RECEIVED
JUN 08 2011
DIVISION OF WATER QUALITY

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: Coachella Valley Mosquito + Vector Control District			
B. Mailing Address: 43-420 Trader Place			
C. City: Indio	D. County: Riverside	E. State: CA	F. Zip Code: 92201
G. Contact Person: Jeremy Wittie	H. Email address: jwittie@cvmvcd.org	I. Title: Scientific Operations Manager	J. Phone: 760-342-8287

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: Coachella Valley Water District / Imperial Irrigation District
   Name of the conveyance system: various un-named ag. ditches

3. ☑ Directly to river, lake, creek, stream, bay, ocean, etc.
   Name of water body: Whitewater Storm Channel / Salton Sea

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

B. Regional Water Quality Control Board(s) where application areas are located (REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 7
(List all regions where pesticide application is proposed.)

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

V. PESTICIDE APPLICATION INFORMATION

A. Target Organisms: X Vector Larvae X Adult Vector

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

* See attached

C. Period of Application: Start Date 10/31/2011 End Date Until permit expires

D. Types of Adjuvants Added by the Discharger: Carrier adjuvant - BVA Spray 13 epa# 53206-2

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: Jeremy Wittie

B. Signature: _____ **Date:** 5/31/2011

C. Title: Scientific Operations Manager

X. FOR STATE WATER BOARD USE ONLY

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

Coachella Valley Mosquito and Vector Control District
Pesticide Application Information
Larvacides Used

Trade Name	Active Ingredient	EPA Registration No.
Agnique MMF	poly (oxy-1,2ethanediyl), α-(C16-20 branched & linear alkyl)-ω-hydroxyl (100%)	53263-28
Altosid Briquets (30 day)	S-Methoprene	2724-375
Altosid Liquid Larvacide	(S)-Methoprene	2724-392
Altosid Pellets	(S)-Methoprene	2724-448
Altosid XR Briquets	(S)-Methoprene	2724-421
Natular G	Spinosad (mixture of spinosyn A and spinosyn D)	8329-80
Natular T30	Spinosad (mixture of spinosyn A and spinosyn D)	8329-85
Natular XRG	Spinosad (mixture of spinosyn A and spinosyn D)	8329-83
Natular XRT	Spinosad (mixture of spinosyn A and spinosyn D)	8329-84
Natular 2EC	Spinosad (mixture of spinosyn A and spinosyn D)	8329-82
VectoBac G	Bacillus thuringiensis israelensis (Bti)	73049-10
VectoBac WDG	Bacillus thuringiensis israelensis (Bti)	73049-56
VectoBac 12AS	Bacillus thuringiensis israelensis (Bti)	73049-38
VectoLex CG	Bacillus sphaericus (Bs)	73049-20
VectoLex WDG	Bacillus sphaericus (Bs)	73049-57
VectoLex WSP	Bacillus sphaericus (Bs)	73049-20
VectoMax CG	Bacillus sphaericus (Bs) and Bacillus thuringiensis israelensis (Bti)	73049-429

Coachella Valley Mosquito and Vector Control District
Pesticide Application Information
Adulticides Used

Trade Name	Active Ingredient	EPA Registration No.
Aqua-Reslin	Permethrin and technical Piperonyl Butoxide	432-796
BVA 13 Oil - carrier/adjuvant	Refined Petroleum Distillate	55206-2
Demand CS	Lambda-Cyhalothrin	100-1066
Pyrenone 25-5	Pyrethrin and technical Piperonyl Butoxide	432-1050
Pyrocide	Pyrethrin and technical Piperonyl Butoxide	1021-1569

Coachella Valley Mosquito and Vector Control District

43-420 Trader Place • Indio, CA 92201 • (760) 342-8287 • Fax (760) 342-8110
• Toll Free 1-888-343-9399
E-mail: CVmosquito@cvmvcd.org • Website: www.cvmvcd.org

NOTICE TO SUBJECT/ INTERESTED AGENCIES

The Honorable Bob Buster
The Honorable John F. Tavaglione
The Honorable Jeff Stone
The Honorable John J. Benoit
The Honorable Marion Ashley
Bureau of Land Management – South Coast Field Office
California Department of Fish & Game, Region 6
Caltrans District #8
Department of Pesticide Regulations
Regional Water Control Board Region 7
Riverside County Agricultural Commissioner
Riverside County Department of Environmental Health
Coachella Valley Water District
Mission Springs Water District
Imperial Irrigation District
Desert Water Agency
Indio Water Authority
Valley Sanitary District
Torrez Martinez Tribe
City of Desert Hot Springs
City of Palm Springs
City of Cathedral City
City of Rancho Mirage
City of Indian Wells
City of Palm Desert
City of La Quinta
City of Indio
City of Coachella

Subject: **The Coachella Valley Mosquito and Vector Control District Notice of Intent to apply aquatic larvacides and adulticides for vector control as part of the District's Integrated Vector Management program.**

Pursuant to the provisions stated in the National Pollutant Discharge Elimination System (NPDES) Permit (Order No. 2011-0002-DWQ) [General Permit No. CAG 990004] adopted on March 1, 2011, by the State Water Resources Control Board, notice is hereby given that the Coachella Valley Mosquito and Vector Control District intends to continue to perform larvicide, ultra low volume (ULV) adulticide, as well as barrier adulticide applications as part of its Integrated Vector Management Program. The permit's effective date has been postponed until October 31st 2011.

Time Period / Purpose:
This notification covers District control measures from June 1, 2011 thru December 31, 2011 as needed for the suppression of vector populations and arbovirus transmission when non-chemical strategies aren't feasible. The permit itself will be in effect for 5 years. Each year the District will update interested agencies regarding the control products being used within the District's boundaries.

Application Locations and Application Types:
Application of mosquito control products will be made throughout the Coachella Valley Mosquito and Vector Control District (see District Map Attachment) by:

- Ultra Low Volume(ULV) and Barrier adulticide applications
- Larvaciding applications

Applications are made based on key vector and arbovirus surveillance indicators. All pesticide labeling requirements are complied with during application of vector control products.

Vector Control Products:

The following California registered public health pesticides may be used within the District boundaries:

Larvicides

Trade Name	Active Ingredient	EPA Registration No.
Agnique MMF	poly (oxy-1,2ethanediyl), α-(C16-20 branched & linear alkyl)- ω-hydroxyl (100%)	53263-28
Altosid Briquets (30 day)	S-Methoprene	2724-375
Altosid Liquid Larvacide	(S)-Methoprene	2724-392
Altosid Pellets	(S)-Methoprene	2724-448
Altosid XR Briquets	(S)-Methoprene	2724-421
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Natular 2EC	Spinosad (mixture of spinosyn A and spinosyn D)	8329-82
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VectoBac WDG	Bacillus thuringiensis israelensis (Bti)	73049-56
VectoBac 12AS	Bacillus thuringiensis israelensis (Bti)	73049-38
VectoLex CG	Bacillus sphaericus (Bs)	73049-20
VectoLex WDG	Bacillus sphaericus (Bs)	73049-57
VectoLex WSP	Bacillus sphaericus (Bs)	73049-20
VectoMax CG	Bacillus sphaericus (Bs) and Bacillus thuringiensis israelensis (Bti)	73049-429

Adulticides

Trade Name	Active Ingredient	EPA Registration No.
Aqua-Reslin Demand CS	Permethrin and technical Piperonyl Butoxide Lambda-Cyhalothrin	432-796 100-1066
Pyrenone 25-5	Pyrethrin and technical Piperonyl Butoxide	432-1050
Pyrocide	Pyrethrin and technical Piperonyl Butoxide	1021-1569

Additional Information:

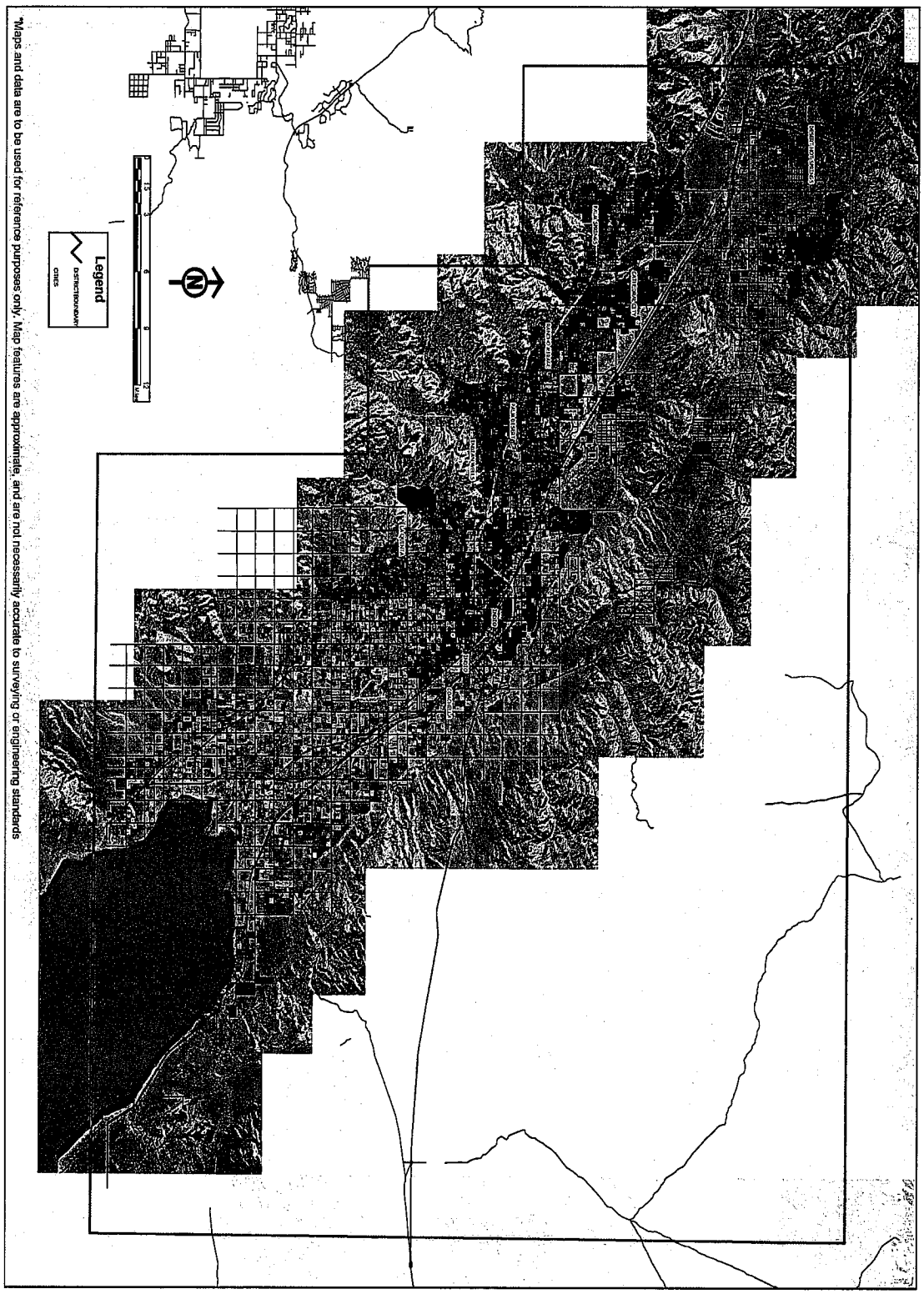
If you have any questions regarding this Notice, please contact the District headquarters at 760-342-8287.

Sincerely,

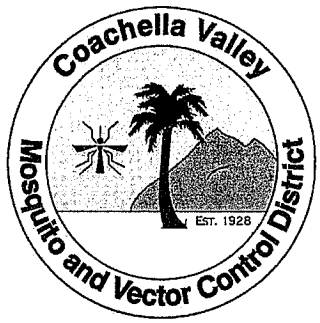
Jeremy Wittie, M.S.
Scientific Operations Manager
jwittie@cvmvcd.org

Cc. Branka B. Lothrop, PhD, General Manager
Sharon Lock, President of the Board
Steven B. Quintanilla, General Counsel

BOUNDARY OF COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT



*Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards

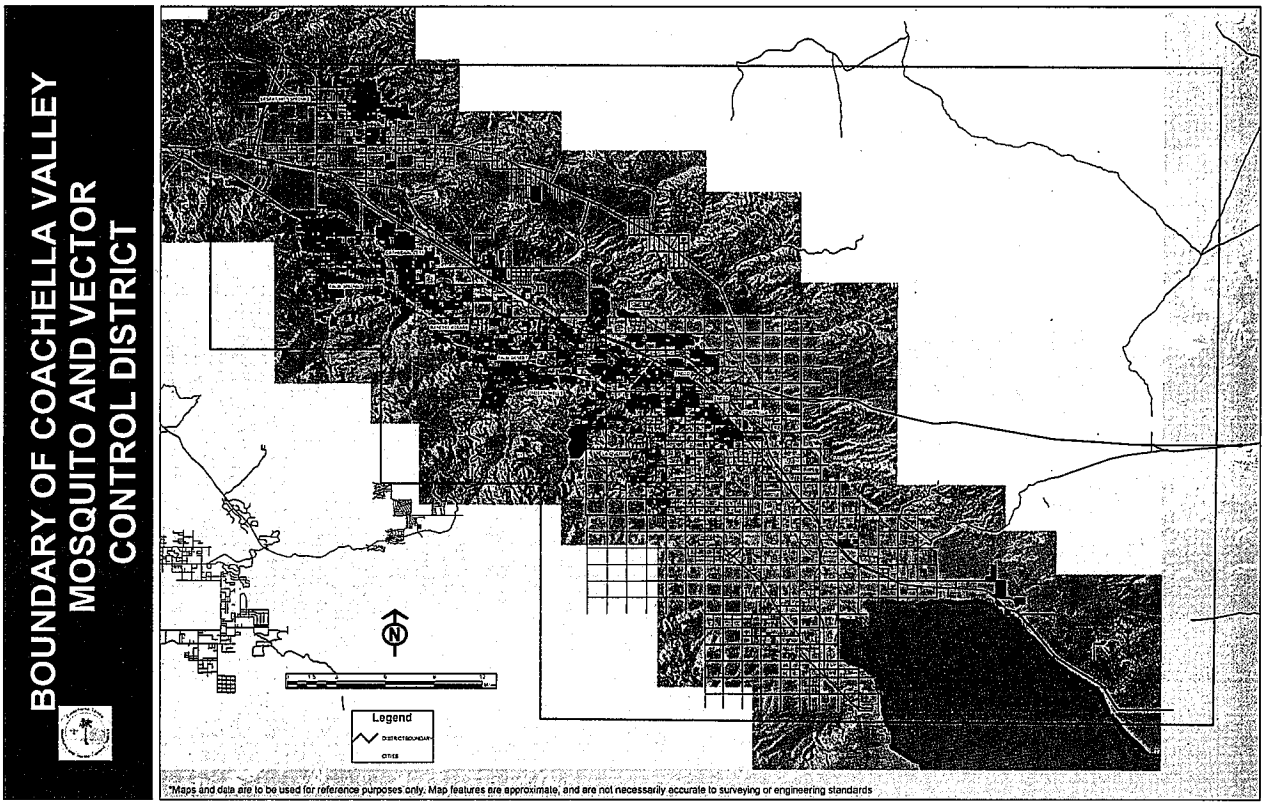


Coachella Valley Mosquito and Vector Control District
Pesticide Application Plan
2011

JW 6.1.2011

Pesticide Application Plan (PAP) Elements:

1. Description of all target areas, if different from the water body of the target area, into which larvicides and adulticides 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;



The Coachella Valley extends for approximately 45 miles (72 km) in Riverside County southeast from the San Bernardino Mountains to the Salton Sea. It is approximately 15 miles (24 km) wide along most of its length, bounded on the west by the San Jacinto Mountains and the Santa Rosa Mountains and on the north and east by the Little San Bernardino Mountains. The Coachella Valley Mosquito and Vector Control District covers the entire valley and terminates at the Riverside/Imperial County line near the Salton Sea State Park. Larvicide and adulticide applications may occur anywhere in the specified region to bodies of water when deemed necessary by key mosquito and arbovirus surveillance indicators.

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

Deciding to use chemicals to control vectors relies on the analysis of surveillance data and a basic understanding of vectors and vector borne disease ecology. District staff is routinely trained on the basic principles of the ecology of vectors and the pathogens they transmit. Several standard operating procedures have also been developed and/or adopted to give guidance in determining when pesticide use is warranted to control local mosquito populations in order to prevent arbovirus transmission.

Factors affecting the decision to use pesticides for Mosquito Control

Abiotic Factors

Abiotic factors, that can influence a decision to use fast acting chemical control, are seasonal and daily weather patterns and localized larval and adult habitat conditions; all of which can affect the potential for vector and arbovirus activity and ultimately affect a technician's decision to utilize a particular control product.

Biotic Factors

Biotic factors, that can influence use of chemical control of mosquitoes, include the number of larvae or pupae present in a breeding source, species and stage of mosquito larvae or adults present, presence and level of natural predators in a breeding habitat, level of resistance (if detected), and level of detected arbovirus activity in an area under surveillance for potential chemical control.

District Established Thresholds for Vector Control Measures

The District has established thresholds for both larval and adult mosquito control. These thresholds have been developed through years of surveillance and historical data of arbovirus transmission in mosquito producing habitats in the Coachella Valley.

The District has set standard larval sampling (dipping) protocols for various mosquito breeding habitats found throughout the Coachella Valley. Larval sampling consists of the vector control technician taking a certain number of dips, based on the surface area and the type of the breeding source, using the standard 1-pint dipper. Once all dips are taken, the vector control technician determines the average number of mosquito larvae per dip. If the average per dip exceeds one larva per dip this level of breeding warrants a control measure. All the larval samples obtained by dipping surveillance are labeled and taken to the laboratory for final identification. At this point, abiotic and biotic factors are taken under consideration and the proper treatment is determined by the vector control technician in the field. When at all possible, physical (i.e. stagnant water removal) or biological control (i.e. mosquitofish or tadpole shrimp) measures are utilized. In habitats that are conducive to breeding primary vectors of human health importance, it is necessary for District technicians to utilize one of the few fast acting, biorational, and highly specific control products that are registered in California.

For adulticiding, the District established adulticiding protocols and five year thresholds using data from adult mosquito carbon dioxide baited trap surveillance deployed throughout the Coachella Valley. These

traps and thresholds are used as indicators for when it may be necessary to use adult control measures. When trap numbers of mosquitoes of public health importance *(Culex tarsalis, Culex quinquefasciatus)* exceed the five year threshold for that trap, District staff begins to coordinate the potential use of adulticides to reduce the local adult mosquito population to prevent/reduce arbovirus transmission. Several other factors are also considered prior to making the decision to conduct either a ground or aerial ultra low volume adulticide application. Aerial ultra volume adulticiding is only deployed in cases of arbovirus transmission and over non-populated areas. In addition, factors such as presence/or absence of arbovirus activity, risk assessment level (see discussion below), seasonal weather patterns, and localized resistance are some that are considered carefully when determining if adulticiding measures are justified and will be effective. In every case the pesticide labeling requirements are strictly adhered to.

CVMVCD Mosquito-Borne Virus Surveillance and Emergency Response Plan (see attachment)

The District has developed and adopted a modified version of the California Mosquito-borne Virus Surveillance and Response Plan. This document outlines the District's mosquito surveillance and control objectives and outlines several models used to predict the risk of mosquito borne disease epidemics and establishes standard public outreach, surveillance, and mosquito control measures based on the level of estimated level of risk. Please refer to Section V thru VI for a description of response levels, models utilized to determine level of risk for human epidemics of SLE, WEE, and WNv, and also descriptions of the conditions as well as recommended District response based on the level of risk.

3. Pesticide products or types expected to be used and if known, their degradation by-products, the method in which they are applied, and if applicable, the adjuvants and surfactants used;

Please see Attachments E and F within the 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, backpack, hand can, helicopter, or airplane according to label directions.

4. 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 state, county, city, and private property owners to effect long-term solutions to reduce or eliminate the need for continued applications as described in CVMVCD Mosquito Reduction Best Management Practices.

The typical sources treated by the District include:

Freshwater swamps and marshes

In the Coachella Valley, marshes (primarily duck clubs or managed wetlands) are drained and re-filled once to enhance the primary productivity of the habitat, and under certain circumstances, this can result in large populations of mosquitoes.

Whitewater River/Storm Channel

The Whitewater River transects the entire length of the Coachella Valley. Most of the year, the river is dry and only has significant flow during the few rain storms experienced during the winter months. Water flow does occur year round from the city of Indio east to the Salton Sea, due to the treated sewage water discharge and agricultural run off. This part of the Whitewater river runs year-round and does not breed mosquitoes. Very few treatments to the Storm Channel occur in the urban, dry sections, where water discharge from local home owner associations creates stagnant pools that are prone to dense growths of bulrush and cattail.

Salt marshes

In the Coachella Valley, the salt marshes along the Salton Sea can produce large numbers of *Cx. tarsalis* broods, negatively influencing the health, comfort and economy of residents and visitors in the area. Natural decrease of the Salton Sea level greatly reduced the *Cx. tarsalis* population in the area, but *Cx. tarsalis* can still rise to significant numbers during the spring and fall posing a serious public health threat.

Temporary standing water

There are several species of mosquitoes that can breed in water that stands only one to two weeks. Such habitats include irrigation tail water as well as standing water in irrigated pastures and other agricultural habitats. Few mosquito species from three major genera are found in these sources, and during warm months and increase irrigation, pastures and other agricultural lands are enormous mosquito producers of *Aedes*, *Psorophora*, and *Culex* mosquitoes.

Wastewater treatment facilities/Storm Water Retention Basins

Aquatic sites in this category include a wide variety of ponds, ditches and other structures designed to handle wastewater of some kind. Included are sewage treatment ponds, wetlands managed for de-nitrification, and storm sewers systems.

Containers

Containers such as flowerpots, cans, tree holes, fountains, tires, and neglected swimming pools are excellent habitats for several *Culex, Culiseta*, and *Anopheles* species. Typically, problems with container breeders occur during the wetter parts of the year.

5. Other control methods used (alternatives) and their limitations;

With any mosquito or other vector source, CVMVCD'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 CVMVCD Mosquito Reduction Best Management Practices.

Specific methods used by the District include: physical control, biological control, public education, and working with both government and private property owners to find long-term water management strategies that meet their needs while minimizing the need for public health pesticide applications.

Mosquitofish, *Gambusia affinis,* are the most commonly used biological control agent for mosquitoes in the world. Correct use of this fish can provide safe, effective, and persistent suppression of a variety of mosquito species in many types of mosquito sources.

As with all safe and effective control agents, the use of mosquitofish requires a good knowledge of operational techniques and ecological implications, careful evaluation of stocking sites, use of appropriate stocking methods, and regular monitoring of stocked fish. The District has received written permission (5/1/2006) from the California Department of Fish and Game to stock mosquitofish in the Coachella Valley, operating under the following conditions as specified by Fish and Game:

1. Fish and Game is notified prior to planting of mosquitofish in a drain or body of water that connects to the Salton Sea.
2. Fish and Game is notified prior to planting mosquitofish in the main stem of Salt creek.
3. Mosquitofish are not to be planted in the following Desert Pupfish (Genus *Cyprinodon*) refugia ponds:
    a. McCallum/Simone Pond and the Visitor center pond or any water course at the Thousand Palms Preserve, along Thousand Palms Canyon Drive.
    b. The Seep Pond, the Oasis Pond or the Cienega (Sonoran) Pond, located at the Living Desert Zoological Gardens
    c. The small pond behind the Salton Sea State Park's headquarters.
    d. Any pond or water course located at the Dos Palmas Preserve.

The principal habitat characteristic that affects the successful use of mosquitofish is its relative stability. Mosquitofish usually are not effective in intermittently flooded areas unless a refuge impoundment is provided. Because of this, mosquitofish are more effective against mosquito breeding in permanent and semi-permanent water, such as *Culex* spp., *Anopheles* spp., and *Culiseta* spp., than against floodwater species, like *Aedes* spp. and *Psorophora* spp.

In the Coachella Valley, agricultural irrigation creates temporary, stagnant habitats of unpredictable flood durations that promote mosquito breeding. The District uses indigenous freshwater crustaceans, called Tadpole shrimp (*Triops newberryi*), in limited organic agricultural operations to help deter and control mosquito breeding in these habitats.

Factors such as water retention time, soil type, mosquito species, and various agricultural practices limit the usefulness of this opportunistic predator for wide scale use as a biological control agent in the Coachella Valley.

6. How much product is needed and how this amount was determined;

Note – Estimates based on usage during the 2010 calendar year.
Products with an asterisk (*) are in the first year of use, thus estimate was produced after one fiscal quarter of ordering not usage.

Product	EPA Reg Number	Estimated Annual Usage Calendar Year	Unit of Measure
Larvacides			
Agnique MMF	53263-28	665.00	Gal
Altosid Briquets	2727-375	3,715.00	Units
Altosid XR	2724-451	9,278.00	Units
Altosid Pellets	2724-448	7,798.00	Lbs
Altosid Liquid Larvacide	2724-392	13.00	Gal
Natular 2EC*	8329-82	20.00	Gal
Natular G*	8329-80	4,000.00	Lbs
Natular G30*	8329-83	1,600.00	Lbs
Natular T30*	8329-85	4,800.00	Units
Natular XRT*	8329-84	4,400.00	Units
Vectobac 12 AS	73049-38	58.00	Gal
Vectobac G	73049-10	11,500.00	Lbs
Vectobac WDG	73049-56	264.50	Lbs
Vectolex WDG	73049-57	410.00	Lbs
Vectolex WSP	73049-20	835.00	Units
Vectolex CG	73049-20	1,640.00	Lbs
Vectomax CG	73049-429	4,000.00	Lbs
Adulticides			
Aqua-Reslin	432-1277	5.5	Gal
Demand CS	100-1066	6.3	Gal
Pyrenone 25-5	432-1050	21.2	Gal

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

**Please see the MVCAC NPDES Coalition Monitoring Plan*

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

Please refer to CVMVCD Mosquito Reduction Best Management Practices. Evaluation and determination of the feasibility of alternatives to pesticide application are discussed in greater detail in Section 11 below.

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

a. Measures to prevent pesticide spills;

- District staff monitors application equipment on a daily basis to ensure it remains in proper working order.
- Spill mitigation kits are placed in all District vehicles and pesticide storage areas to respond to spills.
- Pesticides are kept in secure locations both on District grounds and when in District vehicles.
- Employees are trained on spill prevention and response annually.

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

- Spray equipment is calibrated twice each year and is a part of the Cooperative Agreement with California Department of Public Health.
- District recommended rates (within the range of specified label rates) for all vector control products have been determined through years of applied studies to ensure the proper rates are utilized in each of the mosquito breeding habitats found in the Coachella Valley.
- Each Vector Control Technician utilizes scales and graduated cylinders to measure control products on a daily basis.
- Products are checked out to certified Vector Control Technicians on a daily basis to help ensure accuracy of reporting and limit amount of product used on a daily basis.

c. A plan to educate Coalition's or Discharger's staff and pesticide applicator on any potential adverse effects from pesticide application.

- District applicators (State Cert. Public Health Vector Control Technicians) are all certified by the California Public Health Department. They are also required to complete in-house pesticide training on a yearly basis and attend, within two year cycles, state training to maintain their state certification.

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

- The District calibrates all equipment mounted on trucks and hand held larviciding equipment each year to meet application specifications.
- Field Supervisors review pesticide application records daily to ensure appropriate amounts of material are being used.
- Ultra Low Volume (ULV) equipment is calibrated annually for output and droplet size to meet label requirements.
- Aerial larvaciding equipment is calibrated by the Contractor for each product.
- Aerial adulticide equipment is calibrated before each use and droplet size is monitored by the District to ensure droplets meet label requirements. Airplanes used in urban ULV applications and the primary airplane used for rural ULV spraying is equipped with advanced guidance and drift management equipment, to ensure the best available technology is being used to place product in the intended spray area. If a secondary airplane is used in rural ULV applications, it will be equipped with an advanced guidance system.

e. Descriptions of specific BMPs for each pesticide product used; and

- The District has determined recommended rates for various products based on years of applied studies in the Coachella Valley. *Please see Exhibit A: Mosquito Larvicides Product Use Guidelines and Exhibit B: Mosquito Adulticide Product Use Guidelines.*

f. Descriptions of specific BMPs for each type of environmental setting (agricultural, urban, and wetlands)

- Please see CVMVCD Mosquito Reduction Best Management Practices.

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:

a. 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 determines 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
- Presence of sensitive/endangered species or habitats.

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

Please see the CVMVCD Mosquito Reduction Best Management Practices and the CVMVCD Mosquito-borne Virus Surveillance and Response Plan.

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

Any site that holds water for more than 96 hours (four 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 as described in CVMVCD Mosquito Reduction Best Management Practices.

d. 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 and disease surveillance data by testing certain number of mosquito samples and sentinel chicken test results and uses them to guide mosquito control activities. The District is also implementing new GIS software that allows for mapping and modeling vector related issues, that help track mosquito breeding sources under control efforts and frequency and amounts of control products usage.

11. Examination of Alternatives; Dischargers shall continue to examine alternatives to pesticide use and reduce the need for applying larvacides that contain temephos and for spraying adulticides. Such methods include:

a. Evaluating management and treatment options that may impact water quality, non-target organisms, vector resistance, feasibility, and cost effectiveness, such as:

- No action
- Source prevention
- Mechanical or physical source reduction methods
- Cultural methods
- Biological control agents
- 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 vectors are present at a level that will constitute a nuisance or threat to public health

The District staff uses the principles and practices of Integrated Vector Management (IVM) as described in CVMVCD Mosquito Reduction Best Management Practices. As stated in item #10 above, locations where vectors may exist are assessed, and the potential for using alternatives to pesticides is determined on a case-by-case basis. Commonly considered alternatives include: 1) Eliminate artificial sources of standing water; 2) Ensure temporary sources of surface water drain within four days (96 hours) to prevent adult mosquitoes from developing; 3) Control plant growth in ponds, ditches, and shallow wetlands; 4) Design facilities and water conveyance and/or holding structures to minimize the potential for producing mosquitoes; and 5) Use appropriate biological control methods that are available.

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

12. Correct Use of Pesticides; 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 proper 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.

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

http://www.cvmvcd.org

References:

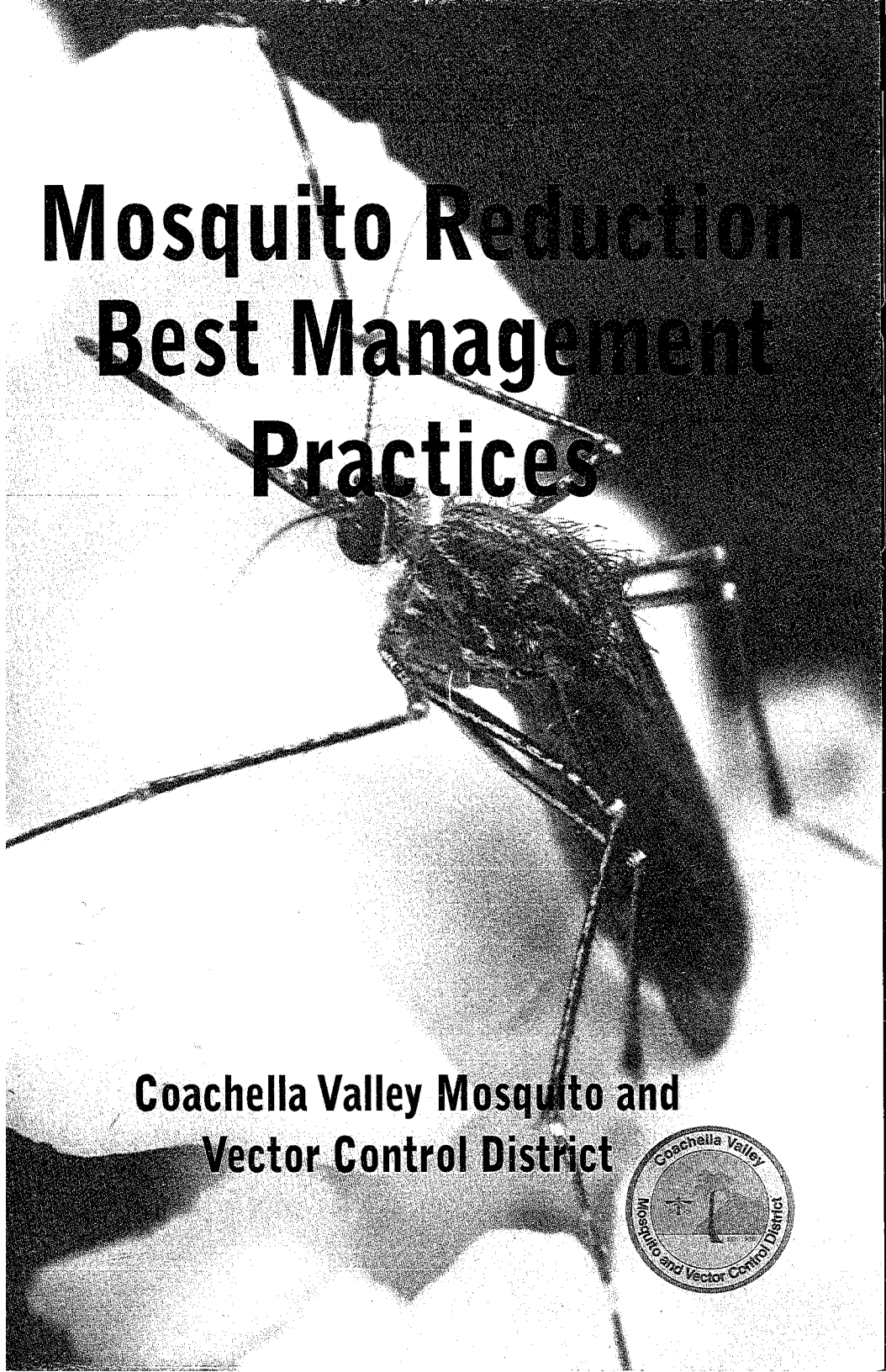
CVMVCD Mosquito Reduction Best Management Practices (Exhibit C attached); Copies may be also requested by calling the Coachella Valley Mosquito and Vector Control District at (760) 342-8287

CVMVCD Mosquito-borne Virus Surveillance and Response Plan. 2010(Exhibit D attached); Copies may be also requested by calling the Coachella Valley Mosquito and Vector Control District at (760) 342-8287

MVCAC NPDES Coalition Monitoring Plan. 2011.

Copies may requested by calling MVCAC at (916) 231-2141

Mosquito Reduction Best Management Practices



Coachella Valley Mosquito and Vector Control District

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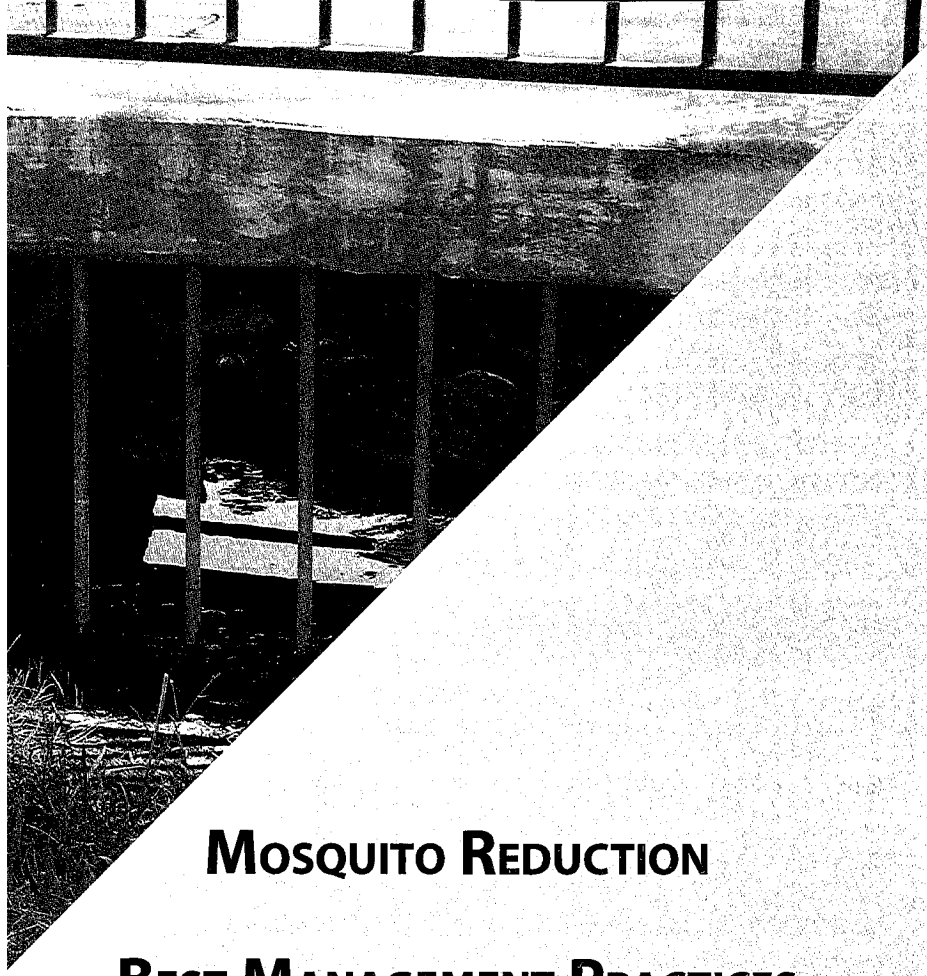
Best Management Practices

Policies



Mosquito Reduction

Best Management Practices

These Mosquito Reduction Best Management Practices (BMPs) are compiled from a number of sources including scientific literature, collaborative inter-agency documents, and from experienced vector control professionals. This list is intended to provide general guidance, not site specific requirements. BMPs that are most applicable and relevant to a specific mosquito source may be selected from the list, and incorporated into the specific BMP Implementation Plan for a specific mosquito source in consultation with District personnel.

Mosquito Reduction Best Management Practices

The Coachella Valley Mosquito and Vector Control District (District) recognizes that certain land management practices can reduce mosquito populations, thereby reducing long-term mosquito treatment costs, reducing the amount of products used in mosquito control operations, helping to protect public health, and contributing to the District's integrated vector management (IVM) approach to mosquito and vector control.

Integrated Vector Management is an approach that focuses on site-specific, scientifically sound decisions to manage vector and nuisance populations by matching a wide variety of techniques with the conditions found on site. These techniques are commonly grouped into four categories:

1. Source reduction or physical control – environmental manipulation that results in a reduction of mosquito breeding sites
2. Cultural Control – change the behavior of people so that their actions prevent the development of mosquitoes or the transmission of vector-borne disease.
3. Biological Control – use of biological agents to limit larval mosquito populations
4. Chemical Control – larvicides (materials that kill immature larval mosquitoes)and adulticides (materials that kill adult mosquitoes)

Through the adoption of these policies and procedures, the District would like to enhance the clarity of its efforts to effectively control mosquitoes by physical, cultural, and biological means. To this end, this document includes District guidelines for land-management practices that provide property owners, landowners and land managers an opportunity to address any land-based mosquito problems as may be identified by the District.

The Mosquito Reduction Best Management Practices (BMPs) referred to in this document are the recommended land management practices that can provide a reduction in mosquito populations by various means including: preventing, reducing or eliminating breeding areas, increasing the efficacy of biological controls, increasing the efficacy of chemical controls, and improving access for control operations. These BMPs have been circulated among representatives of stakeholder groups including property owners, landowners, land managers, regulatory agencies, and other interest groups. As a result of the comments and suggestions received from this process, the District has a good understanding of practical and appropriate BMPs for a variety of

land uses that exist in the Coachella Valley. Not all BMPs included in this document will apply equally to all mosquito sources; however the BMPs listed serve as a starting point in the cooperative development of site-specific BMP Implementation Plans that will address particular mosquito breeding sources.

The District intends to encourage those responsible for significant mosquito sources on their property to develop and implement a cooperative Mosquito Reduction BMP plan with the District to avoid the need for formal enforcement actions authorized under the California Health and Safety Code (HSC)* . While in some situations, the District must employ the California Health and Safety Code in order to ensure safe conditions and to carry out its public responsibilities, it has been the District's experience that a cooperative approach provides more effective and long-lasting mosquito management.

The Mosquito Reduction BMP Implementation Policies are designed to address mosquito breeding sources including, but not limited to: managed wetlands/duck clubs, agricultural fields, stormwater structures, wastewater facilities, and residential properties. Many of these sources produce significant mosquitoes due to management practices that promote favorable habitats for mosquitoes.

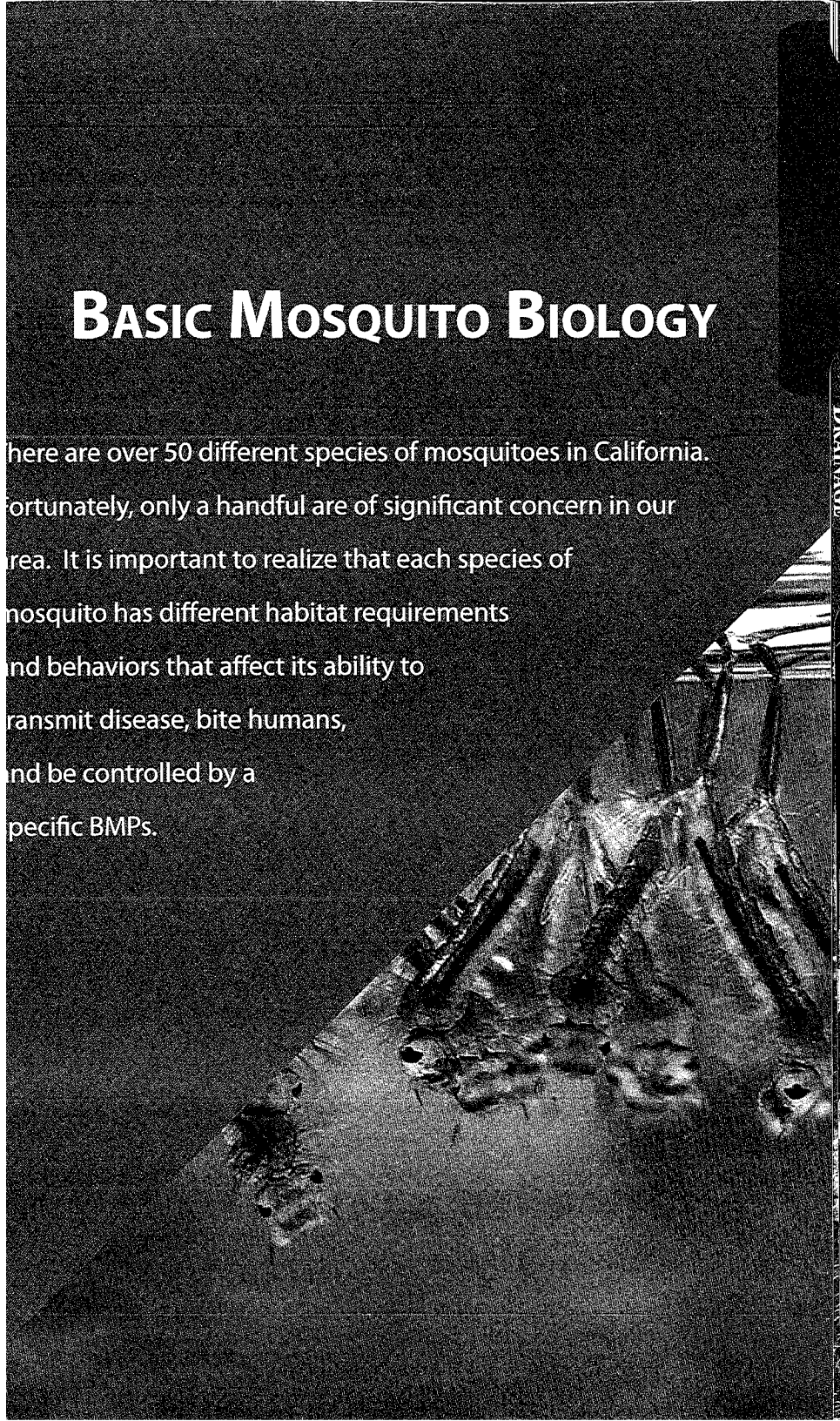
While it is generally accepted that mosquito breeding from all sources may be reduced through the widespread implementation of Mosquito Reduction BMPs, these policies specifically target the most severe mosquito problems with the greatest likelihood of responding through the use of BMPs. These sources are defined as Significant Mosquito Sources, and will be addressed according to the following protocols. For those properties with mosquito sources that do not fit the definition of Significant Mosquito Source, the BMPs offer an opportunity to proactively address mosquito problems to avoid development into a Significant Mosquito Source.

In cases where the implementation of Mosquito Reduction BMPs would cause economic hardship or cause technical difficulties, the District may choose to offer assistance in the form of equipment, labor, technical advice, or other resources. The level of assistance offered will be determined on a case by case basis.

* Under the California Health and Safety Code, mosquito and vector control districts may legally abate a public nuisance defined as "Any water that is a breeding place for vectors" and "Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors." (HSC §2002(j)). Abatement can result in civil penalites of up to $1,000.00 per day (HSC §2085(a), §2061).

Basic Mosquito Biology

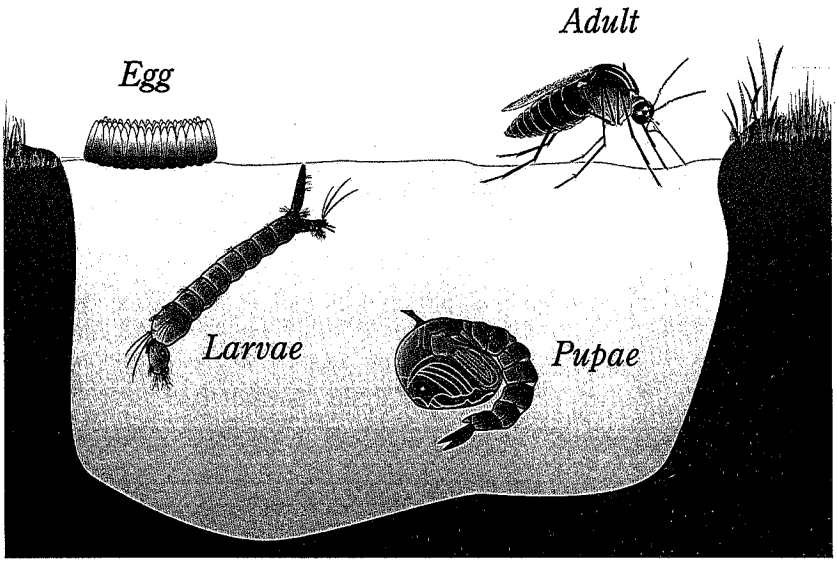
here are over 50 different species of mosquitoes in California. ortunately, only a handful are of significant concern in our rea. It is important to realize that each species of nosquito has different habitat requirements nd behaviors that affect its ability to ransmit disease, bite humans, nd be controlled by a pecific BMPs.



Basic Mosquito Biology

There are over 50 different species of mosquitoes in California. Fortunately, only a handful are of significant concern in our area. It is important to realize that each mosquito species has different habitat requirements and behaviors that affect its ability to transmit disease, bite humans, and be controlled by a specific BMP.

Basic Mosquito Life Cycle



All mosquitoes share a similar life cycle with an aquatic stage (larva and pupa) and an aerial stage (adult). Nearly all mosquito reduction BMPs focus on managing the aquatic stage of the mosquito by creating the conditions less favorable for mosquito development. This usually involves manipulating the amount or timing of standing water, decreasing the amount of vegetation in and around the standing water, and creating a situation where natural or introduced predators can consume the mosquito larvae. Since each species of mosquito has slightly different habitat requirements, it is important to understand which mosquitoes favor which habitats to understand how a particular BMP is designed to work.

To understand BMPs it is useful to think of mosquitoes as belonging to one of the following three categories. Examples of common species within each category follow.

1. **Standing-Water Mosquitoes** prefer still water commonly found in ponds, un-maintained swimming pools, rice fields, puddles, etc.

Common Mosquito Reduction BMPs:

a. Drain standing water.

b. Reduce or eliminate emergent vegetation in and along the edges of the water.

c. Hold water level constant to encourage natural predators or biological control agents (e.g. mosquitofish).

d. Contact the District to coordinate mosquito prevention with other mosquito control operations such as chemical and biological control.

2. **Floodwater Mosquitoes** commonly lay their eggs in moist soil. When they become submerged in a seasonal wetlands or irrigated pastures, the eggs hatch.

Common Mosquito Reduction BMPs:

- Provide rapid percolation of water to prevent standing water longer than 72-96 hours.
- Reduce or eliminate emergent vegetation by disking or mowing and dispose of as much dead vegetation as possible. This will allow for better percolation.
- Flood quickly to encourage all eggs to hatch at once and minimize the need for multiple larvicide applications.
- Contact the District to coordinate mosquito prevention with other mosquito control operations such as chemical and biological control.

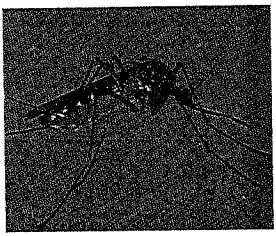
3. **Container Mosquitoes** prefer contained areas of water such as tree holes, buckets, tires, etc. Some standing water mosquitoes will also develop in containers such as the Southern House Mosquito (*Culex quinquefasciatus*)

Common Mosquito Reduction BMPs:

- Drain containers of standing water
- Cover, overturn, or create drainage holes that prevent standing water in the container.
- Identify and prevent sprinklers or other water from refilling containers.
- Contact the District to coordinate mosquito prevention with other mosquito control operations such as chemical and biological control.

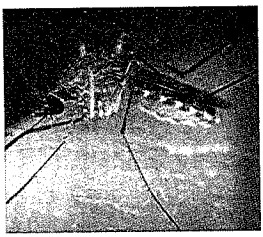
Standing-Water Mosquitoes

Encephalitis Mosquito *(Culex tarsalis)*



The Encephalitis Mosquito can transmit encephalitis viruses to humans. It has been known to transmit West Nile virus, western equine encephalomyelitis and St. Louis encephalitis. The Encephalitis Mosquito can be found throughout the Coachella Valley. Immature mosquitoes develop in wetlands, duck clubs, irrigated crops, and neglected pools. The adult mosquito prefers to feed on birds and mammals. It is most active during spring, summer and fall.

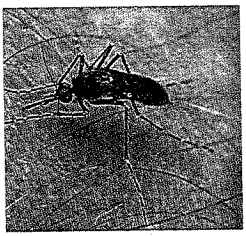
Southern House Mosquito (*Culex quinquefasciatus)*



The Southern House Mosquito has been known to be a secondary vector of West Nile virus and St. Louis encephalitis. It is common throughout the Coachella Valley. Immature mosquitoes often develop in foul water sources such as waste water lagoons, storm water drains, neglected pools, and other containers. It prefers to feed on birds but will readily feed on humans. This mosquito is most active during the spring, summer and fall.

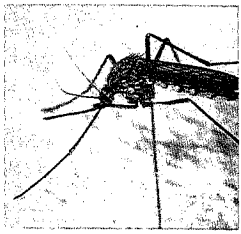
Floodwater Mosquitoes

Psorophora columbiae



Is a severe outdoor pest in rural areas of the Coachella Valley. The primary sources of these mosquitoes are flood irrigated agricultural fields and pastures. It is present from early summer to late fall. *Ps.columbiae* prefers to feed on large mammals, including man, and will bite both day and night with a peak of activity at sunrise and sunset. It can complete development from egg to adult within 72 to 120 hours during the extreme temperatures of summer which can make control of this mosquito very difficult.

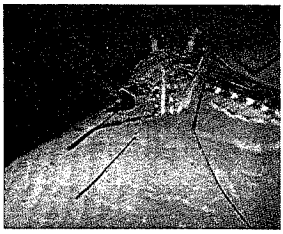
Inland Floodwater Mosquito *(Aedes vexans)*



This mosquito is a secondary vector for dog heartworm and is a severe outdoor pest. It is common in irrigated pastures and in woodland water course pools. They feed primarily on mammals. This mosquito is most active in early spring through late fall. They typically blood feed at dawn and dusk, but may also be active during the day.

Container Mosquito

Southern House Mosquito *(Culex quinquefasciatus)*



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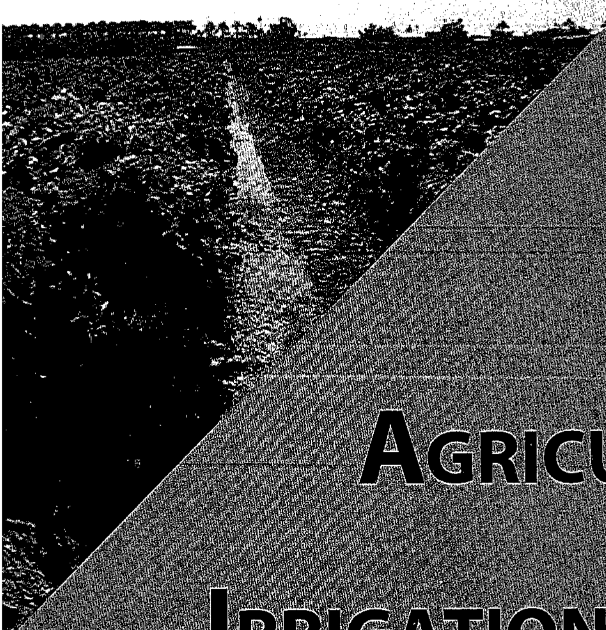


Agricultural Irrigation and Drainage

AGRICULTURAL IRRIGATION AND DRAINAGE

These mosquito reduction BMPs are compiled from a number of sources including scientific literature, collaborative inter-agency documents, and from experienced vector control professionals. This list is intended to provide general guidance, not site specific requirements. BMPs that are most applicable and relevant to a specific mosquito source may be selected from the list, and incorporated into the specific BMP Implementation Plan for a specific mosquito source in consultation with District personnel.

Common Mosquito Development Sites

- Vegetated ditches
- Seepage or flooding of fallow fields
- Irrigation tail water return sumps
- Blocked ditches or culverts
- Leaky water control structures
- Irrigated pastures
- Low areas caused by improper grading
- Broken or leaky irrigation pipes or valves
- Agricultural fields

Common Mosquito Species:

Clean standing water sources: *Culex tarsalis*

Nutrient rich water sources: *Culex quinquefasciatus*

Seasonally flooded areas: *Aedes vexans and Psorophora columbiae*

Special Concerns

Agricultural practices vary among growers, locations, and conventional or organic production methods. Pesticide regulations can affect the ability to use chemical control the mosquito reduction BMPs below are offered as tools to balance the economic and agronomic requirements of the growers and land owners with the need for effective mosquito control. The District is committed to working with growers to implement mosquito control practices that coincide with agricultural practices and minimize the impact on the economics or yields of the crop.

General Mosquito Reduction Principles

1. Prevent or eliminate unnecessary standing water that stands for more than

72 -96 hours year round.

2. Maintain access for District staff to monitor and treat mosquito breeding sources.

3. Minimize emergent vegetation and surface debris on the water.

4. Contact the District for technical guidance or assistance in implementing mosquito reduction BMPs.

Mosquito Reduction BMPs for Agricultural Settings

Ditches and Drains

DD-1. Construct or improve ditches with at least 2:1 slopes and a minimum 4 foot bottom. Consider a 3:1 slope or greater to discourage burrowing animal damage, potential seepage problems, and prevent unwanted vegetation growth. Other designs may be approved by the District based on special circumstances.

DD-2. Keep ditches clean and well-maintained. Periodically remove accumulated sediment and vegetation. Maintain ditch grade to prevent areas of standing water.

DD-3. Design irrigation systems to use water efficiently and drain completely to avoid standing water.

Irrigated Pastures

IP-1. Grade field to achieve efficient use of irrigation water. Use NRCS guidelines for irrigated pastures. Initial laser leveling and periodic maintenance to repair damaged areas are needed to maintain efficient water flow (Lawler and Lanzaro, 2005).

IP-2. Irrigate only as frequently as is needed to maintain proper soil moisture. Check soil moisture regularly until you know how your pasture behaves (Lawler and Lanzaro, 2005).

IP-3. Do not over fertilize. Excess fertilizers can leach into irrigation tail water, making mosquito production more likely in ditches or further downstream

(Lawler and Lanzaro, 2005).

IP-4. Apply only enough water to wet the soil to the depth of rooting (Lawler and Lanzaro, 2005).

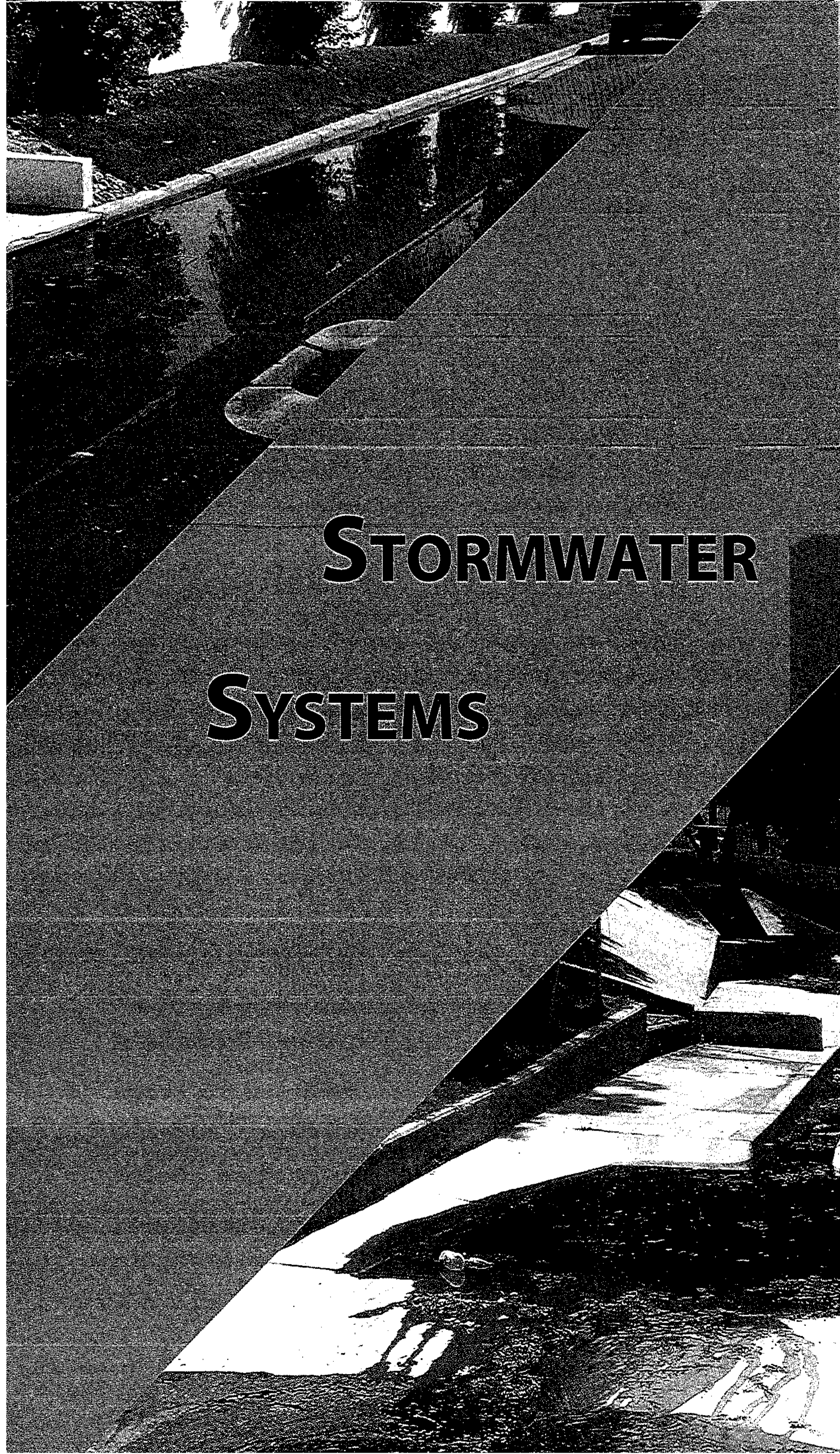
IP-5. Drain excess water from the pasture within 24 hours following each irrigation. This prevents scalding and reduces the number of weeds in the pasture. Good check slopes are needed to achieve drainage. A drainage ditch may be used to remove water from the lower end of the field (Lawler and Lanzaro, 2005).

IP-6. Inspect fields for drainage and broken checks to see whether re-leveling or reconstruction of levees is needed. Small low areas that hold water can be filled and replanted by hand. Broken checks create cross-leakage that provide habitat for mosquitoes (Lawler and Lanzaro, 2005).

IP-7. Keep animals off the pasture while the soil is soft. An ideal mosquito habitat is created in irrigated pastures when water collects in hoof prints of livestock that were run on wet fields or left in the field during irrigation. Keeping animals off wet fields until soils stiffen also protects the roots of the forage crop and prevents soil compaction that interferes with plant growth (Lawler and Lanzaro, 2005).

IP-8. Break up pastures into a number of smaller fields so that the animals can be rotated from one field to another. This allows fields to dry between irrigations and provides a sufficient growth period between grazings. It also prevents hoof damage (pugging), increases production from irrigated pastures, and helps improve water penetration into the soil by promoting a better root system (Lawler and Lanzaro, 2005).

STORMWATER SYSTEMS



IMPLEMENTATION POLICIES
REFERENCES
STORMWATER SYSTEMS
MANAGED WETLANDS
URBAN & SUBURBAN MOSQUITO SOURCES

STORMWATER SYSTEMS

Common Mosquito Development Sites

- Detention/retention basins
- Catch basins/storm drains
- Underground water storage devices
- Combined Sewer Systems
- Clogged sediment screens
- Blocked culverts
- Roadside ditches

Common Mosquito Species:

Above ground / clean-water sources: *Culex tarsalis*

Underground / polluted or nutrient rich water: *Culex quinquefasciatus*

Special Concerns

Recently, the National Pollution Discharge Elimination System (NPDES) permit requirements are taking the spotlight in the stormwater quality community. Stormwater facilities are often ideal mosquito development sites and support large populations of vectors of diseases, such as West Nile Virus, in close proximity to residential areas, making it critical to consider mosquito development. The District must identify appropriate actions to address mosquito problems during the planning stages of new development as well as existing storm water facilities. Coordination with the NPDES program will be critical in the success of this endeavor.

General Mosquito Reduction Principles

1. Prevent or eliminate unnecessary standing water that remains for more than 72 -96 hours all year round.
2. Maintain access for District staff to monitor and treat mosquito breeding sources.
3. Minimize emergent vegetation or surface debris in the water.
4. Contact the District for technical guidance or assistance in implementing mosquito reduction BMPs.

Mosquito Reduction BMPs for Stormwater Systems

Above Ground Structures

SW-1. Build shoreline perimeters as steep and uniform as practicable to discourage dense plant growth (Metzger, 2004).

SW-2. Design and obtain necessary approvals for all wetlands to allow for complete draining when needed (Metzger, 2004).

SW-3. Access roads should be built as close to the shoreline as possible. Vegetation or other obstacles should not be permitted between the access road and the stormwater treatment device that might obstruct the path of larvicides to the water (Metzger, 2004).

SW-4. Vegetation should be controlled (by removal, thinning, or mowing) periodically to prevent barriers to access (Metzger, 2004).

SW-5. Catch Basins, drop inlets, storm drains, and other structures originally designed to not hold water should be regularly checked and maintained to function as designed.

SW-6. Basins designed to be dry but remain wet should be corrected by retrofit, replacement, repair, or more frequent maintenance.

SW-7. Coordinate cleaning of catch basins, drop inlets, or storm drains with mosquito treatment operations.

SW-8. Enforce the prompt removal of silt screens installed during construction when no longer needed to protect water quality.

Underground Structures (Sumps, vaults, drop inlets, catch basins)

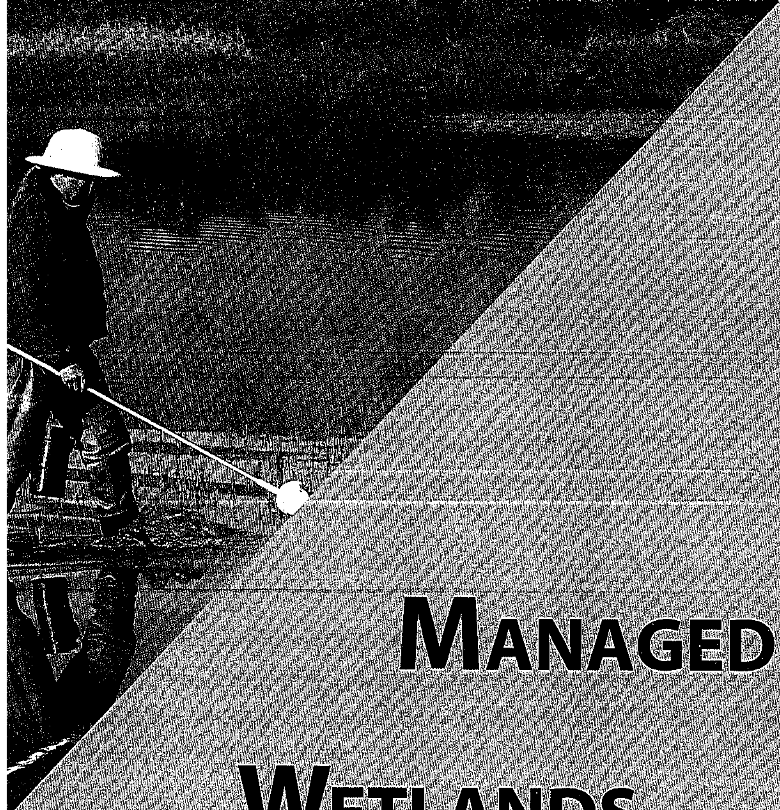
SW-9. Completely seal structures that retain water permanently or longer than 72 hours to prevent entry of adult mosquitoes (Metzger, 2004).

SW-10. Stormwater structures utilizing covers should be tight fitting with maximum allowable gaps or 1/16 inch (2 mm) holes of to exclude entry of adult mosquitoes (Metzger, 2004).

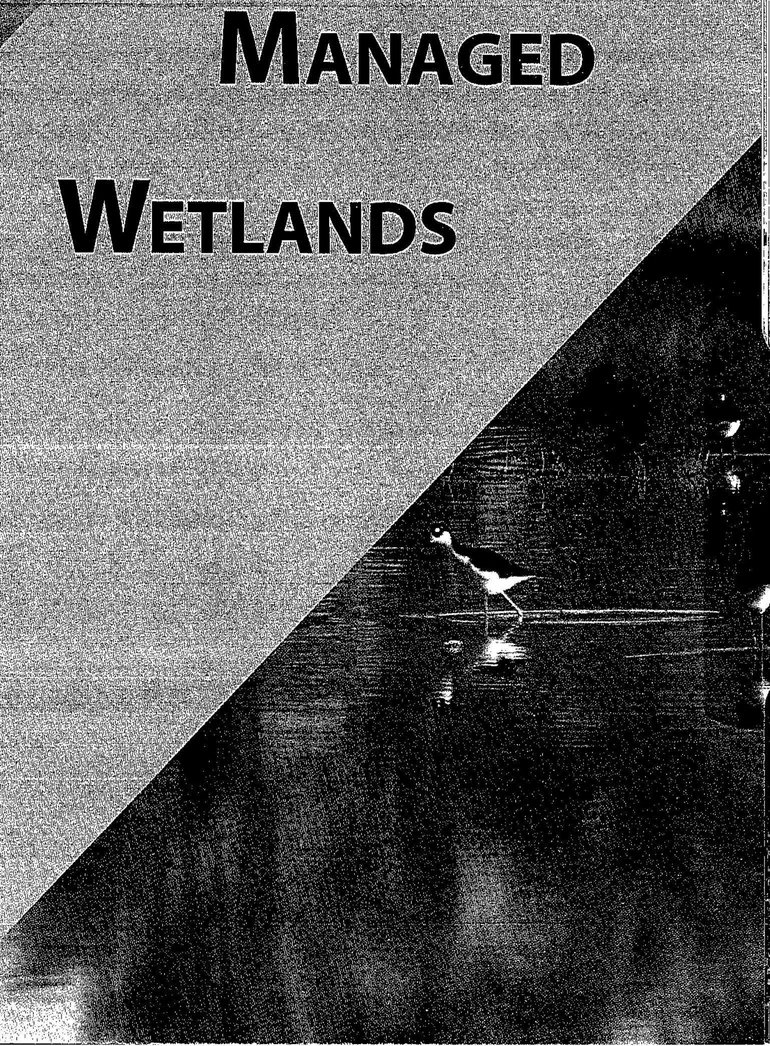
SW-11. If the sump, vault, or basin is sealed against mosquitoes, with the exception of the inlet and outlet, submerge the inlet and outlet completely to reduce

the available surface area of water for mosquito egg-laying (female mosquitoes can fly through pipes) (Metzger, 2004).

SW-12. Design structures with the appropriate pumping, piping, valves, or other necessary equipment to allow for easy dewatering of the unit if necessary (Metzger, 2004).



MANAGED WETLANDS



IMPLEMENTATION POLICIES
REFERENCES
MANAGED WETLANDS
URBAN & SUBURBAN MOSQUITO SOURCES

MANAGED WETLANDS

Common Mosquito Development Sites

- Permanent wetlands for habitat or species conservation
  - o Manmade, waste water wetlands
- Duck clubs
- Treatment Wetlands

Common Mosquito Species:

Permanent wetlands: *Culex tarsalis, Cules quinquefasciatus*

Duck clubs: *Culex tarsalis, Aedes vexans, Psorophora columbiae Culiseta innornata*

Special Concerns

Managed wetlands are being built and restored across California. Each varies depending on the habitat, water quality, recreational, economic, and other management goals, and may be subject to additional regulations including state and federal conservation easements and management plans. Mosquito Reduction BMPs attempt to balance the management goals of land managers, land owners, and other regulatory agencies with the need for effective mosquito control. The District is committed to working with wetland managers and state and federal agencies, to implement mosquito control practices in a cooperative manner.

General Mosquito Reduction Principles

1. Prevent or eliminate unnecessary standing water that remains for more than 72 -96 hours all year round.
2. Maintain access for District staff to monitor and treat mosquito breeding sources.
3. Minimize emergent vegetation and surface debris on the water.
4. Contact the District for technical guidance or assistance in implementing mosquito reduction BMPs, or to coordinate flood-ups with mosquito control operations.

MOSQUITO REDUCTION BMPS FOR MANAGED WETLANDS

MW-1. Maintain all open ditches by periodically or regularly removing trash, silt, and vegetation to maintain efficient water delivery and drainage (Kwasny et. al., 2004).

MW-2. Provide reasonable access on existing roads and levees to allow mosquito abatement technician access for monitoring, abatement, and implementation of BMPs. Make shorelines of natural, agricultural, and constructed water bodies accessible to maintenance and vector control crews for periodic maintenance, control, and removal of emergent vegetation, as well as for routine mosquito monitoring and abatement procedures (Kwasny et. al., 2004).

MW-3. Inspect, repair, and clean water control structures of debris. Remove silt and vegetation build-up in front of structures that impedes drainage or water flow. Completely close, board or mud-up controls to prevent unnecessary water flow, except where water circulation is necessary (Kwasny et. al., 2004).

MW-4. Construct, improve, or maintain ditches with 2:1 slopes and a minimum 4 foot bottom. Consider a 3:1 slope or greater to discourage burrowing animal damage, potential seepage problems, and prevent unwanted vegetation growth (Kwasny et. al., 2004). Other designs may be approved by the District depending on special circumstances.

MW-5. Construct, or improve, or maintain levees to quality standard that ensures stability and prevents unwanted seepage. Ideally build levees with >3:1 slopes & >80% compaction; consider >5:1 slope or greater in areas prone to over-land flooding and levee erosion (Kwasny et. al., 2004).

MW-6. Inspect and repair levees at least annually (Kwasny et. al., 2004).fdsfs

MW-7. Design managed wetland projects to include independent inlets and outlets for each wetland unit (Kwasny et. al., 2004).

MW-8. Excavate deep channels or basins to maintain permanent water areas (> 2.5 feet deep) within a portion of seasonal managed wetlands. This provides year-round habitat for mosquito predators which can inoculate seasonal wetlands when they are irrigated or flooded (Kwasny et. al., 2004).

MW-9. Maintain separate permanent water reservoir that conveys water to sea-

sonal wetlands. Provides year-round habitat for mosquito predators which can inoculate seasonal wetlands when they are irrigated or flooded (Kwasny et. al., 2004).

MW-10. Encourage populations of insectivorous birds (e.g swallows) and bats by preserving nesting and roosting areas (Kwasny et. al., 2004).

MW-11. Whenever possible, maintain storm-water ponds and wetlands at depths in excess of 4 feet (1.2 m) to limit the spread of invasive emergent vegetation such as cattails (Typha spp.) (Kwasny et. al., 2004; Metzger, 2004).

MW-12. Make water's edge accessible to maintenance and vector control crews for periodic maintenance, control, and removal of emergent vegetation, as well as for routine mosquito monitoring and abatement procedures, if necessary (Metzger, 2004).

Vegetation Management

MW-13. Control floating vegetation conducive to mosquito production (i.e., water hyacinth, water primrose, parrot's feather *Eichhornia spp.*, duckweed Lemna and *Spirodela spp.*, and filamentous algal mats) (Metzger, 2004).

MW-14. Perform routine maintenance to reduce problematic emergent plant densities to facilitate the ability of mosquito predators (i.e., fish) to move throughout vegetated areas, and allow good penetration of chemical control agents. (Kwasny et. al., 2004)

MW-15. Eliminate floating vegetation conducive to mosquito production (e.g., water hyacinth *Eich hornia spp.*, duckweed Lemna and *Spirodela spp.*, and filamentous algal mats) (Metzger, 2004).

MW-16. Perform routine maintenance to reduce emergent plant densities to facilitate the ability of mosquito predators (i.e., fish) to move throughout vegetated areas (Metzger, 2004).

Water Management

MW-17. Maintain stable water level during mosquito season by ensuring constant flow of water into pond or wetland to reduce water fluctuation due to evaporation, transpiration, outflow, and seepage (Kwasny et. al., 2004; Walton, 2003).

MW-18. Flood managed wetlands with water sources containing mosquito fish or other invertebrate predators. Water from permanent ponds can be used to passively introduce mosquito predators (Kwasny et. al., 2004).

MW-19. Rapidly irrigate managed wetlands keeping the time water enters the pond to complete drawdown between 4 and 10 days (Kwasny et. al., 2004).

MW-20. Delay early fall flooding to avoid increased late-season mosquito production.

MW-21. Implement additional BMPs for managed wetlands that need to be flooded earlier than recommended in the fall. The wetlands targeted for early fall flooding should not be near urban centers and should not have a history of heavy mosquito production (Kwasny et. al., 2004).

MW-22. Flood managed wetland unit as fast as possible. Coordinate flooding with neighbors or water district to maximize flood-up rate (Kwasny et. al., 2004).

MW-23. Encourage water circulation by providing a constant flow of water equal to discharge at drain structure (Kwasny et. al., 2004).

MW-24. Flood managed wetland as deep as possible at initial flood-up (18-24) (Kwasny et. al., 2004).

MW-25. Drain irrigation water into ditches or other water bodies with abundant mosquito predators. Prevent free flooding into fallow or dry fields (Kwasny et. al., 2004).

MW-26. Evaluate necessity of irrigation, especially multiple irrigations, based on habitat conditions and plant growth. Reduce number and duration of irrigations when feasible (Kwasny et. al., 2004).

MW-27. Stock managed wetlands, especially brood ponds or permanent wetlands, with mosquito fish or encourage habitat for naturalized populations. Utilize water sources with mosquit fish to passively transport predators to newly flooded habitats (Kwasny et. al., 2004).

MW-28. Maintain permanent or semi-permanent water where mosquito predators can develop and be maintained. Discourage use of broad spectrum pesticides (Kwasny et. al., 2004).

MW-29. Where feasible, have an emergency plan that provides for immediate drainage into acceptable areas if a public health emergency occurs (Walton, 2003).

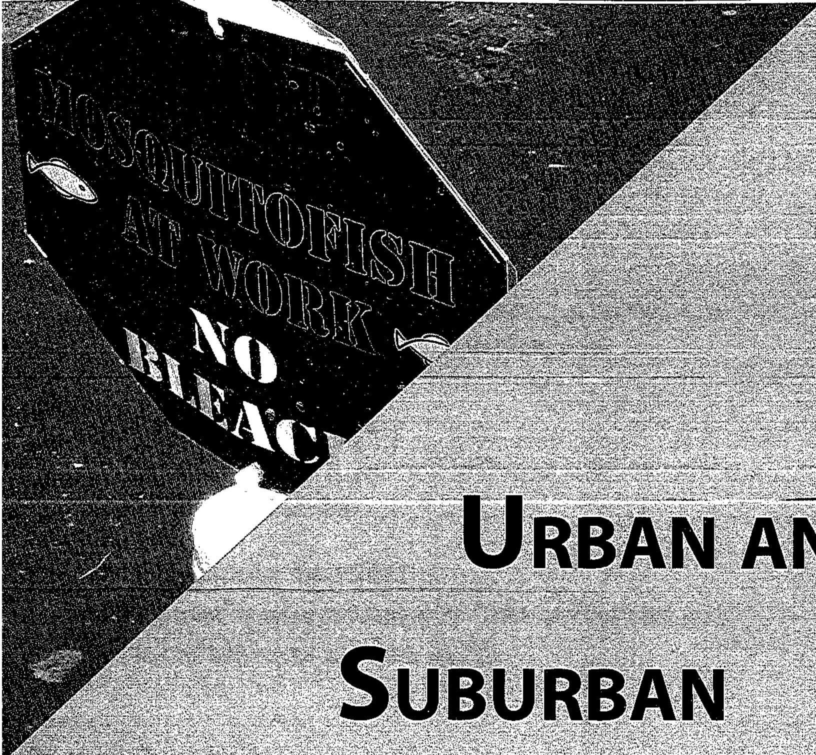
MW-30. Minimize fluctuations in water level to prevent large areas of intermittently flooded substr-ate or isolated pools from being created, particularly during mosquito season,, (Kwasny et. al., 2004).

Coordination with District

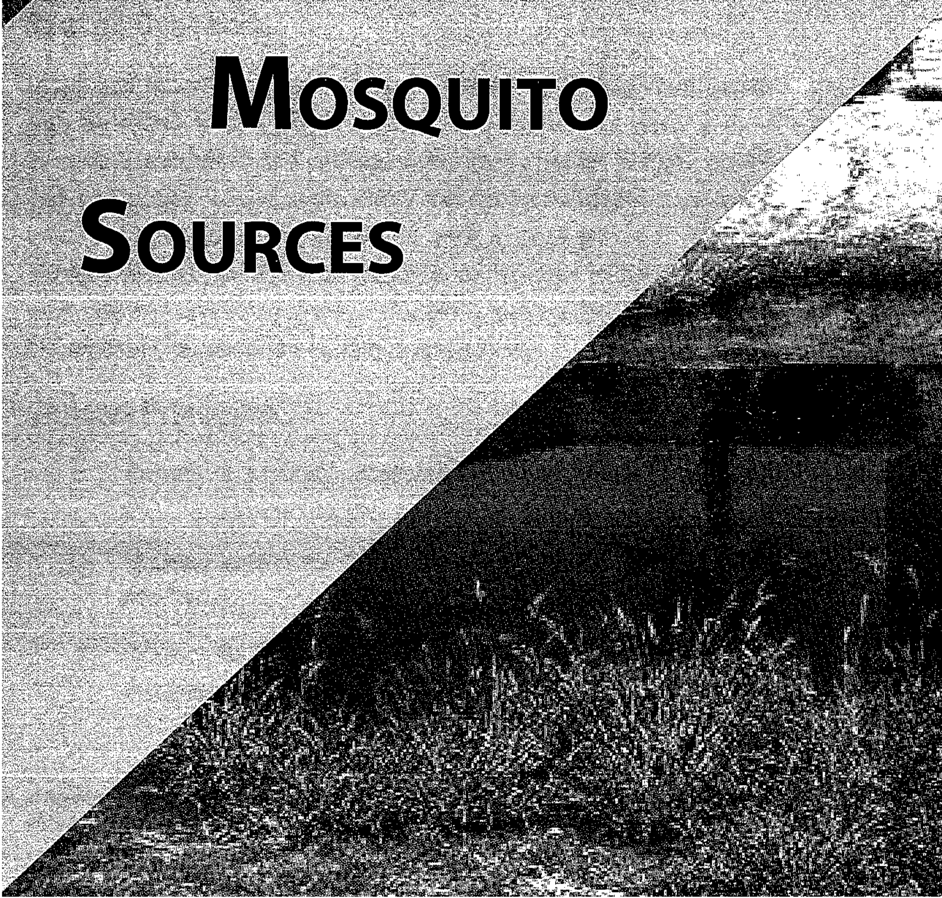
MW-31. Consult with the District on agency-sponsored habitat management plans on private lands, and on the timing of managed wetland flooding on public and private lands – urge private landowners to do the same (Kwasny et. al., 2004).

MW-32. Identify problem locations for mosquito production with the District and work to implement mosquito BMPs. Identify potential cost-share opportunities to implement BMPs (Kwasny et.al., 2004).

MW-33. Consult with the District on the design of restoration and enhancement projects that have the possibility of effecting mosquito production or control operations (Kwasny et. al., 2004).



Urban and Suburban Mosquito Sources



URBAN AND SUBURBAN MOSQUITO SOURCES

Common Mosquito Development Sites

- Neglected swimming pools and spas
- Decorative/Ornamental ponds and fountains
- Bird baths
- Water-filled containers
- Poorly designed or damaged landscape irrigation systems
- Stored or waste tires

Common Mosquito Species:

Water with more organic material: *Culex quinquefasciatus*

Cleaner water sources: *Culex tarsalis*

Special Concerns

Urban and suburban mosquito sources are especially important because, sources may be in and around private residences which are not easily seen or accessed by control technicians and produce mosquitoes in areas of high population density. This can quickly lead to vector-borne disease transmission since the vector (mosquito) and dead end host (human) are often in close proximity. Economic or social changes in a neighborhood can result in an increase in mosquito sources such as un-maintained swimming pools. Fortunately, many of the BMPs for residential areas are relatively inexpensive and easy to implement.

General Principles

1. Prevent or eliminate unnecessary standing water that remains for more than 72 -96 hours all year round.
2. Maintain access for District staff to monitor and treat mosquito breeding sources.
3. Contact the District for technical guidance or assistance in implementing mosquito reduction BMPs.

Mosquito Reduction BMPs for Urban and Suburban Mosquito Sources

Residential Areas

US-1. Drain all containers of standing water, including pet dishes, wading pools, potted plant drip trays, boats, birdbaths, tires, and buckets, at least once a week during mosquito season. Keep in mind that mosquitoes can develop in as little as 1/8" of standing water.

US-2. Use an approved disinfection process (chlorine, bromine) to prevent mosquito breeding in swimming pools and spas. Use skimmers and filter systems to remove egg rafts and mosquito larvae.

US-3. If a pool or spa is not going to be maintained for any reason, do one of the following: 1)drain the pool or spa completely of any water (note that in-ground pools may be damaged by being completely drained. Above-ground pools and spas generally may be drained with out damage), 2) notify district so that the pool can be inspected regularly and treated with a larvicide and/ or stocked with mosquito fish if needed.

US-4. Notify District of any ponds (including ornamental ponds) with permanent or seasonally permanent water. Allow district technicians to inspect and periodically stock mosquitofish to biologically control mosquito larvae.

US-5. Landscape irrigation drainage should be managed such that no water stands for more than 72 - 96hrs.

US-6. All underground drain pipes should be laid to grade to avoid low areas that may hold water for longer than 72 - 96hrs.

US-7. Provide safe access for District technicians to all pools, spas, ponds, landscape irrigation structures, catch basins, storm drains, drainage pipes, sewer cleanouts, or any other potential mosquito breeding source.

US-8. Repair leaks or damaged drainage system components to prevent standing water for more than 72 - 96hrs.

US-9. Notify District of any condition that may produce mosquitoes on the property such as flooding, broken pipe, damaged septic tank cover, leaking outdoor faucet if unable to be fixed or results in standing water for more than 72 - 96hrs.

Tire Storage

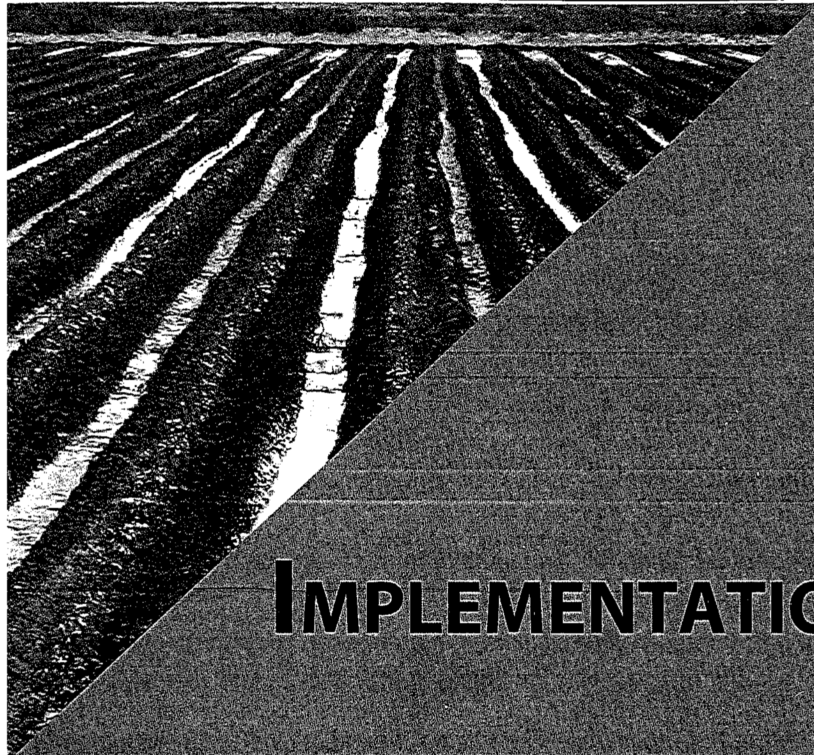
TR-1. Never allow water to accumulate in tires. Tires should be stored in a covered location or covered by a tarp in order to prevent the accumulation of water from rain, sprinklers, etc.

TR-2. Tires should never be stored in a pile. Tires should be stored on racks or in a stack not more than two rows wide.

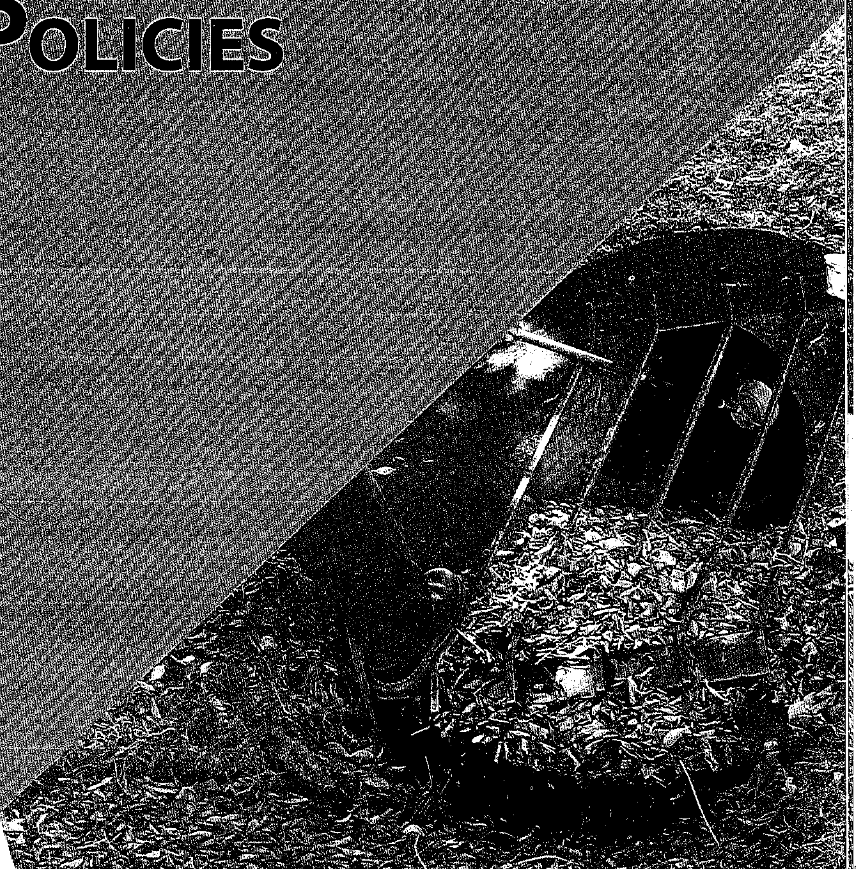
TR-3. Tires should be stored in a manner that allows inspections of each individual tire.

TR-4. Waste tires should be picked up by the proper disposal entity on a regular basis.

TR-5. Those responsible for stored tires should inspect and dump out any water that may have accumulated inside tires on their premises on a weekly basis.



IMPLEMENTATION POLICIES



IMPLEMENTATION POLICIES

Significant Mosquito Sources - SMS

Significant Mosquito Sources will be identified based on the following criteria:

- Mosquito breeding from the source is more than similar land types, and exceeds treatment thresholds;
- Treatment costs incurred by the District are increased due to problems caused by management practices;
- The source is in close proximity to areas of significant population density; and/or
- BMPs exist to address the land management practices and can be reasonably utilized to reduce mosquito breeding.

If left untreated, a SMS would be considered a public nuisance as defined in the California Health and Safety Code (HSC) §2002(j).

A combination of larval dip data and adult mosquito surveillance data will be used to determine the pre and post BMP implementation mosquito abundance for a particular property or mosquito source. In cases where existing data or current sampling methods are not sufficient to detect the efficacy of a particular BMP, a specific monitoring plan will be established to meet the needs of the particular property or mosquito source.

Management practices that would contribute to increased mosquito breeding include but are not limited to:

- Poor water management,
- Lack of emergent vegetation control,
- Lack of effective refugia to maintain biological control populations (e.g. borrow pits for holding mosquitofish),
- Poor condition of water conveyance or drainage structures,
- Practices that impede access to the source, and lack of notification of practices that would effect mosquito control operations.

Other factors such as treatment costs, proximity to population centers, vector-borne disease status, mosquito species detected and the efficacy of available treatment

options will be considered when evaluating a SMS as defined above. Those sources that are determined to have the highest potential for mosquito reduction from the implementation of BMPs and are adjacent to population centers of reasonably high density will be selected for inclusion into the BMP compliance program.

BMP Request for Compliance

Once the District has identified a Significant Mosquito Source, it will present a Request for Compliance to the responsible party, proposing a course of action based on one or more BMPs that, if implemented, can reduce or eliminate the mosquito breeding sources.

The Request for Compliance will contain at minimum the following:

- Justification for requested actions
- Description of the proposed BMPs regarding method and timing of implementation.
- District resources available to assist with BMP Implementation
- Assessment method

The responsible party can contact the District to discuss the proposed BMP Request for Compliance.

Compliance Procedure

The following items are a generally chronological progression of the Mosquito Reduction BMP Compliance Program actions after a Significant Mosquito Source is identified.

NOTE: The numbered items correspond to the numbers on Figure 1 (BMP Flowchart).

1. **Identify a Significant Mosquito Source** – The District will identify Significant Mosquito Sources based on the previously defined criteria.
2. **Contact Responsible Party** - The District will contact the responsible party (as defined in HSC §2060) of properties in the Coachella Valley that have been identified as significant mosquito sources, that if untreated, would be-

come a public nuisance (under HSC §2060). The District will also contact state and federal agencies that have an underlying interest in the property, including a conservation easement, habitat management plan, or other habitat maintenance agreement. A Request for Compliance Notice will be provided to the responsible parties. This request will include an explanation of why the site was determined to be a significant mosquito source, including mosquito surveillance data if requested.

3. **Request for Compliance** - The District will work with the responsible party to achieve a mutually agreeable course of action to address the mosquito source including specific BMPs, implementation timeline, maintenance requirements, and monitoring plan. A defined negotiation period will be designated at the start of the negotiations.

4. **Additional Resources** - At the discretion of the District, resources may be made available to assist in complying with the BMP requirements. In cases where District resources are used, specific maintenance requirements will be specified in the cooperative agreement, and will be signed by the responsible party and the District. This Agreement will contain the name of the responsible party, location of the property, description of the work to be done, the cost of the work, if any, to be paid by the responsible party, and requirements for maintenance to be performed by the responsible party

5. **Coordinate with other regulatory agencies** – Other local, state, federal, and conservation agencies will be brought into the negotiation process if necessary, to avoid or address any potential regulatory conflicts with the BMP Request for Compliance.

6. **Notice of Violation** – The Notice of Violation is issued when Request for Compliance is not addressed after proposed time for compliance expires. This document will also outline the consequences of non-compliance with the BMP Request for Compliance under the California Health and Safety Code.

7. **Implementation and Monitoring** - After successful implementation of the requirments specified in the Request for Compliance, regular inspections of the property will be coducted to assess the responsible party's continued maintenance and compliance with the BMPs. The District reserves the right to renegotiate the BMP Request for Compliance if it is discovered that adequate mosquito control is not being achieved. In this case, the process would return to Step 2. As long as the responsible party is in compliance with the terms

of the cooperative agreement, no additional charges or penalties will be assessed by the District.

8. **Evaluation of BMP Efficacy** - An effective mosquito management plan requires regular assessment and adaptive management to address changing conditions or unforeseen effects. The District will evaluate each BMP Request for Compliance to determine if the BMPs are meeting the needs of both the responsible party and the District. Based on this evaluation, either party may initiate a review of the BMP Implementation Plan pursuant to the terms of the Request for Compliance Notice

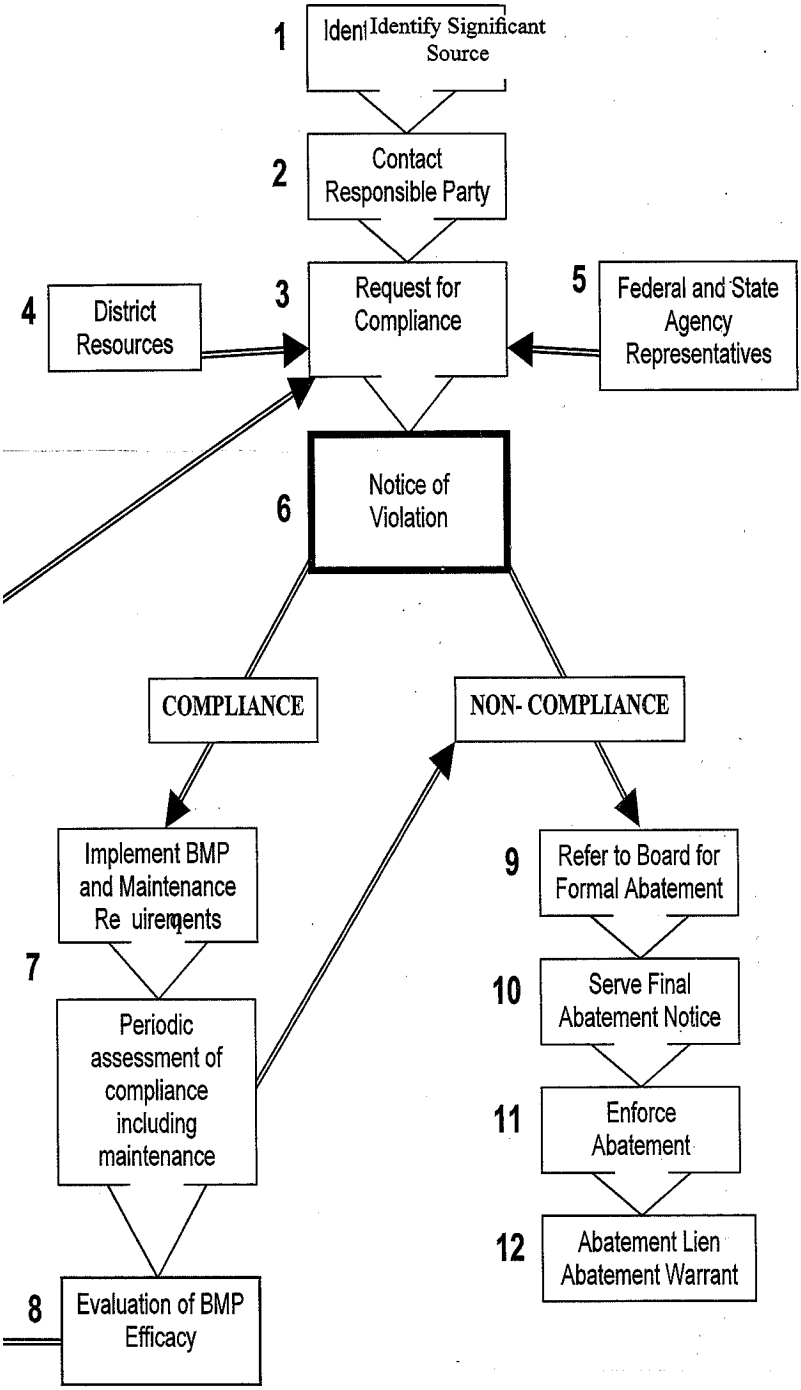
Abatement Procedure

Why Abatement procedure

Abatement Process - If the responsible party does not take corrective action or does not provide a reasonable explanation for the continued lack of compliance with the request, the case may be considered for Formal Abatement process as defined in HSC §2060 - §2067.

Refer to Figure 1 - BMP Flowchart

Figure 1: BMP Program Flowchart



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COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT

MOSQUITO-BORNE VIRUS SURVEILLANCE AND EMERGENCY RESPONSE PLAN

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E-mail: cvmosquito@cvmvcd.org
www.cvmvcd.org

GW 6.1.2011

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I. INTRODUCTION

For over 30 years, California has had a mosquito-borne disease surveillance program in place to monitor mosquito abundance and encephalitis virus activity. The state wide surveillance program was established in 1969. The District started with surveillance in the early 1980s and the present program is in place from 1990, and it was developed by a cooperative effort of the Arbovirus Research Group at the School of Public Health, UC Berkeley (now the Center for Vector-borne Disease, UC Davis), and the Coachella Valley Mosquito and Vector Control District (the District).

The District mission is to protect the health of the public in the Coachella Valley from excessive nuisance caused by mosquitoes and risk from mosquito-borne viral disease through an ongoing mosquito surveillance and control program. Intensive control measures may be applied to reduce the potential for virus transmission to humans by suppressing infected mosquito populations for no less than a 10 day period while infectious viremia persists in vertebrate hosts, thus breaking the cycle by preventing new vector infections.

This document describes an enhanced surveillance and response program for the Coachella Valley dependent on the level of risk of mosquito-borne virus transmission to humans. The Mosquito-borne Virus Surveillance & Response Plan generated by California Department of Public Health Services (DPHS) , Mosquito & Vector Control Association of California (MVCAC) and University of California, is the core of this document, however some necessary adjustments were made in benchmark ratings relative to the conditions in the Coachella Valley.

Guidelines for adult mosquito surveillance, processing mosquitoes for arbovirus detection, maintaining and bleeding sentinel chickens, testing dead birds and testing equines, as well as information regarding compounds approved for mosquito control in California are part of the California State Mosquito-Borne Virus Surveillance & Response plan.

II. BACKGROUND INFORMATION

Mosquito-borne viruses belong to a group of arthropod-borne viruses referred to us as arboviruses (for **ar**thropod-**bo**rne). From 12 mosquito-borne viruses known to occur in California, to date, only St. Louis encephalitis virus (SLE), Western equine encephalitis virus (WEE), and West Nile virus (WNV) have caused significant outbreaks of human disease. These viruses are maintained in nature in wild bird-mosquito cycles, and therefore they do not depend upon infections of humans or domestic animals for their persistence.
Surveillance includes the monitoring of immature and adult mosquito abundance and detecting virus activity by testing (a) adult female mosquitoes, (b) sentinel chickens and wild birds, (c) horses, and (4) humans for infection. Surveillance must include not only the monitoring of mosquito-borne viruses known to exist in California, but also the detection of newly introduced viruses.

III. MOSQUITO SURVEILLANCE OBJECTIVES

Mosquito control is the only practical method of protecting people and animals from WNV, SLE and WEE infections. Larvae and pupae (immature stages) of *Culex tarsalis* and *Culex quinquefasciatus* can be found throughout the Coachella Valley in a wide variety of aquatic sources, ranging from urban retention basins to irrigated agricultural lands, Salton Sea marshes and duck club habitats.

A. Mosquito Surveillance

Surveillance includes monitoring of immature and adult mosquito abundance in the Coachella Valley throughout the year. To monitor mosquito larvae, "dippers" or long-handled ladles are used to collect samples from known and new water sources. At that time, the number of larvae and pupae per "dip" is estimated. These data are used to determine larval control measures.

The records of the number and developmental stages of larvae, source size treated, product name and amount used, with the control effectiveness data can provide an early warning tool for forecasting the size of the adult population.

Mosquito adult surveillance in the Coachella Valley is conducted by setting 76 CO_2 baited traps on a biweekly basis, and 27 gravid traps on a weekly basis. Adult mosquito abundance is a key factor when evaluating the risk of disease transmission. **Guidelines for mosquito surveillance are summarized in Appendix A of California State Mosquito-Borne Virus Surveillance & Response plan – May 2011**

B. Mosquito Infections

Early detection of virus activity may be accomplished by testing *Culex tarsalis*, the primary vector of SLE, WEE, and WNV for virus infection. Sampling of other mosquito species may be necessary to detect the introduction of viruses that do not have a primary avian-*Culex* transmission. Mosquitoes are trapped by using carbon-dioxide-baited traps and the females are then pooled in groups up to 50 for submission to the laboratory at the UCD Center for Vector-borne Disease (CVEC). The current surveillance system is designed to detect WNV and other potentially new viruses, in addition to SLE and WEE.

Procedures for processing mosquitoes for virus infection are summarized in Appendix B California State Mosquito-Borne Virus Surveillance & Response plan – May 2011.

C. Avian Infections

Detection of arbovirus transmission in the bird population can be accomplished by using caged chickens as sentinels and bleeding them periodically to detect viral antibodies (serocoversions). In the Coachella Valley, 9 flocks of 10 chickens are placed in locations where mosquito abundance is known to be high or where there is a history of virus activity. Each chicken is bled biweekly, by pricking the comb and collecting blood on a filter paper strip. The blood is tested for antibodies to SLE, WEE, and WNV at the DPHS Viral and Rickettsial Diseases Laboratory. **Sentinel housing, bleeding instructions, and testing protocols are provided in Appendix C of the California State Mosquito-Borne Virus Surveillance & Response plan – May 2011.**

D. Dead Birds

In 2000, DPHS initiated a dead bird surveillance program in collaboration with other public agencies. DPHS annually notifies about 600 agencies, organizations and veterinarians involved with wildlife, including rehabilitation centers, about the program. Dead birds are reported to DHS, shipped to a California Animal Health & Food Safety Laboratory for screening and removal of kidney tissue, which is then sent to the UC Davis Arbovirus Research Unit for WN viral isolation. The dead bird testing algorithm is provided **in Appendix D of the California State Mosquito-Borne Virus Surveillance & Response plan – May 2011**

E. Equine Infections

Equine disease due to WEE is not a sensitive indicator of epizootic (infections only in animals) WEE activity in California. The reason for this is the widespread vaccination of equines. If confirmed cases do occur, it is a strong indication that WEE is active in the region. California Department of Agriculture (CDFA) and DPHS annually contact veterinarians to insure equine vaccinations. Besides WEE and WNV, other mosquito-borne viruses may also cause encephalitis in horses, and consequently, testing of equine specimens by DPHS has been expanded to include other viruses. **See Appendix E of the California State Mosquito-Borne Virus Surveillance & Response plan – May 2011.**

G. Human Infections

In general, human cases are not a sensitive surveillance indicator of virus activity because most human infections (>99%) have no, or only mild, symptoms. When severe encephalitis cases do occur, rarely are arboviruses suspected, and sera generally are not sent to DPHS for testing. Communication with key hospitals and local health officials has been enhanced in the last year. However, rapid detection and reporting of confirmed human cases is crucial to local mosquito control agencies in planning and expending emergency control activities to prevent additional infections. **(See Appendix F and G of the California State Mosquito-Borne Virus Surveillance & Response plan – May 2011.**

H. Data Analysis and Interpretation

1. All weather reports received from state and local agencies that can affect mosquito breeding will be reviewed and analyzed by the District staff.
   Weekly and biweekly mosquito occurrence reports received from the CVMVCD laboratory and from the DPHS - VBDS statewide will be used for forecasting purposes. For websites related to weather conditions refer to **Appendix I of the California State Mosquito-Borne Virus Surveillance & Response plan.**

2. Reports from DPHS – VBDS and UCD on virus isolations in mosquito pools and chicken bloods tested, confirmed human cases and horse cases of encephalitis will be used for operational program planning.

I. Public information and education

Residents, farmers and duck club owners can play an important role in reducing the number of adult mosquitoes by eliminating standing water that may support the development of immature mosquitoes. Farmers and ranchers can ensure that irrigation practices do not allow standing water for extended periods, and duck club owners can work with mosquito control agencies to determine appropriate flooding schedules. Education regarding personal protective measures will help reduce exposure to mosquitoes (insect repellents, protective clothing time of the exposure to mosquitoes). Equally important is the education of the medical community to recognize the symptoms of WEE, SLE, and WNv and request proper laboratory testing for their conformation. Public health officials need to be alerted if a mosquito-borne viral disease is detected, especially if the public health risk is high.

The level of public information and education depends on the conditions and required response.

Level 1: During a normal mosquito-breeding season, routine public education will be conducted.

Level 2: Emergency planning, enhanced public education will be conducted including, posted messages on the symptoms of encephalitis, public information about pesticide applications and recommendation about avoiding mosquito bites.

Level 3: Full-scale media campaign is required at this level. Coordinate with CDHS in a regional emergency response in conjunction with California Office of Emergency Service in informing, County Board of Supervisors, Local Health Departments, city, and county officials.

IV. MOSQUITO CONTROL OBJECTIVES

Mosquito control in California is conducted by over 70 local agencies, including mosquito and vector control districts, environmental health departments and county health departments.

The Coachella Valley Mosquito and Vector Control District is a Special District and public agency that operates under the California Health and Safety Code, section (2000). The District currently serves 2400 square miles and has an 11 member board of Trustees, nine from incorporated cities and two from the County at large, to govern it.
The District mission is to reduce the risk from disease carried by mosquitoes and other vectors for residents in the Coachella Valley. **See Appendix H of the California State Mosquito-Borne Virus Surveillance & Response plan for compounds approved for mosquito control in California – May 2011.**

A. Larval control

This strategy prevents producing another generation of mosquitoes capable of transmitting disease. Control of larvae is target-specific and covers a defined area. Larval mosquito control includes environmental manipulation, biological control, and chemical control.

Environmental manipulation decreases habitat availability for immature mosquitoes. It may include water management, such as conservative crop irrigation in the Coachella Valley in date and citrus orchards, drainage in the urban areas, re-circulation of water at the fish farms and water disposal through evaporation, such as at duck clubs.

Biological control uses natural predators, parasites, or pathogens to suppress immature stages of mosquitoes. In the Coachella Valley, the tadpole shrimp, *Triops longicaudatus*, is finding its use in the agricultural habitats for suppression of the nuisance species of mosquitoes. Mosquitofish, *Gambusia affinis*, are the most widely used. In the Coachella Valley, these fish are released annually in a variety of habitats, mostly abandoned pools, and small ponds in the duck club area.

Chemical control presently includes products that are highly specific and have minimal impact on non-target organisms. These products include microbial control agents, such as *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs). Microbial products control mosquito larvae within 24 hours, and Bti is used at short term habitats, such as irrigated dates and citrus orchards. Microbial products with a longer residual, such as *Bacillus sphaericus*, are mostly used at permanent habitats of *Culex tarsalis* where penetration of the product is not an issue, or is applied by air to force the granules through the dense vegetation. Insect growth regulators, such as methoprene are widely in use in permanent breeding sources of *Culex tarsalis*, for instance, salt marshes along the Salton Sea and duck club ponds. Recently, lightweight oils that create monomolecular surface films are used, but have the drawback of suffocating non-target surface breathing aquatic organisms as well.

B. Adult control

Adult mosquito control may be required as an additional measure to control populations of infected mosquitoes and stem an epidemic. Adult mosquito control products may be applied by ground-based equipment (presently used in the Coachella Valley) and fixed wing airplanes or helicopters. Many factors need to be considered when selecting a pesticide and the target area for adult mosquito control treatments. These factors may include (1) efficacy against the target species or life cycle stages, (2) pesticide resistance (3) pesticide label requirements, (4) availability of pesticide and application equipment, (5) environmental conditions (6) cost, and (7) toxicity to non-target species, including humans. The products most likely used for adult mosquito control include pyrethrin and pyrethroids such as resmethrin, and permethrin.

V. RESPONSE LEVELS

The California Mosquito-borne Virus Surveillance and Response Plan is based on conditions that exist at three response levels identified as normal season, emergency planning, and epidemic. Seven risk factors that are analyzed to determine the appropriate response level include:

- Environmental conditions (Salton Sea level, rainfall, and temperature)
- Adult mosquito vector abundance
- Virus isolation rates from mosquitoes
- Sentinel chicken seroconversion rates
- Infection rates in wild or domestic animals
- Human cases of mosquito-borne viruses
- Proximity of detected virus activity to urban or suburban regions

Each of these factors is rated on a scale of 1 to 5, with 5 representing conditions indicative of a high risk of human infection with a mosquito-borne virus. An average rating is determined for the seven factors and is correlated with the response level as follows:

- **Normal season (1.0 to 2.5),**
- **Emergency planning (2.6 to 4.0),**
- **Epidemic (4.1 to 5.0).**

Table 1 – 3 provide worksheets to assist in determining the appropriate rating for each of the risk factors. The term "average" refers to averages over non-epidemic years in a specific region, such as that within the boundaries of a local mosquito and vector control district. Averages typically are determined for the preceding five-year period. Roles and responsibilities of key agencies involved in carrying-out the surveillance and response plan are outlined in "Key Agency Responsibilities".

Mosquito-borne Virus Risk Assessment Tables

Table 1.

SLE Surveillance Factor	Assessment Value	Benchmark	Value
1. **Environmental conditions** Favorable environmental conditions include above normal temperatures Salton Sea level, and rainfall.	1	Salton Sea level, rainfall, and temperature well below average	
	2	Salton Sea level, rainfall, and temperature below average	
	3	Salton Sea level, rainfall, and temperature average	
	4	Salton Sea level, rainfall, and temperature above average	
	5	Salton Sea level, rainfall, and temperature well above average	
2. Adult *Culex tarsalis and Cx. quinquefasciatus* vector abundance average Area of North and West Shore in last 5 years = female mosquitoes /trap night/ month	1	Vector abundance well below average (<50%)	
	2	Vector abundance below average (50–90%)	
	3	Vector abundance average (90–150%)	
	4	Vector abundance above average (150–300%)	
	5	Vector abundance well above average (>300%)	
3. Virus isolation rate in *Culex tarsalis and Culex quinquefasciatus* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested (or per 20 pools)	1	MIR / 1000 = 0	
	2	MIR / 1000 = 0–1.0	
	3	MIR / 1000 = 1.1–2.0	
	4	MIR / 1000 = 2.1-5.0	
	5	MIR / 1000 > 5.0	
4. Sentinel chicken seroconversion rate per 10 birds Number of chickens in a flock that develop antibodies to a particular virus. If more than one flock is present in a region, number of flocks with seropositive chickens is an additional consideration	1	No seroconversions	
	2	One seroconversion in single flock over broad area	
	3	One seroconversion in multiple flocks in region	
	4	Two–three seroconversions per flock in multiple flocks in region	
	5	More than three seroconversions per flock in multiple flocks in region	
5. Infections in wild birds or domestic animals	1	No bird or equine cases over broad region	
	2	No bird or equine cases in specific region	
	3	One bird or equine case in broad region	
	4	One or two birds or equine cases in specific region	
	5	More than two birds or equine cases in specific region	
6. Human cases	1	No human cases	
	3	One human case statewide (but not within local jurisdiction or region)	
	5	One or more human cases in region	
7. Proximity to urban or suburban regions (score only if virus activity detected) Risk of outbreak is highest in urban areas because of high likelihood of contact between humans and vectors	1	Virus activity in remote area	
	2	Virus activity in rural areas	
	3	Virus activity in small towns	
	4	Virus activity in suburban areas	
	5	Virus activity in urban area	
<u>Response Level / Average Rating:</u> Normal Season (1.0 to 2.5) Emergency Planning (2.6 to 4.0) Epidemic (4.1 to 5.0)		**TOTAL**	
		AVERAGE	

Table 2.

WEE Surveillance Factor	Assessment Value	Benchmark	Value
1. Environmental conditions Considers Salton Sea level, rainfall, and ambient temperature.	1	Salton Sea level, rainfall, and temperature well below average	
	2	Salton Sea level, rainfall, and temperature below average	
	3	Salton Sea level, rainfall, and temperature average	
	4	Salton Sea level, rainfall, and temperature above average	
	5	Salton Sea level, rainfall, and temperature well above average	
2. Adult *Culex tarsalis and Culex quinquefasciatus* abundance Area of North and West Shore in last 5 years = female mosquitoes /trap night/ month	1	Vector abundance well below average (<50%)	
	2	Vector abundance below average (50–90%)	
	3	Vector abundance average (90–150%)	
	4	Vector abundance above average (150–300%)	
	5	Vector abundance well above average (>300%)	
3. Virus isolation rate in *Culex tarsalis and Culex quiqvefasciatus* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested (or per 20 pools)	1	MIR / 1000 = 0	
	2	MIR / 1000 = 0–1.0	
	3	MIR / 1000 = 1.1–2.0	
	4	MIR / 1000 = 2.1-5.0	
	5	MIR / 1000 > 5.0	
4. Sentinel chicken seroconversion rate Number of chickens in a flock that develop antibodies to a particular virus. If more than one flock is present in a region, number of flocks with seropositive chickens is an additional consideration. Typically 10 chickens/flock	1	No seroconversions	
	2	One seroconversion in single flock over broad area	
	3	One seroconversion in multiple flocks in region	
	4	Two–three seroconversions per flock in multiple flocks in region	
	5	More than three seroconversions per flock in multiple flocks in region	
5. Infections in equines or ratites	1	No cases.	
	2	One case in broad region.	
	3	One or two case in region	
	4	One or two cases in specific region	
	5	More than two cases in specific region	
Response Level / Average Rating: Normal Season (1.0 to 2.5) Emergency Planning (2.6 to 4.0) Epidemic (4.1 to 5.0)		**TOTAL**	
		AVERAGE	

Table 3.

WNV Surveillance Factor	Assessment Value	Benchmark	Value
1. Environmental conditions Favorable environmental conditions in the Coachella Valley for virus multiplications/transmission. Considers Salton Sea level, rainfall, and ambient temperature.	1	Salton Sea level, rainfall, and temperature well below average	
	2	Salton Sea level, rainfall, and temperature below average	
	3	Salton Sea level, rainfall, and temperature average	
	4	Salton Sea level, rainfall, and temperature above average	
	5	Salton Sea level, rainfall, and temperature well above average	
2. Adult *Culex tarsalis and Culex quinquefasciatus* abundance Area of North and West Shore in last 5 years = female mosquitoes /trap night/ month.	1	Vector abundance well below average (<50%)	
	2	Vector abundance below average (50–90%)	
	3	Vector abundance average (90–150%)	
	4	Vector abundance above average (150–300%)	
	5	Vector abundance well above average (>300%)	
3. Virus isolation rate in *Culex tarsalis and Culex quiqvefasciatus* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested (or per 20 pools)	1	MIR / 1000 = 0	
	2	MIR / 1000 = 0–1.0	
	3	MIR / 1000 = 1.1–2.0	
	4	MIR / 1000 = 2.1-5.0	
	5	MIR / 1000 > 5.0	
4. Sentinel chicken seroconversion rate Number of chickens in a flock that develop antibodies to a particular virus. If more than one flock is present in a region, number of flocks with seropositive chickens is an additional consideration. Typically 10 chickens/flock	1	No seroconversion	
	2	One seroconversion in single flock over broad area	
	3	One seroconversion in multiple flocks in region	
	4	Two–three seroconversion per flock in multiple flocks in region	
	5	More than three seroconversion per flock in multiple flocks in region	
5. Dead bird infection Includes zoo collections.	1	No WN positive dead bird in California	
	2	WN positive dead bird in neighboring state, but not CA	
	3	One WN positive dead bird in none specific region	
	4	One WN positive dead bird in specific region	
	5	Multiple WN positive dead bird reported in specific region.	
6. Human cases	3	One human case statewide (but not within specific region)	
	4	One human case in specific region	
	5	Multiple human cases in specific region	
<u>Response Level / Average Rating:</u> **Normal Season (1.0 to 2.5)** **Emergency Planning (2.6 to 4.0)** **Epidemic (4.1 to 5.0)**			
	TOTAL		
	AVERAGE		

A. Level 1: Normal Season

Risk rating: 1.0 to 2.5

CONDITIONS
• Average or below average Salton Sea level and rainfall; average seasonal temperatures • Mosquito abundance at or below five year average (key indicator = adults of vector species) • No virus isolations from mosquitoes • No seroconversions in sentinel chickens • No equine cases • No human cases
RESPONSE
• Conduct routine public education (eliminate standing water around homes, use personal protection measures) • Conduct routine mosquito and virus surveillance activities • Conduct routine mosquito larval control • Inventory pesticides and equipment • Evaluate pesticide resistance in vector species • Ensure adequate emergency funding • Release routine press notices • Send routine notifications to physicians and veterinarians • Establish and maintain routine communication with local office of emergency services personnel; obtain Standardized Emergency Management System (SEMS) training

B. Level 2: Emergency Planning

Risk rating: 2.6 to 4.0

CONDITIONS
• Salton Sea level and rainfall above average • Adult mosquito abundance >5-year average (150% to 300%) • One or more virus isolations from mosquitoes (MIR / 1000 is <5) • One to three chicken seroconversions per flock of 10 birds • One or two equine cases • One human case statewide • Viral activity in small towns or suburban area • Evidence of recent infection in wild birds
RESPONSE
• Review epidemic response plan • Enhance pubic education (include messages on the signs and symptoms of • encephalitis; seek medical care if needed; inform public about pesticide applications if appropriate) • Enhance information to public health providers • Increase surveillance and control of mosquito larvae • Increase adult mosquito surveillance • Increase number of mosquito pools tested for virus • Conduct localized chemical control of adult mosquitoes • Contact commercial applicators in anticipation of large scale adulticiding • Review candidate pesticides for availability and susceptibility of vector mosquito species • Ensure notification of key agencies of presence of viral activity, including the local office of emergency services

C. Level 3: Epidemic Conditions

Risk rating: 4.1 to 5.0

CONDITIONS
• Salton Sea level, rainfall, and water release rates from flood control dams well above average • Adult vector population extremely high (>300%) • Virus isolates from multiple pools of mosquitoes (MIR / 1000 > 5.0) • More than three seroconversions per flock of 10 birds in multiple flocks • More than two equine cases in specific region • One or more human cases in region • Virus detection in urban or suburban areas • Increased seroprevalance rates in wild bird populations or die-off of susceptible species
RESPONSE
• Conduct full scale media campaign • Alert physicians and veterinarians • Conduct active human case detection • Continue enhanced larval surveillance and control of immature mosquitoes • Broaden geographic coverage of adult mosquito surveillance • Accelerate adult mosquito control • Coordinate the response with the local Office of Emergency Services or if activated, the Emergency Operation Center (EOC) • Initiate mosquito surveillance and control in geographic regions without an organized vector control program • Request public health exemptions from FIFRA (40 CFR 166) and emergency tolerance exemptions (40 CFR 176) • Determine whether declaration of a local emergency should be considered by the County Board of Supervisors (or Local Health Officer) • Determine whether declaration of a "State of Emergency" should be considered by the Governor at the request of designated county or city officials • Ensure state funds and resources are available to assist local agencies at their request • Continue mosquito education and control programs until mosquito abundance is substantially reduced and no additional human cases are detected

VII. A. Key Agency Responsibilities

A. Local Mosquito and Vector Control Agencies

- Gather, collate, and interpret regional weather data
- Monitor abundance of immature and adult mosquitoes
- Collect and submit mosquito pools for virus isolation
- Maintain sentinel chicken flocks, obtain blood samples, and send them to laboratory
- Conduct routine control of immature mosquitoes
- Conduct control of adult mosquitoes when needed
- Educate public on mosquito avoidance
- Coordinate with local Office of Emergency Services personnel
- Communicate regularly with neighboring agencies

B. Mosquito and Vector Control Association of California

- Coordinate purchase of sentinel chickens
- Receive, track, and disperse payment for surveillance expenses
- Coordinate surveillance and response activities among member agencies
- Maintain a standby contract with a large scale aerial pesticide applicator
- Serves as spokesperson for member agencies
- Establish liaisons with press and government officials

C. California Department of Public Health Services

- Collate adult mosquito abundance data submitted by local agencies; provide summary of data to local agencies
- Coordinate submission of specimens for virus testing
- Maintain database of all specimens tested
- Test sentinel chicken sera for viral antibodies
- Test human specimens for virus
- Distribute a weekly bulletin summarizing surveillance test results
- Send weekly surveillance results to the UC Davis interactive website
- Immediately notify local vector control agency and public health officials when evidence of viral activity is found
- Conduct epidemiological investigations of cases of equine and human disease
- Coordinate and participate in a regional emergency response in conjunction with California Office of Emergency Services
- Conduct active surveillance for human cases
- Coordinate equine and "dead bird" surveillance programs for WNv and other arboviruses
- Provide oversight to local jurisdictions without defined vector-borne disease control program
- Maintain inventory of antigens and antisera to detect exotic viruses

D. University of California at Davis (CVEC)

- Conduct research on arbovirus surveillance, transmission of mosquito-borne diseases, and mosquito ecology and control

- Test mosquito pools for virus
- Provide a panel of tests for a wide range of viruses for identification of viruses from human, equine, bird, or arthropod vectors
- Maintain an interactive website for dissemination of mosquito-borne virus information and data
- Maintain inventory of antigens and antisera to detect exotic viruses
- Provide confirmation of tests done by local or state agencies

E. **California Department of Food and Agriculture**

- Notify veterinarians and veterinary diagnostic laboratories about WEE and testing facilities available at UCD Center for Vector-borne Disease Research
- Conduct necropsies on dead crows and other birds
- Provide outreach to general public and livestock and poultry producers on the monitoring and reporting of equine and ratite encephalitides
- Facilitate equine and ratite sample submission from the field

F. Local Health Departments

- Refer human and equine specimens to DHS for further testing
- Notify local medical community, including hospitals and laboratories, if evidence of viral activity present
- Participate in emergency response
- Assist in public education

Governor's Office of Emergency Services

- Coordinate the local, regional, or statewide emergency response under epidemic conditions in conjunction with DHS via the Standardized Emergency Management System (SEMS)
- Serve as liaison with the Federal Emergency Management Agency (FEMA) in the event that a federal disaster has been declared

Centers for Disease Control and Prevention

- Provide consultation to state and local agencies in California if epidemic conditions exist
- Provide national surveillance data to state health departments

VII. B. DISTRICT OWNED INSECTICIDE APPLICATION EQUIPMENT

D. LARVAL CONTROL

Equipment	Number in use
1. Hand Cans (1 gal)	36
2. Hand Spreaders	11
3. Maruyama Back Sprayers	29
4. Hand Backpack Sprayers	35
5. Argo – all terrain vehicle	2
6. Powered Liquid Skid Mounted Sprayer	2
7. ATV - quadbike	2
8. ATV - ranger	2

E. ADULT CONTROL

Equipment	Number in use
1. Beecomist Pro-Mist ULV Sprayer	2
2. London Fog ULV Model 18-20	2
3. Hand Portable Fog Generator	3

F. AERIAL APPLICATORS AVAILABLE FOR CONTACT

1. Salton Sea Air Service, Inc.
   101-111 Desert Air Drive
   North Shore, CA 92254
   (760) 393-3994

VII. C. CHEMICAL PRODUCTS AND SUPPLIES

The following products are stored at the District's storage and minimum amounts available during the mosquito season for use:

LARVAL CONTROL

PESTICIDE	AMOUNT	TREATMENT/ACREAGE
1. Agnique MMF	90 gal	90 ac
2. Altosid XR	1600 each	3.67
3. Altosid Briquettes	1520 each	3.49
4. Altosid Pellets	3150 lbs	630
5. Altosid Liquid	7 gal	224
6. VectoBac G	2700 lbs	270
7. VectoBac WDG	90 lbs	205
8. VectoBac 12AS	30 gal	240
9. VectoLex CG	1700 lbs	170
10. VectoLex WDG	130 lbs	130
11. VectoLex WSP	300 each	0.34
12. VectoMax CG	850 lbs	85
13. Natular G	500 lbs	77
14. Natular G30	500 lbs	50
15. Natular T30	130 each	0.3
16. Natular EC	3 gal	128
17. Natular XRT	50 each	0.11

ADULT CONTROL

PESTICIDE	AMOUNT	TRETMENT/ACRAGE
Pyrocide for ULV 7396	6 gal	900 ac
Pyrenone 25-5	270 gal	40640 ac
Aqua Resilin	20 gal	47657 ac

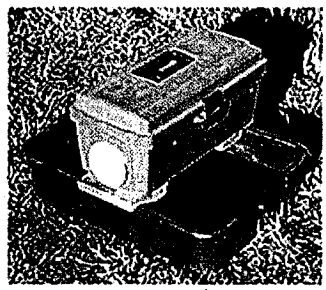
VIII. APPENDIX

VII. Appendix A.

List of CVMVCD Gravid Trap Locations 2011

Site ID	NO.	City	Location Description	Latitude	Longitude
200	1	Mecca	Ave 65 and Lincoln	33.58059	-116.07774
204	2	Indio	VSD	33.712031	-116.194718
208	3	Palm Springs	Mesquite-Sewer Treament Plant	33.807501	-116.497363
301	4	Bermuda Dunes	78325 Hidden River Rd	33.73809	-116.298
302	5	Rancho Mirage	70-800 Hwy-Fire Station	33.75278	-116.43083
307	6	Coachella	1377 6th St-Fire Station #79	33.67849	-116.17849
309	7	Indian Wells	44900 El Dorado	33.72286	-116.33811
311	8	Indio	80-940 Shenendoah	33.71731	-116.2538
320	9	Palm Desert SM	Shadow Mountain CC Golf Club Ln	33.711574	-116.378692
321	10	Rancho Mirage	Tamarisk CC 70-240 Frank Sinatra	33.77678	-116.42374
322	11	Cathedral City	69-380 Converse Rd	33.790673	-116.451053
324	12	Thousand Palms	72695 La Canada	33.823889	-116.393056
326	13	Desert Hot Springs	Mission Springs Water District-Horton Treatment Plant	33.95801	-116.48208
331	14	Palm Desert LD	Portola-Living Desert	33.70248	-116.37198
344	15	La Quinta	Washington/Ave 52	33.67158	-116.3014
346	16	Thermal	56075 Hwy 111	33.64139	-116.14132
347	17	La Quinta	44555 Adams-La Quinta FS	33.72496	-116.28666
203	18	Palm Desert	Sewer Plant-43000 Cook St	33.733537	-116.351461
601	19	DHS	DHS Palm & 8th	33.968831	-116.501683
602	20	Palm Springs	Mountain Gates	33.862433	-116.560769
603	21	Sky Valley	Sky Valley Resort	33.899742	-116.362194
604	22	Palm Springs	270 Vereda Norte	33.841503	-116.549117
605	23	Indio	Ulls Water	33.775625	-116.257544
606	24	Palm Springs	Bogert Trail	33.765833	-116.529864
607	25	La Quinta	Alvarado	33.65377	-116.313906
608	26	Mecca	Ave 60 and Lincoln	33.613189	-116.078175
609	27	Northshore	Seabreeze and Ocotillo	33.507275	-115.890147

CVMVCD Gravid Trap Locations 2011



VII. Appendix B

List of CVMVCD CO_2 Trap Locations 2011

Site ID	NO.	City	Location Description	Latitude	Longitude
5	1	Oasis	Johnson and Avenue 82	33.455241	-116.061172
2	2	Oasis	Johnson and Avenue 84	33.440559	-116.0607
6	3	Oasis	Lincoln and Avenue 82	33.454897	-116.078977
131	4	Oasis	Ave. 81& Johnson - Jessup Ranch	33.459421	-116.087272
130	5	Oasis	Johnson and Avenue 81	33.462382	-116.061245
132	6	Oasis	Johnson and Avenue 81	33.463593	-116.074278
8	7	Oasis	Buchanan and Avenue 80	33.470187	-116.094818
9	8	Thermal	Pierce and King St	33.48065	-116.112692
13	9	Thermal	Buchanan and Avenue 76	33.498767	-116.095372
15	10	Thermal	Filmore and Avenue 76	33.498956	-116.130198
21	11	Thermal	Polk and Avenue 74	33.510786	-116.149466
25	12	Thermal	Filmore and Avenue 72	33.52516	-116.131143
23	13	Thermal	Polk and Avenue 70	33.542636	-116.148191
27	14	Thermal	Filmore and Avenue 68	33.555035	-116.130245
30	15	Mecca	Pierce and Avenue 70	33.540282	-116.112702
33	16	Mecca	Buchanan and Avenue 72	33.525217	-116.095513
17	17	Mecca	Lincoln and Avenue 73	33.516797	-116.082468
34	18	Mecca	Lincoln and Avenue 72	33.525969	-116.078921
35	19	Mecca	Lincoln and Avenue 70	33.539988	-116.078863
37	20	Mecca	Buchanan and Avenue 68	33.554755	-116.092281
68	21	Mecca	Lincoln and Avenue 66	33.569223	-116.079206
200	22	Mecca	Lincoln and Avenue 65	33.580572	-116.077744
140	23	Mecca	Johnson and Avenue 66	33.569114	-116.061466
532	24	Mecca	Grant and Avenue 66	33.569232	-116.044161
530	25	Mecca	Grant and Avenue 64	33.583961	-116.04366
531	26	Mecca	Hayes and Avenue 64	33.583798	-116.026346
533	27	Mecca	Hayes and Avenue 66	33.569668	-116.026249
40	28	Mecca	Hayes and Avenue 68	33.554938	-116.026518
48	29	Mecca	Johnson and Avenue 70	33.540052	-116.061755
45	30	Mecca	Grant and Avenue 71	33.532695	-116.043672
121	31	Mecca	Colfax and Avenue 72	33.52908	-116.035213
122	32	Mecca	Ave. 72 & Colfax -Gordon's Ranch	33.532247	-116.030868
123	33	Mecca	South of Gordon Ranch	33.526966	-116.030798
46	34	Mecca	Hayes and Avenue 72	33.525378	-116.026382
55	35	Mecca	Garfield and Avenue 72	33.523699	-116.008858
43	36	Mecca	Garfield and Avenue 70	33.540228	-116.008863
50	37	Mecca	Arthur and Avenue 70	33.539965	-115.991758
51	38	Mecca	Cleveland and Avenue 70	33.540407	-115.974133
56	39	Mecca	Arthur and Avenue 72	33.525371	-115.991129
57	40	Mecca	Cleveland and Avenue 72	33.524985	-115.97331
58	41	Mecca	Gun Club	33.525475	-115.956632

54	**42**	Northshore	Vanderveer and Avenue 73	33.521118	-115.939335
114	**43**	Northshore	Desert Mobile Home Park	33.515167	-115.93451
115	**44**	Northshore	Mecca Ave	33.512678	-115.930857
116	**45**	Northshore	South of Tripoli Rd	33.51122	-115.925506
60	**46**	Northshore	Salton Sea State Park	33.510767	-115.920793
10	**47**	Oasis	Buchanan and Avenue 79	33.481054	-116.095336
208	**48**	Palm Springs	Sewer Plant-4375 Mesquite Ave	33.805514	-116.498372
204	**49**	Indio	Wild Bird Center-45500 Van Buren	33.712031	-116.194712
203	**50**	Palm Desert	Sewer Plant-43000 Cook St	33.733537	-116.351461
201	**51**	Thermal	57023 Hwy 111	33.634805	-116.136049
210	**52**	Cathedral City	69380 Converse Rd	33.790675	-116.451052
536	**53**	Thermal	Avenue 62 and Orchid	33.598087	-116.224755
537	**54**	Thermal	Avenue 60 and Tyler	33.613073	-116.164041
538	**55**	Thermal	Avenue 58 and Van Buren	33.62715	-116.196887
539	**56**	Coachella	Avenue 54 and Jackson	33.656714	-116.218393
540	**57**	Mecca	Avenue 73 and Lincoln	33.51823	-116.078914
541	**58**	Mecca	Avenue 66 and Harrison	33.568954	-116.181827
542	**59**	Mecca	Avenue 64 and Fillmore	33.583874	-116.129596
600	**60**	DHS	Mission Lakes	33.982506	-116.531908
601	**61**	DHS	DHS Palm & 8th	33.968831	-116.501683
602	**62**	Palm Springs	Mountain Gates	33.862433	-116.560769
603	**63**	Sky Valley	Sky Valley Resort	33.899742	-116.362194
604	**64**	Palm Springs	270 Vereda Norte	33.841503	-116.549117
605	**65**	Indio	Ulls Water	33.775625	-116.257544
606	**66**	Palm Springs	Bogert Trail	33.765833	-116.529864
607	**67**	La Quinta	Alvarado	33.65377	-116.313906
608	**68**	Mecca	Ave 60 and Lincoln	33.613189	-116.078175
609	**69**	Northshore	Seabreeze and Ocotillo	33.507275	-115.890147
610	**70**	Mecca	Torres Martinez Wetlands	33.519944	-116.07636
302	**70**	Rancho Mirage	70-800 Hwy-Fire Station	33.75278	-116.43083
307	**71**	Coachella	1377 6th St-Fire Station #79	33.67849	-116.17849
322	**72**	Cathedral City	69-380 Converse Rd	33.790673	-116.451053
324	**73**	Thousand Palms	72695 La Canada	33.823889	-116.393056
326	**74**	Desert Hot Springs	Mission Springs H2O District-Horton Treatment Plant	33.95801	-116.48208
344	**75**	La Quinta	Washington/Ave 52	33.67158	-116.3014
347	**76**	La Quinta	44555 Adams-La Quinta FS	33.72496	-116.28666

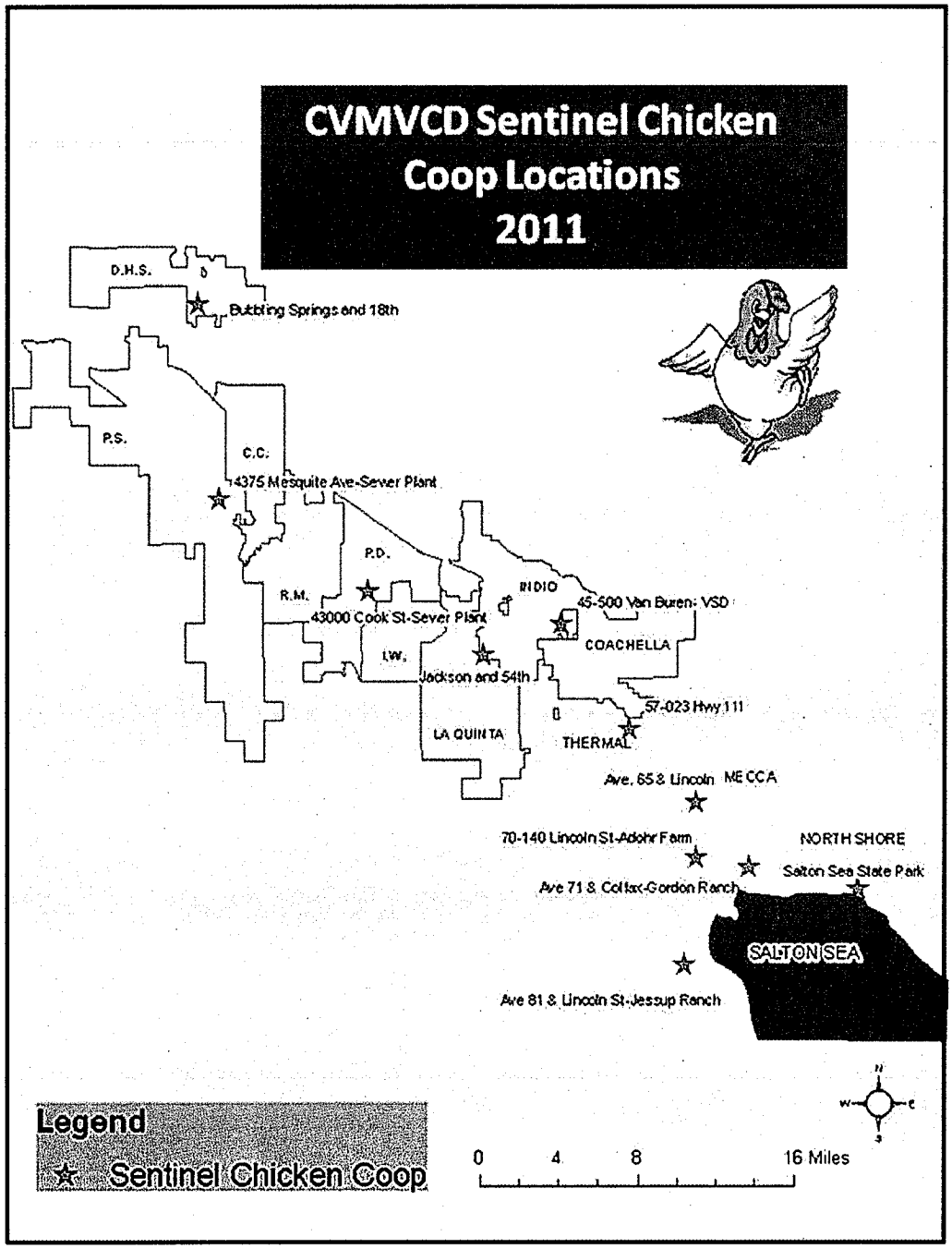
BOLD #'s:
also gravid
trap site

CVMVCD CO_2 Trap Locations 2011

VII. Appendix C.

List of CVMVCD Sentinel Chicken Coops - 2011

Site ID	NO.	City	Location Description	Latitude	Longitude
35	1	Mecca	70-140 Lincoln St-Adohr Farm	33.539204	-116.077955
114	2	Mecca	Desert Beach Dr. SE	33.515161	-115.934507
122	3	Mecca	Ave 71 & Colfax-Gordon Ranch	33.532244	-116.030875
131	4	Oasis	Ave 81 & Lincoln St-Jessup Ranch	33.461111	-116.089722
200	5	Mecca	Ave. 65 & Lincoln	33.58059	-116.07774
201	6	Thermal	57-023 Hwy 111	33.634752	-116.136081
203	7	Palm Desert	43000 Cook St-Sewer Plant	33.733544	-116.194718
204	8	Indio	45-500 Van Buren- VSD	33.712023	-116.194718
208	9	Palm Springs	4375 Mesquite Ave-Sewer Plant	33.805527	-116.498382
327	10	DHS	Bubbling Wells and 18th	33.917922	-116.484575
539	11	Coachella	Ave. 54 and Jackson	33.656714	-116.218393
60	12	North Shore	Salton Sea State Park	33.510767	-115.920793


CVMVCD Sentinel Chicken Coop Locations 2011
D.H.S.
Bubbling Springs and 18th
P.S.
C.C.
4375 Mesquite Ave-Sewer Plant
P.D.
R.M.
43000 Cook St-Sewer Plant
INDIO
45-500 Van Buren- VSD
COACHELLA
L.W.
Jackson and 54th
57-023 Hwy 111
LA QUINTA
THERMAL
Ave. 66 & Lincoln MECCA
70-140 Lincoln St-Adohr Farm
NORTH SHORE
Salton Sea State Park
Ave 71 & Collax-Gordon Ranch
SALTON SEA
Ave 81 & Lincoln St-Jessup Ranch
Legend
Sentinel Chicken Coop
0 4 8 16 Miles

VII. Appendix D

Table 4. Annual and Monthly total and average rainfall (in.) for the Coachella Valley.

MONTH	2004	2005	2006	2007	2008	2009	2010	5 yr Avg.
JANUARY	0.01	1.52	0.0	0.09	1.62	0	2.55	**0.852**
FEBRUARY	0.00	2.12	0.02	0.00	0.04	0.48	0.41	**0.19**
MARCH	0.00	0.01	0.18	0.00	0.00	0	0.24	**0.084**
APRIL	0.36	0	0	0.04	0.0	0	0	**0.008**
MAY	0.00	0	0	0.00	0.04	0	0	**0.008**
JUNE	0.00	0	0	0.00	0.00	0	0	0.00
JULY	0.00	0	0	0.00	0.02	0	0	**0.004**
AUGUST	0	0	0	0	0.08	0	0	**0.016**
SEPTEMBER	1.38	0.01	0	0.1	0.0	0	0.01	**0.022**
OCTOBER	0.64	2.1	0.03	0	0.0	0	0.72	**0.15**
NOVEMBER	0.99	0	0	0	0.0	0	0	0.00
DECEMBER	0.97	0	0	0.36	1.5	0.58	0.37	**0.562**
YR TOTAL	**4.35**	**5.8**	**0.23**	**0.59**	**3.27**	**1.06**	**4.3**	**1.89**

* This data used for surveillance factor # 1 in the Mosquito Borne Virus Risk Assessment Table calculations for SLE, WEE, and WNV on pages 9 – 11 of the Coachella Valley Mosquito Borne Virus Surveillance and Emergency Response Plan.

VII. Appendix E

Table 5. Average Minimum and Maximum temperatures (°F) in the Coachella Valley.

Month	2005		2006		2007		2008		2009		2010		5 yr avg.	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
Jan	68	44	72	38	67	34	67	39	75	41	69	40	***70***	***38***
Feb	68	50	77	41	75	42	74	42	72	41	72	45	***73***	***42***
Mar	79	51	74	46	85	49	84	50	82	48	77	47	***80***	***48***
Apr	85	53	82	56	99	42	89	56	107	69	82	50	***74***	***55***
May	95	65	96	64	96	62	93	63	109	88	91	60	***97***	***67***
Jun	101	68	106	73	104	67	107	71	112	87	101	69	***75***	***73***
Jul	108	78	110	81	107	75	107	79	117	64	107	76	***110***	***75***
Aug	105	77	106	73	107	76	105	79	117	64	105	74	***76***	***73***
Sep	100	66	100	67	100	69	104	69	106	56	103	67	***103***	***66***
Oct	90	59	89	57	90	56	93	56	88	54	87	59	***77***	***56***
Nov	81	47	78	45	83	49	83	51	80	45	76	43	***80***	***47***
Dec	72	39	70	34	65	36	67	40	67	37	71	43	***68***	***38***

* This data used for surveillance factor # 1 in the Mosquito Borne Virus Risk Assessment Table calculations for SLE, WEE, and WNV on pages 9 – 11 of the Coachella Valley Mosquito Borne Virus Surveillance and Emergency Response Plan.

VIII. Appendix F

AVERAGE WATER LEVEL FOR THE SALTON SEA

Hydrologic Unit 18100200, Imperial County, western shore at Sandy Beach and 15.5 miles northwest of Westmorland.

Location: Lat. 33'33'33', lon. 115'49'59' in SE ¼ SW ¼ sec. 21 T. 11 S., R.11 E.

Salton Sea level from Jan. 2004 to 2010 at State Park, North Shore.

The Salton Sea is the largest inland body of shallow water in California surrounded by Colorado Desert ecosystem. It is in the southeastern corner of California and spans Riverside and Imperial counties. Surface elevation is 227 feet below mean sea level, surface area 365 square miles, contains 7.5 million acre-feet of water (maf), evaporates 1.36 maf each year and salinity is 44,000 milligrams per liter.

The Salton Sea's water level is maintained by agricultural runoff and to a lesser extent by municipal effluent and storm water that flows into the Sea through rivers and creeks in the Imperial, Coachella and Mexicali Valleys. Seasonal differences and fluctuations in the surface elevation are presented in table below for period from 2004 to 2010 with the average Sea water level for each month and year in analyzed period.

The current monthly Salton Sea water level needs to be compared with the average table value for particular month and use in the benchmark # 1 as a surveillance factor in Table 1 – 3 ; Mosquito-borne Virus Risk Assessments.

TABLE 6

MAX	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2004	-228.5	-228.3	-228	-227.6	-227.6	-228.1	-228.3	-228.5	-229.2	-229.2	-229.2	-229.1
2005	-228.4	-228.1	-227.9	-227.8	-227.7	-227.9	-228.2	-228	-228.5	-228.8	-228.8	-228.6
2006	-228.6	-228.4	-228.3	-228.2	-228.2	-228.2	-228.3	-228.5	-229.1	-229.5	-229.4	-229.4
2007	-229.5	-229	-228.8	-228.7	-228.7	-228.7	-229	-229	-229.5	-229.8	-229.8	-229.8
2008	-229.6	-229.5	-229.2	-229.1	-229.2	-229.2	-229.5	-229.7	-229.9	-230.5	-230.51	-230.3
2009	-230.2	-230	-229.9	-229.9	-229.8	-230.1	-230.3	-230.5	-230.9	-231.3	-231.4	-231.4
2010	-231.3	-230.7	-230.5	-230.4	-230.5	-230.6	-230.59	-231.1	-231.5	-231.6	-231.6	-231.75
5 yr Avg	-229.84	-229.52	-229.34	-229.26	-229.28	-229.36	-229.54	-229.76	-230.18	-230.54	-230.54	-230.53
MIN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2004	-228.6	-228.5	-228.3	-228.1	-228.1	-228.2	-228.5	-228.5	-229.1	-229.3	-229.1	-229.1
2005	-229.0	-228.5	-228.0	-227.9	-227.9	-228.1	-228.2	-228.3	-228.8	-229.1	-228.9	-228.9
2006	-228.9	-228.5	-228.4	-228.4	-228.1	-228.6	-228.6	-229	-230	-229.6	-229.4	-229.6
2007	-229.3	-229.2	-229.1	-228.8	-228.8	-228.9	-229.1	-229.3	-229.5	-230	-229.9	-229.8
2008	-229.8	-229.65	-229.5	-229.4	-229.4	-229.4	-229.7	-229.9	-230.2	-230.6	-230.51	-230.51
2009	-230.3	-230.2	-230	-230.1	-229.9	-230.3	-230.5	-230.8	-231.1	-231.5	-231.5	-231.5
2010	-231.4	-230.8	-230.7	-230.5	-230.6	-230.7	-231	-231.5	-231.7	-231.7	-231.75	-231.42
5 yr Avg	-229.94	-229.67	-229.54	-229.44	-229.36	-229.58	-229.78	-230.10	-230.50	-230.68	-230.61	-230.57

VIII APPENDIX G.

RISK ASSESSMENT OF MONTHLY AVERAGES AND THRESHOLD FOR ADULT MOSQUITOES FROM CO2 TRAPS AT THE NORTH AND WEST SHORE AREAS OF THE SALTON SEA

The seasonal seroconversion rate of sentinel chickens to WNV, WEE and SLE in the Coachella Valley, among other factors, is related to temperature, Salton Sea level, rainfall, and vector abundance and population size of vertebrate hosts.

Monthly mosquito population averages from North and West Shore areas for the last 5 years were analyzed to determine their association with SLE and WEE virus transmitting to sentinel chickens.

Table 7 and 8 present the average number of *Cx. tarsalis* female mosquitoes per trap night/month in the areas of the North and West shore of the Salton Sea.

TABLE 7.
North Shore Average Number of Mosquitoes in 6 traps/month/year

MONTH	2006	2007	2008	2009	2010	5-yr AVG
JAN	48	48	186	237	26	**109**
FEB	55	26	29	64	127	**60**
MAR	20	88	163	192	519	**196**
APR	56	166	151	72	399	**169**
MAY	40	107	235	101	89	**114**
JUN	28	93	89	3	89	**60**
JUL	7	14	6	2	24	**11**
AUG	1	2	16	8	13	**8**
SEP	11	39	53	16	41	**32**
OCT	32	39	49	99	312	**106**
NOV	50	92	44	68	12	**53**
DEC	50	28	58	74	89	**60**

TABLE 8.
West Shore Average Number of Mosquitoes in 6 traps/month/year

MONTH	2006	2007	2008	2009	2010	5-yr AVG.
JAN	110	104	162	485	41	**180**
FEB	106	62	177	73	182	**120**
MAR	203	294	277	321	527	**324**
APR	208	165	525	261	798	**391**
MAY	158	101	199	165	250	**175**
JUN	325	82	70	177	203	**171**
JUL	38	31	55	60	46	**46**
AUG	4	55	40	44	137	**56**
SEP	25	122	104	90	119	**92**
OCT	194	270	417	249	527	**331**
NOV	231	262	132	154	37	**163**
DEC	90	36	58	107	213	**101**

RECEIPT

No. 336184

DATE 2/18/11

FROM David - DWQ

$ 136.00

CK# 134678

DOLLARS

○ FOR RENT
○ FOR Coachella Valley Mosquito & Vector Control

ACCT.		
PAID		
DUE		

○ CASH
○ CHECK
○ MONEY ORDER
○ CREDIT CARD

FROM _____ TO _____

BY _____

A-2501
T-46820