

1. Availability of a suitable rodenticide.
2. Susceptibility of rodent populations to rodenticides.
3. Environmental conditions not listed in the guidelines.
4. Availability of District funding or resources.
5. Legislation, regulation, or precedential case authority.
6. Unforeseen biological conditions.
7. Presence or absence of rodent-borne disease.
8. Introduction of an invasive disease vector of public health importance.

Integrated Vector Management Rat Control Guidelines

Rodent Control Site Assessment

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Is homeowner, or adult > 18 years old, available for consultation?	No	Reschedule inspection if possible.
Yes ↓		
Interview homeowner about rat activity on their property. ↓		
Conduct inspection of property looking specifically for rodent harborage, food sources, structural issues allowing rodents access to home, and rodent droppings.	Yes	Discuss findings with homeowner, provide educational materials, consider rodent bait station placement .
No ↓		
Do not install bait stations and/or remove bait stations and schedule an inspection for 6 months.		

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Integrated Vector Management Rat Control Guidelines

Rodent Bait Station Placement

<i>Criteria</i>	<i>Evaluation</i>	<i>Decision</i>
Are rats entering the building?	Yes	Do not place bait station.
No ↓		
Signs of active rodent infestation	Yes	Distribute educational materials and encourage abatement of rodent harborage and food source. Consider rodent bait station placement only after abatement and Release of Liability Form is signed.
No ↓		
Does property have pets and/or small children?	Yes	Distribute educational materials and only place bait station out of reach of pets and small children after Release of Liability Form is signed.
No ↓		
Is adjacent property contributing to a rodent infestation?	Yes	Distribute educational materials and attempt contact of neighbor. Consider rodent bait station placement only after Release of Liability Form is signed.
No ↓		
Is the property adjacent to an environmentally sensitive habitat?	Yes	Distribute educational materials and encourage abatement of rodent harborage and food source. Consider rodent bait station placement only after abatement and after Release of Liability Form is signed.
No ↓		
Consider rodent bait station placement only after abatement and after Release of Liability Form is signed.		

Rat Control Release of Liability

K'WEST PRINTING (714) 997-9630



ORANGE COUNTY VECTOR CONTROL DISTRICT

13001 Garden Grove Blvd., Garden Grove, CA 92843-2102

Phone: (714) 971-2421 • (949) 654-2421

www.ocvcd.org

RELEASE OF LIABILITY

The undersigned does hereby RELEASE the ORANGE COUNTY VECTOR CONTROL DISTRICT and its officers, agents, and employees from any and all liability arising out of claims or damage pertaining to the placement of rodenticide on the property address listed below.

The undersigned acknowledges that the rodenticide is a poison that should be considered dangerous and may be lethal. Keep all children and pets away from this rodenticide bait.

X

Occupant's Signature

Date	
ZONE NO.	MAP AREA
Thomas Bros. Guide	
PAGE NO.	GRID
SERVICE REQUEST NUMBER	

WARNING AND AGREEMENT

THE RODENTICIDE BAITS USED IN ROOF RAT EXTERMINATION CONTAIN POISONS AND SHOULD BE CONSIDERED DANGEROUS AND CAN BE LETHAL IF INGESTED. KEEP ALL CHILDREN AND PETS AWAY FROM PLACED RODENTICIDE BAIT.

If accidentally swallowed by humans, domestic animals, or pets, rodenticides used in roof rat control can reduce the clotting ability of blood and cause internal hemorrhaging. In such cases, immediate medical help should be sought. The antidote recommended for this type of anticoagulant rodenticide is intravenous and oral administrations of Vitamin K combined with blood transfusions. This is the indicated treatment for hemorrhage caused by accidental ingestion of anticoagulant rodenticides.

☐ Dog(s) and/or other domestic pet(s) presently reside on this property. I have been warned of the dangers of this rodenticide being ingested by dog(s) and other domestic pet(s). I will keep my pets away from the rodenticide bait and containers.	☐ No dogs reside on property.
X Occupant's Signature	

I request that the ORANGE COUNTY VECTOR CONTROL DISTRICT take such steps as are necessary to control roof rat infestation and give my permission for the use of rodenticide bait on my property. I have read the warnings as to the dangers inherent with the use of rodenticide bait and hereby release the ORANGE COUNTY VECTOR CONTROL DISTRICT from any liability for injury, death, and/or damage that may arise from such use.

I agree to warn all persons coming on to my property of the presence of rodenticide thereon, and also agree to indemnify, defend, and hold ORANGE COUNTY VECTOR CONTROL DISTRICT harmless from any claim, liability, injury, death, and/or damage resulting from or caused by the use of said rodenticide.

I further agree to follow the recommendations made by the VECTOR CONTROL INSPECTOR in regard to roof rat control and prevention. In the event that I sell or vacate this property, or feel that the rat problem has abated, I will notify the ORANGE COUNTY VECTOR CONTROL DISTRICT for proper disposal of any existing rodenticide placed on my property.

I understand that in the event that the recommendations presented by the VECTOR CONTROL INSPECTOR are not followed, that no further rat control measures will be taken by the ORANGE COUNTY VECTOR CONTROL DISTRICT.

I have been advised to rat-proof the structures on my property and agree that the ORANGE COUNTY VECTOR CONTROL DISTRICT has no obligation to remove any carcasses from my property.

X

Occupant's Signature

Occupant's Name (Please Print)

Street Address

Apt. No.

City

Zip Code

Telephone Number

Inspector's Name

Phone Ext. No.

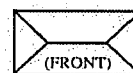
Date Replaced

Date Removed

White Copy - Administrative

DO NOT RELOCATE BAIT BLOCKS OR BAIT STATIONS.

BAIT PLACEMENT DIAGRAM



Number of Bait Blocks Placed: Chlorophacinone _____ Bromadiolone _____

Number of Bait Stations Placed: ☐ Number of Bait Stations Replaced: ☐ Number of Bait Stations Removed: ☐

Yellow Copy - Occupant

Pink Copy - Inspector

5/11/10

Appendix II

California Mosquito-Borne Virus Surveillance and Response Plan

Separate Document

5/11/10

RECEIPT		No. 336197
DATE <u>06/21/11</u>		
FROM <u>Charlow - DWQ</u>		\$ <u>136⁰⁰</u>
CK# <u>11640</u>		DOLLARS
☐ FOR RENT ☐ FOR <u>ORANGE COUNTY VECTOR CONTROL DIST.</u>		
ACCT.		☐ CASH ☐ CHECK ☐ MONEY ORDER ☐ CREDIT CARD
PAID		FROM _____ TO _____
DUE		BY <u>[Signature]</u>
		A-2501 T-46820

RECEIPT		No. 336198
DATE <u>06/21/11</u>		
FROM <u>Charlow - DWQ</u>		\$ <u>136⁰⁰</u>
CK# <u>11639</u>		DOLLARS
☐ FOR RENT ☐ FOR <u>ORANGE COUNTY VECTOR CONTROL DIST.</u>		
ACCT.		☐ CASH ☐ CHECK ☐ MONEY ORDER ☐ CREDIT CARD
PAID		FROM _____ TO _____
DUE		BY <u>[Signature]</u>
		A-2501 T-46820