SWRCB Received Date: 5/30/2016

ATTACHMENT E – NOTICE OF INTENT

WATER QUALITY ORDER 2016-0039-DWQ
GENERAL PERMIT CAG990004

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# _____	
	☒ D. Enrolled under Order 2011-0002-DWQ: WDID# 2016-0039-DWG	

II. DISCHARGER INFORMATION

A. Name Los Angeles County West Vector Control District			
B. Mailing Address 6750 Centinela Avenue Blvd.			
C. City Culver City	D. County LA County	E. State CA	F. Zip Code 90230
G. Contact Person Robert Saviskas	H. Email address rsaviskas@ lawestvector.org	I. Title Exec. Director	J. Phone 310-915-7373

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: LA County Public Works; Caltrans
Name of the conveyance system: Drainage channels; stormwater BMPs

☒ 3. Directly to river, lake, creek, stream, bay, ocean, etc.
Name of water body: Malibu Creek, Malibu Lagoon, LA River, Dominguez Channel, Ballona Creek, Ballona Wetlands

* 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 4
(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: ☒ Vector Larvae ☐ Adult Vector

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

See attached table

C. Period of Application: Start Date July 1, 2016 End Date on going

D. Types of Adjuvants Added by the Discharger:

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 Pesticides Application Plan shall be included with the NOI. (No change to previously filed PAP)

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. (No change from previously filed notifications)

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 Order, including developing and implementing a monitoring program, will be complied with."

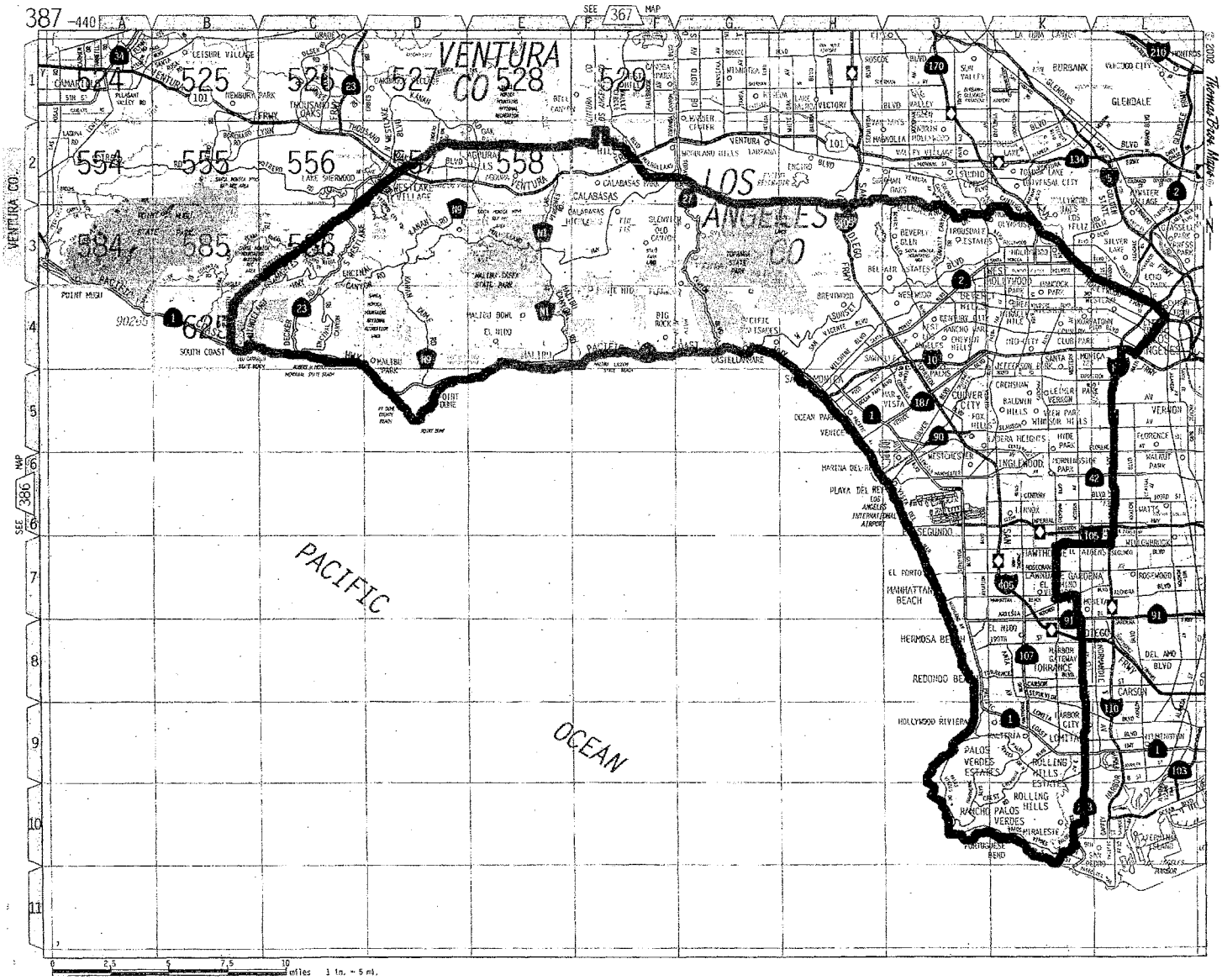
A. Printed Name: Robert Saviskas

B. Signature: Robert Saviskas **Date:** May 30, 2016

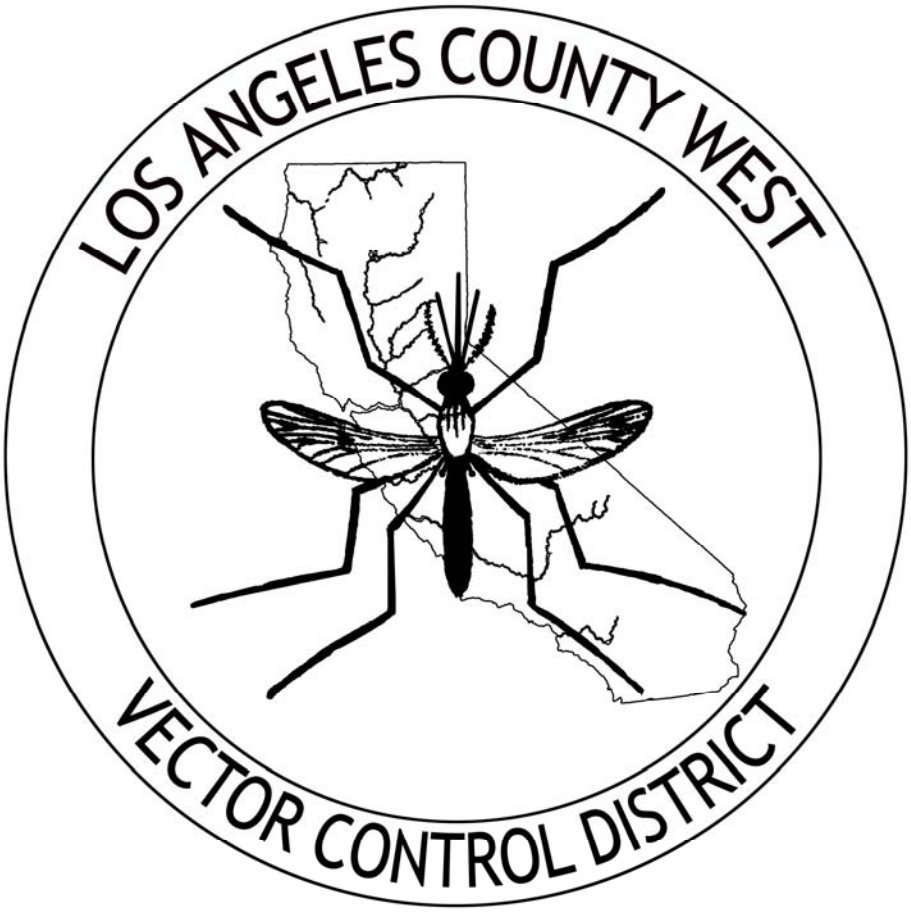
C. Title: Executive Director

X. FOR STATE WATER BOARD USE ONLY

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


387
SEE 367 MAP
VENTURA CO.
VENTURA CO
LOS ANGELES CO
PACIFIC OCEAN
SEE 386 MAP
0 2.5 5 7.5 10 miles 1 in. = 5 mi.
© 2002 Thomas Bros. Maps

Trade Name	**Active Ingredient**
Agnique MMF	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alklyl)-ω-hydroxy
Agnique MMF-G	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alklyl)-ω-hydroxy
Altosid Liquid Larvicide (A.L.L.)	(S)-Methoprene
Altosid Pellets	(S)-Methoprene
Altosid Briquets	(S)-Methoprene
Altosid Briquets XR5	(S)-Methoprene
Altosid XR-G	(S)-Methoprene
Vectobac 12AS	*Bacillus thuringiensis* var. *israelensis*
Vectobac Granules	*Bacillus thuringiensis* var. *israelensis*
Vectolex FG	*Bacillus sphaericus*
VectoMax FG	*Bacillus sphaericus*
VectoMax (Wsp)	*Bacillus sphaericus & Bacillus thuringiensis* var. *israelensis*
4S1 4-Star (Briq)	*Bacillus sphaericus & Bacillus thuringiensis* var. *israelensis*
4S3 4-Star (Briq)	*Bacillus sphaericus & Bacillus thuringiensis* var. *israelensis*
4S6 4-Star (Briq)	*Bacillus sphaericus & Bacillus thuringiensis* var. *israelensis*



PESTICIDE APPLICATION PLAN (PAP)

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

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

The NPDES Permit requires a Pesticides Application Plan (PAP) that contains the following elements:

1. **Description of ALL target areas, if different from the water body of the target area, in to 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 Los Angeles County West Vector & Vector-Borne Disease Control District's ("District") activities are conducted year-round within a 680 square mile area contained within Los Angeles County. This includes the incorporated cities of Agoura Hills, Beverly Hills, Calabasas, Culver City, El Segundo, Hawthorne, Hermosa Beach, Hidden Hills, Inglewood, Lawndale, Lomita, the westerly portion of the City of Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Torrance, West Hollywood, Westlake Village, and some unincorporated portions of the County of Los Angeles.

Also, below is a list of the receiving waters in Los Angeles County that may be affected by the District's mosquito control applications. These features, their tributaries, lakes, reservoirs, marshes, unnamed drainages, ditches and the water conveyance and infrastructure throughout the county can be subject to mosquito control applications by the Los Angeles County West Vector Control District: Malibu Creek, Malibu Lagoon, Los Angeles River, Dominguez Channel, Balloon Creek and the Ballona Wetlands.

Please also see Appendix A, a map of service areas and list of zip codes contained within the District's boundaries that may be affected by the District's applications.

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

The District uses BMPs described in its own Mosquito Reduction Best Management Practices (Appendix C), as well as practices in accordance with the Best Management Practices for Mosquito Control in California and the California Mosquito-borne Virus Surveillance and Response Plan.

In general, the District uses an integrated pest management ("IPM") approach to mosquito and vector control. IPM is an approach that focuses on site–specific, scientifically sound decisions to manage pest 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 development sites;
2. Biological Control—use of biological agents to limit larval mosquito populations;
3. Chemical Control—larvicides (materials that kill immature larval mosquitoes) and adulticides (materials that kill adult mosquitoes); and

4. Cultural Control—change the behavior of people so that their actions prevent the development of mosquitoes or the transmission of vector–borne disease. 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 landowners and land managers an opportunity to address any land based mosquito problems as may be identified by the District.

The District's Mosquito Reduction Best Management Practices ("BMPs") are designed to address mosquito breeding sources including, but not limited to: managed wetlands, oil fields, storm water structures, sewage treatment facilities, residential properties, and cemeteries. Many of these sources produce significant mosquitoes due to management practices that promote favorable habitat for mosquitoes.

The BMPs are recommended land management practices that can provide a reduction in mosquito populations by various means. The District follows a step-by-step BMP land and water management protocol to control and reduce mosquito breeding progressing from step 1 to step 2, or beyond only if the previous action is not an effective control measure. These steps are as follows:

(1) reducing or eliminating of standing water of breeding areas;
(2) introduction of biological controls (*e.g.*, mosquito fish);
(3) increasing physical maintenance to reduce vegetation and increase access by biological controls (*e.g.*, mosquito fish) to larvae breeding sites; and
(4) introducing chemical (*e.g.*, larvicide) controls.

While it is generally accepted that mosquito production from all sources may be reduced through the widespread implementation of the District's 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 policies and procedures. For those properties with mosquito sources that do not fit the definition of a 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.

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

- Mosquito production from the source is more than similar land uses, 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 production.

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

A combination of larval dip data and adult mosquito surveillance data will be used 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 production include but are not limited to: poor water management, lack of emergent vegetation control, lack of effective refugia to maintain biological control populations, poor condition of water conveyance or drainage structures, practices that impede access to the source, and lack of notification of practices that would affect mosquito control operations.

Other factors such as treatment costs, proximity to population centers, vector-borne disease status, mosquito species produced, and the efficacy of available treatment options will be considered when evaluating a Significant Mosquito Source 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 Implementation Process for Significant Mosquito Sources

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.*

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 Los Angeles County that have been identified as significant mosquito sources, that if untreated, would become a public nuisance (under HSC §2060). The Department 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 draft BMP Implementation Plan will be provided to the responsible parties. This plan will include an explanation of why the site was determined to be a significant mosquito source, including mosquito surveillance data, if requested.
3. **Negotiate BMP Implementation Plan**—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

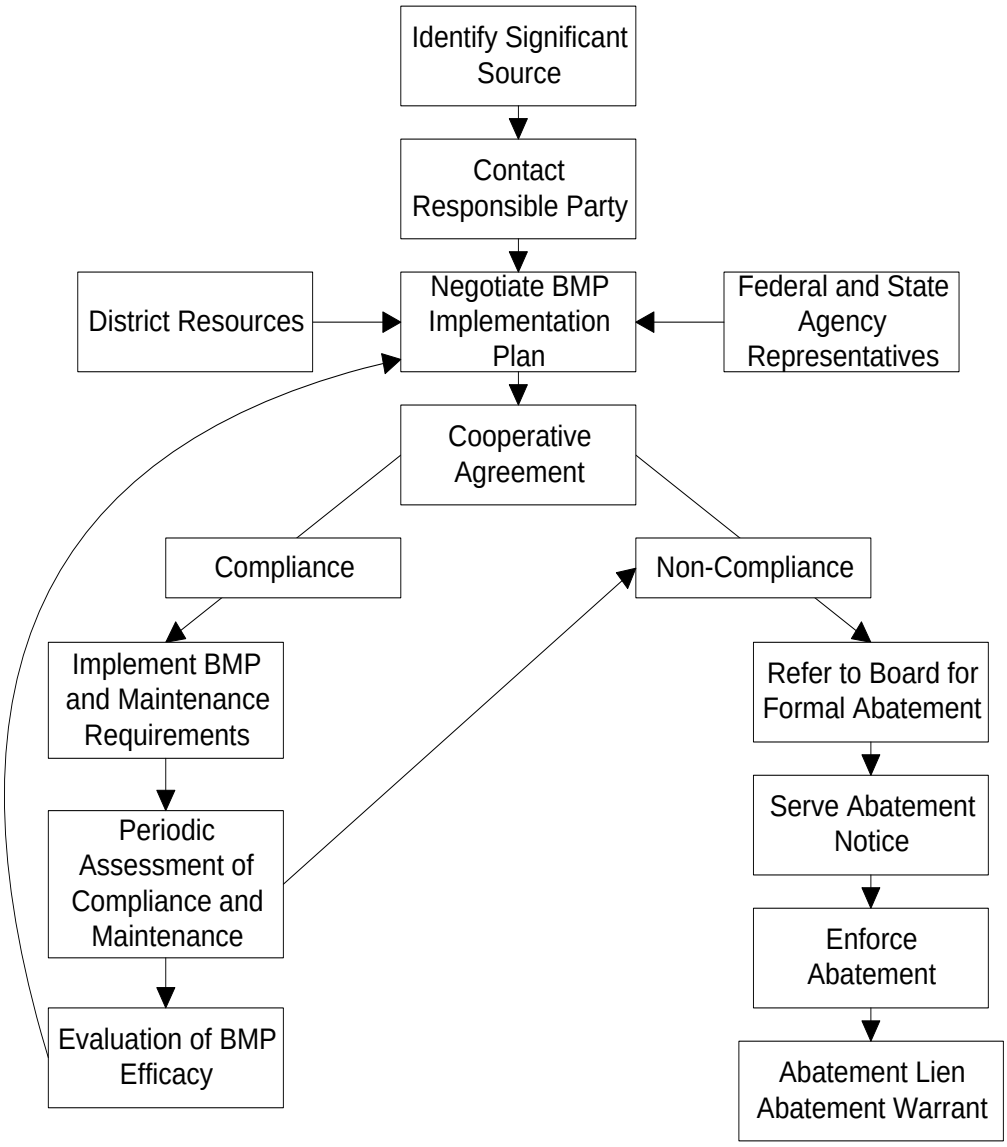
requirements, and monitoring plan. A defined negotiation period will be designated at the start of the negotiations.

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 said work, if any, to be paid by the responsible party; and requirements for maintenance to be performed by the responsible party. This agreement shall be subject to the same requirements as any other agreement covered by these policies.
5. **Coordinate with other regulatory agencies**—Other local, state, federal, and conservation agencies will be brought into the negotiation process to avoid or address any potential regulatory conflicts with the draft BMP Implementation Plan.
6. **Cooperative Agreement**—The cooperative agreement will formalize the relationship between the District and the responsible party holding both to the terms agreed upon in the BMP Implementation Plan. This document will also outline the consequences of non–compliance with the BMP Implementation Plan under the California Health and Safety Code.
7. **Implementation and Monitoring**—After successful implementation of the requirements, regular inspections of the property will be conducted to assess the responsible party's continued maintenance and compliance with the BMPs. The District reserves the right to renegotiate the BMP Implementation Plan 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 Implementation Plan 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 cooperative agreement.
9. **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 cooperative agreement, the case may be brought to the District Board of Trustees to begin the Formal Abatement process as defined in HSC §2061.
10. **Serve Abatement Notice**—Under guidance from the District Board of Trustees, the responsible party will be served an abatement notice directing them to comply with the cooperative agreement within the specified timeframe. Civil penalties of up to $1000 per day will be imposed for non–compliance pursuant to §2061 and §2063 of the California Health and Safety Code.
11. **Enforce Abatement**—Under the direction of the District Board of Trustees, civil penalties and treatment costs not paid within 60 days will be collected "at the same time and in the same manner as ordinary county taxes….and shall be subject

to the same procedure and sale in case of delinquency as are provided for ordinary county taxes." HSC §2065(b).

12. **Additional Abatement Actions**—Under the direction of the District Board of Trustees, and/or Executive Director, other measures such as an abatement warrant or abatement lien may be imposed pursuant to the California Health and Safety Code.

Figure 1: BMP Program Flowchart



Considerations are also drawn from and in accordance with the BMPs for Mosquito Control in California and the California Mosquito-borne Virus and Surveillance & Response Plan.

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;

The following list of products may be used by the District for larval or adult control. This list is directly from Attachment E and F within the NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the U.S. for Vector Control Applications. All of these products are used according to label directions and may be applied by ground (hand, truck, ATV, backpack, etc.) or by air (helicopter or fixed wing aircraft).

Trade Name	**Active Ingredient**
Agnique MMF Mosquito Larvicide & Pupicide (53263-28)	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alkyl)-ω-hydroxy
Agnique MMF G (53263-30)	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alkyl)-ω-hydroxy
Zoecon Altosid Liquid Larvicide Mosquito Growth Regulator (2724-392)	(S)-Methoprene
Zoecon Altosid Pellets (2724-448)	(S)-Methoprene
Zoecon Altosid Briquets (2724-375)	(S)-Methoprene
Zoecon Altosid XR Extended Residual Briquets (2724-392)	(S)-Methoprene
Zoecon Altosid XR-G (2724-451)	(S)-Methoprene
Vectobac-12AS (73049-38)	*Bacillus thuringiensis* var. *israelensis*
Vectobac-G Biological Mosquito Larvicide Granules (73049-10)	*Bacillus thuringiensis* var. *israelensis*
Vectolex CG Biological Larvicide (73049-20)	*Bacillus sphaericus*
Vectolex WDG Biological Larvicide (73049-57)	*Bacillus sphaericus*
Vectomax CG Biological Larvicide (73049-429)	*Bacillus thuringiensis* var. *israelensis*, *Bacillus sphaericus*
Fourstar Briquets (83362-3)	*Bacillus thuringiensis* var. *israelensis*, *Bacillus sphaericus*
FourStar SBG (85685-1)	*Bacillus thuringiensis* var. *israelensis*, *Bacillus sphaericus*

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;

Please see Appendix A. Any site that holds water for more than 96 hours (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible the District works with property owners to effect long-term solutions to reduce or eliminate the need for continued applications as described in Best Management Practices for Mosquito Control in California. Mosquito breeding sources and areas that require adult mosquito control are difficult to predict from year to year based on the weather and variations in local environmental conditions.

However, the typical sources treated by the District include:

Box Drain	Catch Basin	Container	Creek/River
Curb	Drainage Channel	Excess Water	Marsh
Oil Sump	Pond/Pool	Septic Tank	Underground Drain

Please refer to the District's response to Item 1 for a map of the District's application areas, target areas and specific water bodies that it regularly treats.

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

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

In all instances, the use of chemical control methods are a last resort after options such as using mosquito fish (*Gambusia affinis*) or source removal have been eliminated. The District attempts to use mosquito fish whenever possible, especially in sources that contain water year-round; in fact, the District was successful in establishing a population of mosquito fish in such as inhospitable location as the lake at the La Brea Tar Pits.

a. Public Education
The District has an active Public Education department that educates residents concerning mosquito development, control and the diseases they transmit and encourages the removal of sources of standing water on their property, and works with property owners to find long-term water management strategies that meet their needs while minimizing the need for public health pesticide applications. The District also provides mosquito fish free of charge to residents within the District and instructions are provided concerning the locations where these fish may or may not be used. The Public Education Department has also implemented an educational program for public elementary schools, where students are given the opportunity to learn hands on about mosquitoes, bees, and ticks through the use of live and preserved insect displays, videos, and insect related handouts. School presentations are customized to match the age of the students as well as the objectives of the teacher. Thousands of pamphlets and videos have been distributed regarding public health issues caused by mosquitoes, Africanized honeybees, ticks and other vectors. The District has been the lead agency in training and coordinating fire departments, police departments, and 911 systems throughout the District.

b. Surveillance of Vector Populations
    1) Collecting adult mosquitoes can provide several important pieces of information. When traps are set at specific locations over a period of time,

or in response to service requests, increases in the mosquito population can be detected. Once these mosquitoes are identified, control measures can then be more easily directed. Knowing what species of mosquito is breeding can help Vector Control Technicians find the breeding source and take the appropriate control measures. After identification by District Vector Ecologists, these mosquitoes can also be tested for the presence of disease. The detection of virus in a mosquito which feeds on humans indicates a true potential for human disease, and immediate control measures can be implemented. Trap collections not only determine where control measures are needed, but also determine the effectiveness of control measures which are in place.

Several of the 50 known species of mosquitoes in California can carry disease under the right conditions. When a female mosquito takes an animal blood meal, which she uses as nourishment for her developing eggs, she may transmit certain disease causing organisms to humans and other animals. These organisms are taken with blood from other infected humans and animals. The mosquito completes the cycle when she bites the next susceptible host, causing infection. The two most important diseases affecting humans worldwide are encephalitis and malaria. In Los Angeles County, mosquitoes that are capable of transmitting West Nile virus (WNV), St. Louis Encephalitis (SLE) and Western Equine Encephalomyelitis (WEE) are pooled and sent to the State Viral and Rickettsial Laboratory for testing. Currently, the District uses two types of traps to monitor mosquito populations: (1) CDC-Type CO2-Baited Traps; and (2) Gavid Traps.

2) Sentinel Chicken Surveillance

Sentinel chicken serology is performed by placing chickens in an area over an extended period of time and testing their blood for the presence of antibodies to WNV, SLE and WEE viruses. The District maintains 20 flocks of chickens located strategically throughout the District.

The chickens are bled once every two weeks during the months of May through October. Blood samples are processed and tested in conjunction with the State of California's laboratories. The results obtained from these laboratory tests are used to increase inspections and control measures in areas where viral activity is present.

It is important to note that the chickens are well cared for at all times. The chickens are not affected by any of the viruses and do not develop any pathogenic symptoms. Only a very small amount of blood is taken from each chicken every other week. The chickens represent a critical element of the District's surveillance program and help to prevent any transmission of SLE and WEE to the human population. Once a small amount of blood

is collected, the blood is transferred to a numbered filter paper strip. This filter paper strip is later used for laboratory testing.

3) Service Requests. Reports of standing water, *i.e.*, neglected pools or mosquitoes from residents allow staff to gauge the success of control efforts and locate new sources of mosquitoes. When requests for service are received, Vector Control Technicians visit the area, interview residents, and search for sources of mosquitoes.

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

The need to a apply product is determined by surveillance. Actual use varies annually depending on mosquito abundance. The pesticide amounts presented in the table below were taken from the District's 2010 Pesticide Use Report ("PUR") as an estimate of pesticide use in 2011. Several factors influence the amounts of pesticides applied, which can include rainfall, weather patterns, disease outbreak, and availability of products. Other public health pesticides, in addition to those listed below may be used as part of the agency's best management practices. Products are applied according to label specifications as determined by the US Environmental Protection Agency.

2010 PESTICIDE USE REPORT

Chemical Name	2010 Amount Applied
Agnique MMF Mosquito Larvicide & Pupicide (biodegradable, alcohol ethoxylated (AE) surfactant)	65.48 gal
Agnique MMF G (biodegradable, alcohol ethoxylated (AE) surfactant)	3.07 lbs
Altosid Briquets (methoprene)	114.75 lbs
Zoecon Altosid XR Extended Residual Briquets (methoprene)	356.88 lbs
Zoecon Altosid XR-G (methoprene)	109.10 lbs
Zoecon Altosid Pellets (methoprene)	1247.22 lbs
Zoecon Altosid Liquid Larvicide Mosquito Growth Regulator (methoprene)	16.9 gal
Summit B.t.i. Briquets (*Bacillus thuringiensis* var. *israelensis*)	24.25 lbs
Vectobac 12AS (*Bacillus thuringiensis* var. *israelensis*)	222.31 gal
Vectobac G Biological Larvicide (*Bacillus thuringiensis* var. *israelensis*)	14338.38 lbs
Vectolex CG Biological Larvicide (*Bacillus sphaericus*)	7061.91 lbs
Vectolex WDG Biological Larvicide (*Bacillus sphaericus*)	0
Vectomax CG (*Bacillus thuringiensis* var. *israelensis, Bacillus sphaericus*)	0

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

The District is a member of the Mosquito and Vector Control Association of California's ("MVCAC") NPDES Coalition Monitoring Program. Please refer to 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**

As described in Item 2 above, water management strategies, vegetation management or the use of fish are the preferred approaches to solving any vector breeding issues. When these methods are not appropriate, feasible or effective, and evidence of breeding continues to exist, larviciding will be considered. Only if all of these methods are not feasible or effective may the agency resort to adult control measures to control vector or nuisance insect populations.

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 Implementation Plan 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 cooperative agreement.

Other factors such as treatment costs, proximity to population centers, vector-borne disease status, mosquito species produced, and the efficacy of available treatment options will be considered when evaluating a Significant Mosquito Source. 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.

For example, if a city is the owner of a recreational lake that is causing significant mosquito problems for nearby residents due to lack of vegetation management, the agency will direct the city to increase vegetation control efforts to allow the existing fish population access to the mosquito larvae. If the city's budgetary restraints do not allow additional resources to be dedicated toward the problem, the agency will assess whether a larviciding approach could be successful. Should vegetation density prevent larvicide from penetrating to the water's surface, and the District lack resources to control the amount of larval sites in the District, then the District may minimize emerging adult populations through adulticiding efforts. All the while, the agency will continue to work with city officials toward a more permanent, economical and environmentally sound solution to the problem.

D. Best Management Practices (BMPs)

The Discharger shall develop BMPs that contain the following elements:

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

The District's BMPs are described in Item 2 above. Specific elements are highlighted below in subsections a-f.

a. Measures to prevent pesticide spill;

All pesticide applicators receive annual spill prevention and response training. District employees ensure daily that application equipment is in proper working order. Spill mitigation devices are placed in all vehicles and pesticide storage areas. All safety, handling and use requirements and instructions are followed per pesticide product labels and Material and Safety Data Sheets.

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

Application equipment is calibrated on a monthly basis and is part of a stipulation of the Cooperative Agreement, a Memorandum of Understanding (MOU) with the California Department of Public Health (CDPH).

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

A plan to educate applicators about any potential adverse effects from pesticide application will be covered in our annual pesticide application and safety training, State-certified continuing education programs, and/or regional NPDES Permit training programs. Pesticide applicators are licensed by the State of California as Vector Control Technicians and are required to complete such trainings.

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

All spray equipment used in larviciding applications is calibrated on a monthly basis to meet application specifications. Supervisors review application records daily to ensure appropriate amounts of material are being used. Ultra Low Volume (ULV) equipment is calibrated for output and droplet size to meet label requirements. Aerial larviciding equipment is calibrated by the Contractor. Aerial adulticide equipment is calibrated regularly and droplet size will be monitored by the agency to ensure droplets meet label requirements. If airplanes are used in urban ULV applications, the primary airplane used for rural ULV application is equipped with advanced guidance and drift management

equipment to ensure the best available technology is being used to place product in the intended area.

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

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

In general, the District follows a four step water management protocol to control and reduce mosquito breeding that progresses from step 1 to step 2, or beyond only if the previous action does not effectively control the mosquito breeding. Those steps are as follows: (1) reducing or eliminating of standing water of breeding areas; (2) introduction of biological controls (*e.g.*, mosquito fish); (3) increase physical maintenance to reduce vegetation and increase access by biological controls (*e.g.*, mosquito fish) to larvae breeding sites; and (4) introduce chemical (*e.g.*, larvicide) controls. The District only uses three (3) types of pesticides for mosquito control. They are: (1) Bacillus products; (2) Methoprene products; and (3) and a biodegradable, alcohol ethoxylated (AE) surfactant made from renewable plant oils. Bacillus and methoprene products are used for larvae control in all setting in keeping with the products labels. Periodically, bacillus and methoprene products may be rotated to prevent the development of mosquito resistance to a single larvicide. The biodegradable, alcohol ethoxylated (AE) surfactant is used only for pupae control. Specific BMPs for each pesticide in specific environmental settings are further described below in subsection (f).

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

Please see Item 2 for a general description of general BMPs used by the District. A list of the District's BMPs is provided below for each type of environmental setting.

STORM WATER SYSTEMS
Mosquito Reduction BMPs for Storm Water Systems
Above Ground Structures

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

SW-2. Whenever possible, maintain stormwater 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).

SW-3. Eliminate floating vegetation conducive to mosquito production (e.g., water hyacinth *Eichhornia* spp., duckweed *Lemna* and *Spirodela* spp., and filamentous algal mats) (Metzger, 2004).

SW-4. 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).

SW-5. Make shorelines 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).

SW-6. Design and obtain necessary approvals for all storm water ponds and wetlands to allow for complete draining when needed (Metzger, 2004).

SW-7. The effective swath width of most backpack or truck–mounted larvicide sprayers is approximately 20 feet (6 m) on a windless day. Because of these equipment limitations, all–weather road access (with provisions for turning a full-size work vehicle) should be provided along at least one side of large above–ground structures that are less than 25 feet (7.5 m) wide (Metzger, 2004).

SW-8. 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 storm water treatment device that might obstruct the path of larvicides to the water (Metzger, 2004).

SW-9. Vegetation should be controlled (by removal, thinning, or mowing) periodically to prevent barriers to access (Metzger, 2004).

SW-10. Design structures so they do not hold standing water for more than 72 hours. Special attention to groundwater depth is essential (Metzger, 2004).

SW-11. Use the hydraulic grade line of the site to select a treatment BMP that allows water to flow by gravity through the structure. Pumps are not recommended because they are subject to failure and often require sumps that hold water (Metzger, 2004).

SW-12. Avoid the use of loose riprap or concrete depressions that may hold standing water (Metzger, 2004).

SW-13. Avoid barriers, diversions, or flow spreaders that may retain standing water (Metzger, 2004).

SW-14. Use concrete or liners in shallow areas to discourage unwanted plant growth where vegetation is not necessary (Metzger, 2004).

SW-15. Where feasible, compartmentalize managed treatment wetlands so that the maximum width of ponds does not exceed two times the effective distance

(40 feet [12 m]) of land based application technologies for mosquito control agents (Walton, 2003).

SW-16. Incorporate features that prevent or reduce the possibility of clogged discharge orifices (e.g., debris screens). The use of weep holes is not recommended due to rapid clogging (Metzger, 2004).

SW-17. Design distribution piping and containment basins with adequate slopes to drain fully and prevent standing water. The design slope should take into consideration buildup of sediment between maintenance periods. Compaction during grading may also be needed to avoid slumping and settling (Metzger, 2004).

SW-18. 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-19. Basins designed to be dry but remain wet should be corrected by retrofit, replacement, repair, or more frequent maintenance.

SW-20. Coordinate cleaning of catch basins, drop inlets, or storm drains with mosquito treatment operations.

SW-21. 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-22. Completely seal structures that retain water permanently or longer than 72 hours to prevent entry of adult mosquitoes (Metzger, 2004).

SW-23. Storm water 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-24. 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-25. Design structures with the appropriate pumping, piping, valves, or other necessary equipment to allow for easy dewatering of the unit if necessary (Metzger, 2004).

MANANGED WETLANDS
Specific Mosquito Reduction BMPs
Design and Maintenance

MW-1. Maintain all open ditches by periodically 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 impede 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. Perform regular pump efficiency testing and make any necessary repairs to maximize output (Kwasny et. al., 2004).

MW-5. 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-6. 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 overland flooding and levee erosion (Kwasny et. al., 2004).

MW-7. Ensure adequately sized water control structures are in place. Increase size and number of water control structures if necessary to allow for complete draw–down and rapid flooding (Kwasny et. al., 2004; Walton, 2003).

MW-8. Inspect and repair levees at least annually (Kwasny et. al., 2004).

MW-9. Design managed wetland projects to include independent inlets and outlets for each wetland unit (Kwasny et. al., 2004).

MW-10. Construct or enhance swales so they are sloped from inlet to outlet and allow the majority of the wetland to be drawn down (Kwasny et. al., 2004).

MW-11. Install cross–levees to facilitate more rapid irrigation and flood–up. Build “underwater” levees that isolate irrigation water during the spring, but can be overtopped during fall and winter flooding (Kwasny et. al., 2004).

MW-12. Excavate deep channels or basins to maintain permanent water areas (> 2.5feet 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-13. Maintain separate permanent water reservoir that conveys water to seasonal 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-14. Encourage populations of insectivorous birds (e.g swallows) and bats by preserving nesting and roosting areas (Kwasny et. al., 2004).

Vegetation Management

MW-15. 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-16. 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).

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 wetlands keeping the time water enters the pond to complete drawdown between 4 and 10 days (Kwasny et. al., 2004).

MW-20. Extended duration irrigations (generally 14–17 days) may be considered for weed control (e.g. cocklebur). Additional measures to offset the potential for increased mosquito production may be needed.

MW-21. Delay fall flooding to avoid increasing late–season mosquito production (Kwasny et. al., 2004).

MW-22. Implement additional BMPs for 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-23. 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-24. Encourage water circulation by providing a constant flow of water equal to discharge at drain structure (Kwasny et. al., 2004).

MW-25. Flood managed wetland as deep as possible at initial flood–up (18–24"). Shallow water levels can be maintained outside of the mosquito breeding season (Kwasny et. al., 2004).

MW-26. 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-27. Use a flood–drain–flood regime to control floodwater mosquitoes. Flood wetland to hatch larvae in the pond. Drain wetland to borrow or other ditch where larvae can be easily treated, drowned in moving water, or consumed by predators. Immediately re–flood wetland. (Kwasny et. al., 2004). *Note: This water management regime should be used only when it does not conflict with water quality regulations.*

MW-28. Evaluate necessity of irrigation, especially multiple irrigations, based on spring habitat conditions and plant growth. Reduce number and duration of irrigations when feasible (Kwasny et. al., 2004).

MW-29. Where feasible, draw–down managed wetland in late March or early April. Irrigate in late April or early May when weather is cooler and mosquitoes are less of a problem (Kwasny et. al., 2004).

MW-30. Irrigate managed wetland before soil completely dries to prevent soil cracking between spring draw–down and irrigation (Kwasny et. al., 2004).

MW-31. Stock managed wetlands, especially brood ponds or permanent wetlands, with mosquito fish or encourage habitat for naturalized populations. Utilize water sources with mosquito fish to passively transport predators to newly flooded habitats (Kwasny et. al., 2004).

MW-32. 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-33. Where feasible, have an emergency plan that provides for immediate drainage into acceptable areas if a public health emergency occurs (Walton, 2003).

MW-34. Minimize fluctuations in water level to prevent large areas of intermittently flooded substrate or isolated pools from being created, particularly during mosquito season which can start as early as March and extend through October depending on weather (Kwasny et. al., 2004).

Coordination with District

MW-35. Consult with the District on agency–sponsored habitat management plans on private lands (e.g. Presley Program), and on the timing of wetland flooding on public and private lands - urge private landowners to do the same (Kwasny et. al., 2004).

MW-36. 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-37. 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
Specific Mosquito Reduction BMPs
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 without 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 ponds with ornamental fish such as koi or goldfish) with permanent or seasonally permanent water. Allow district technicians to inspect and periodically stock mosquitofish or guppies to biologically control mosquito larvae.

US-5. Landscape irrigation drainage should be managed such that no water stands for more than 72 hrs during mosquito breeding season (generally April–October).

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

US-7. Keep rain gutters clear of leaves and debris. Check for standing water in gutters after rain events during mosquito season.

US-8. 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-9. Repair leaks or damaged drainage system components US-9. to prevent standing water for more than 72 hours during mosquito season.

US-10. 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 hours during mosquito season.

Tire storage

US-11. 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.

US-12. Tires should never be stored in a pile. Tires should be stored on racks or in a stack not more than two rows wide.

US-13. Tires should be stored in a manner that allows inspections of each individual tire.

US-14. Waste tires should be picked up by the proper disposal entity on a regular basis.

US-15. 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.

Cemetery Flower Vases

US-16. Use a water–absorbing polymer material (super–absorbent polyacrylamide) which turns standing water into a gel. This eliminates the chance of mosquito development yet allows cut flowers to remain fresh.

US-17. Seek alternatives to in–ground or mounted flower vases which can hold water for 72–96 hours.

US-18. Dump out all vases weekly during the spring, summer, and fall.

SEWAGE TREATMENT FACILITIES

Mosquito Reduction BMPs for Sewage Treatment Plants

Above Ground Structures

SP-1. Routine inspections should be conducted on all equipment, gutters, containers, etc. for standing water and eliminated.

SP-2. Drains, gutters, grates, etc. should be maintained regularly and clear of all debris.

SP-3. Mosquito personnel should be notified immediately of any situation where standing water is created due to leaky pipes, faulty structures, or maintenance activities.

SP-4. In structures such as Hyperion's ornamental pond, mosquitofish should be used. In other permanent water sources, Altosid XR briquettes should be used for long-lasting control. In other temporary situations, Bti may be used as a cost effective alternative.

SP-5. For permanent sources, such as old digesters, treatment using Vectobac granules and/or Agnique via a mist blower pump is recommended.

SP-6. All aboveground access points and vents should be screened when possible to prevent entry to mosquitoes. These screens must be inspected on a routine basis for proper integrity.

SP-7. Whenever possible, aboveground standing water should be drained or pumped out as quickly as possible using vacuum vehicles or submersible pumps.

Underground Structures (Sumps, Vaults, Drop Inlets, Catch Basins)

SP-8. All underground vaults, sumps, pipes, etc. should be sealed as much as possible. All vents and other access points should be screened to prevent entry to mosquitoes. These screens should be for integrity on a routine basis.

SP-9. All offline units should be completely drained (i.e. absolutely no water contained); however, when draining completely is impossible the remaining water should be pumped out using vacuum vehicles or submersible pumps.

SP-10. For most permanent shallow water locations, Altosid XR briquettes should be used; while, for deeper water applications Bti may be more effective.

SP-11. For large underground vaults where access to the entire vault is extremely limited, a mist blower using Agnique MMF may be the most effective method of control to reach hard to reach locations.

SP-12. Any previously working systems that are brought offline for repair or maintenance should be notified to the appropriate mosquito control personnel immediately.

10. Identification of the Problem. Prior to first pesticide application covered under this General Permit that will result in a discharge of 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;

The District staff only applies pesticides to sources of mosquitoes that represent imminent threats to public health or quality of life. 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 Item 2 above. There are over 50 different species of mosquito in California. Fortunately, only a handful of the species are of significant concern in Los Angeles County. It is important to realize that each species of mosquito has different habitat requirements and behaviors that affect its ability to transmit disease, bite humans, and be controlled by a specific BMP. The District categorizes mosquitoes into the following three categories: (1) standing-water mosquitoes, (2) floodwater mosquitoes and (3) container mosquitoes. Since each species of mosquito has slightly different habitat

requirements, it is important to understand which mosquitoes favor which habitats to realize 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, unmaintained swimming pools, puddles, wetlands 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 as in a seasonal wetland or irrigated pasture, the eggs hatch.
   Common Mosquito Reduction BMPs:
   a. Flood when air temperatures do not encourage rapid mosquito development (e.g. late fall rather than summer).
   b. Reduce or eliminate emergent vegetation by disking or mowing.
   c. Flood quickly to encourage all eggs to hatch at once and minimize the need for multiple larvicide applications.
   d. 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:
   a. Drain containers of standing water.
   b. Cover, overturn, or create drainage holes that prevent standing water in the container.
   c. Identify and prevent sprinklers or other water from refilling containers.
   d. 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 virus and St. Louis encephalitis virus. The Encephalitis Mosquito can be found throughout Los Angeles County. Immature mosquitoes develop in wetlands, duck clubs, oil fields and

many urban backyard sources. The adult mosquito prefers to feed on birds and mammals. It is most active during summer and fall.

Southern House Mosquito (*Culex quinquefasciatus*)
The Southern House Mosquito has been known to transmit West Nile virus and St. Louis encephalitis virus. It is common throughout Los Angeles County. Immature mosquitoes often develop in foul water sources such as storm drains, unmaintained swimming pools, cemetery vases, septic tanks, catch basins, waste treatment ponds, and even household containers. As adults, this specie does not normally move far from their breeding source unless overcrowded or there is a lack of available blood sources in or near the area. It prefers to feed on birds but will readily feed on humans. This mosquito is most active during the summer and fall, although it may be found at all times of the year.

Asian Tiger Mosquito (*Aedes albopictus*)
This species of mosquito has not established in California yet, but is an aggressive exotic species that has invaded the eastern and southern US. Over the past 10 years there have been several cases where this mosquito was found in cargo containers in port areas in Los Angeles and San Francisco. This container breeding species is a potential vector for various vector–borne diseases such as Rift Valley Fever, Chikungunya Virus, Dengue Fever, and Yellow Fever. Should *Aedes albopictus* become established in California, the need for effective mosquito control practices will be even more important to protect public health.

Tule Mosquito (*Culex erythrothorax*)
Culex erythrothorax adults are medium-sized mosquitoes which can transmit West Nile virus. Larvae have been collected year-round in ponds, lakes, marshes, and streams where there is shallow water that supports extensive tule or cattail growth. Females usually remain close to the wetland habitat and utilize a broad range of blood sources, including birds and humans. These mosquitoes can be voracious daytime biters of humans and other animals near their wetland habitat.

Cool Weather Mosquito (*Culiseta incidens*)
Culiseta incidens is generally associated with cool weather, although in west Los Angeles County it can be found year-round. Immature stages are found in clean water with some degree of shading, they can also be found in watering troughs, backyard ponds and unmaintained swimming pools. Although collections have been found containing the presence of West Nile virus, it is not believed that *Cs. incidens* plays much of a role, if any, in transmission of the disease. *Culiseta incidens* is believed however to be a vector of dog heartworm in southern California.

Floodwater Mosquitoes
California Salt Marsh Mosquito (*Aedes squamiger*)
Although *Aedes squamiger* has been found with West Nile virus it is not considered an efficient vector of the disease; however, they are an extreme public nuisance through their voracious biting behavior. The eggs are laid on mud and vegetation in the spring and hatch the following fall when the marsh is flooded due to rains. Adults than emerge

the following spring. This mosquito develops in wetlands, duck clubs and irrigated pastures. It prefers to feed on mammals.

Black Salt Marsh Mosquito (*Aedes taeniorhynchus*)
This mosquito is a secondary vector for dog heartworm and is a severe outdoor pest. It is common in high tide pools, primarily those supporting growth of pickleweed (*Salicornia ambigua*). They feed primarily on mammals. Although several arboviruses have been isolated from *Ae. taeniorhynchus*, including eastern equine encephalitis (EEE), Venezuelan equine encephalitis (VEE), and West Nile virus (WNV), there is no evidence that this species transmits human disease in California.

Container mosquitoes
Western Treehole Mosquito (*Aedes sierrensis*)
This mosquito can transmit the dog heartworm parasite (*Dirofilaria immitis*), and is a severe outdoor pest. The western treehole mosquito is common in oak woodlands. Immature stages develop in tree rot holes. Female adults feed primarily on mammals, and are most active during late winter through early spring.

Southern California Malaria Mosquito (*Anopheles hermsi*)
Anopheles hermsi can transmit the malaria parasite to humans and has been implicated in several malaria outbreaks in San Diego County. Immature stages have been collected in a variety of habitats including matted cattail stands, matted root systems of willow trees, river margins and the edges of canyon streams or pools matted with algae. While malaria does not normally occur in California anymore, this mosquito allows the potential for local outbreaks of malaria if a person gets infected elsewhere, and then is bitten by a local *Anopheles* mosquito.

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 (4 days) can produce mosquitoes. Source reduction is the District's preferred solution, and whenever possible the District works with property owners to implement long-term solutions to reduce or eliminate the need for continued applications as described in Item 2 above.

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

This is included in the Best Management Practices for Mosquito Control in California and the California Mosquito-borne Virus Surveillance and Response Plan that the Districts uses, as well as the specifics provided under Item 2 above. The District continually collects adult and larval mosquito surveillance data, dead bird reports, and sentinel chicken test results and uses them to guide mosquito control activities. For example, in 2010, operations staff collected and identified to species 27,309 adult mosquitoes, 399 mosquito pools were submitted for virus testing, along with 1,983

chicken blood samples. Abundance as well as virus occurrence data is utilized to direct additional treatment efforts.

11. Examine the Possibility of Alternatives to Treatments. Dischargers should continue to examine the possibility of alternatives to reduce the need for applying larvicides 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 amount of pesticide necessary to effectively control the target pest.

The District uses the principles and practices of an integrated pest management (IPM) approach, as described on pages 26 and 27 of the Best Management Practices for Mosquito Control in California and discussed in item 2 above. 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) Eliminating artificial sources of standing water; (2) Ensuring temporary sources of surface water drain within four days (96 hours) to prevent adult mosquitoes from developing; (3) Controlling plant growth in ponds, ditches, and shallow wetlands; (4) Designing facilities and water conveyance and/or holding structures to minimize the potential for producing mosquitoes; and (5) Using appropriate biological control methods that are available. Additional alternatives to using pesticides for managing mosquitoes are listed on pages 4-19 of the Best Management Practices for Mosquito Control in California.

Implementing preferred alternatives depends on a variety of factors including availability of District 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.

b. Applying pesticides only when vectors are present at a level that will constitute a nuisance or threat to public health.

The District follows an existing integrated pest management ("IPM") approach, which includes practices in Item 2 above.

A “nuisance” is specifically defined in California Health and Safety Code §2002(j), and includes property that has been artificially altered from its natural conditions so that it now supports the development, attraction or harborage of vectors; any water that a breeding place for vectors; and any activity that supports the development, attraction or harborage of vectors. This definition authorizes the District to address situations where even a low number of vectors may pose a substantial threat to public health and quality of life. In practice, the definition of a “nuisance” is generally only part of a decision to apply pesticides to areas covered under this permit. As summarized in the California Mosquito-borne Virus Surveillance and Response Plan, the overall risk to the public when vectors and/or vector-borne disease are present is used to select an available and appropriate material, rate, and application method to address that risk in the context of our IPM program.

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 right spraying techniques and equipment, taking account of weather conditions and the need to protect the environment.

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

13. Public Notices. If applicable, specify a website where public notices, required in Section VIII.B, may be found.

www.lawestvector.org

REFERENCES:

Best Management Practices for Mosquito Control in California. 2011. Available from the California Department of Public Health—Vector-Borne Disease Section, (916) 552-9730 or by download from http://www.westnile.ca.gov/resources.php under the heading Mosquito Control and Repellent Information, or the Los Angeles County West Vector & Vector-Borne Disease Control District at (310) 915-7370.

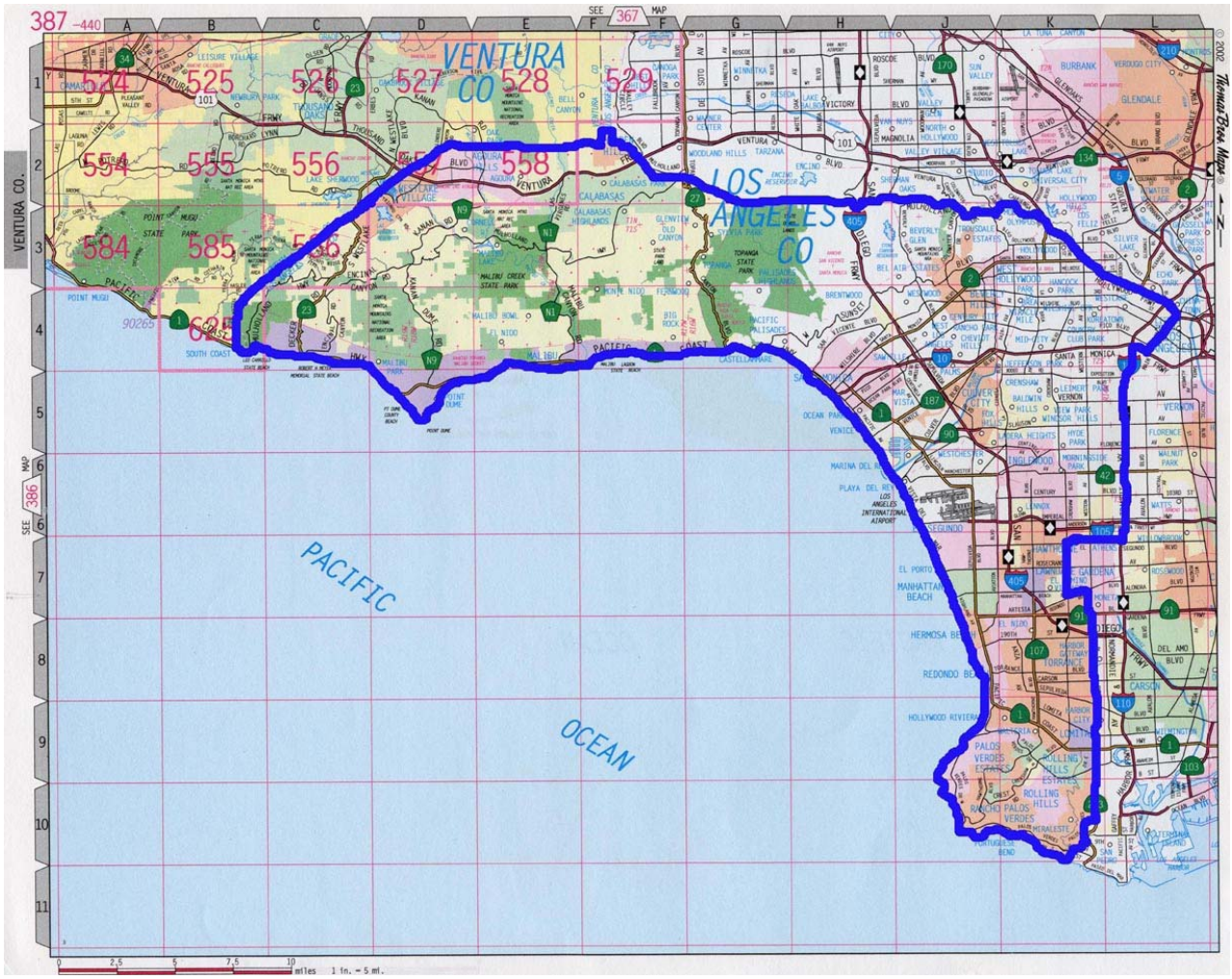
California Department of Public Health. 1989. The California Vector Control Technician Certification and Continuing Education Guidelines (2007 Revision). Accessed 10/25/2011 at http://www.cdph.ca.gov/certlic/occupations/Documents/VCTCEGuide.pdf.

California Mosquito-borne Virus Surveillance and Response Plan. 2010. [Note: this document is updated annually by CDPH]. Available from the California Department of Public Health—Vector-Borne Disease Section, (916) 552-9730 or by download from http://www.westnile.ca.gov/resources.php under the heading Mosquito Control and Repellent Information, or the Los Angeles County West Vector & Vector-Borne Disease Control District at (310) 915-7370.

Los Angeles County West Vector Control District's Best Management Practices for Mosquito Control. 2010. Available from the Los Angeles County West Vector & Vector-Borne Disease Control District at (310) 915-7370.

MVCAC NPDES Coalition Monitoring Plan. *Forthcoming*. Information will be available from MVCAC Consultant hired to develop Monitoring Plan and conduct monitoring.

APPENDIX A: MAP OF DISTRICT'S SERVICE AREAS AND ZIP CODES



DISTRICT SERVICE AREAS

Agoura Hills	**91301**
Beverly Hills	**90210, 90211, 90212, 90213**
Calabasas	**91302**
Culver City	**90230, 90231, 90232**
EI Segundo	**90245**
Hawthorne	**90250**
Hermosa Bch	**90254**
Hidden Hills	**91302**
Inglewood	**90301, 90302, 90303, 90304, 90305**
Lawndale	**90260, 90261**
Lomita	**90717**
Malibu	**90263, 90264, 90265**
Manhattan Bch	**90266**
Palos Verdes Estates	**90274**
Rancho Palos Verdes	**90275**
Redondo Beach	**90277, 90278**
Rolling Hills	**90274**
Rolling Hills Estates.	**90278**
Santa Monica	**90401, 90402, 90403, 90404, 90405**
Torrance	**90501, 90503, 90504, 90505, 90506**
West Hollywood	**90048, 90069**
Westlake Village	**91361, 91362**

Los Angeles City (portions of)*	*zip codes: **90004, 90005, 90006, 90007, 90008, 90010, 90012, 90015,** **90016, 90017, 90018, 90019, 90020, 90024, 90025, 90026, 90028,** **90029, 90034, 90035, 90036, 90037, 90038 ,90045, 90046, 90047,** **90048, 90049, 90057, 90062, 90064, 90066, 90067, 90068, 90069,** **90073, 90077, 90089, 90094, 90272, 90291, 90293, 91364**

Los Angeles County (portions of)**	**zip codes: **90043, 90044, 90056, 90292, 90290,** **90502** is classified outside of the District

APPENDIX B: NOTICE TO POTENTIALLY INTERESTED AGENCIES

The Honorable Gloria Molina
The Honorable Mark Ridley-Thomas
The Honorable Zev Yaroslavsky
The Honorable Don Knabe
The Honorable Michael Antonovich
California Department of Fish & Game, Region 5
Caltrans District # 7
Coastal Commission
Department of Pesticide Regulations
Regional Water Control Board Region 4
Baldwin Hills Conservancy
Coastal Conservancy
LA County Agricultural Commissioner
LA City Department of Public Works
LA City Department of Recreation & Parks
LA County Registrar-Recorder/ County Clerk
LA County Department of Water & Power
LA County Public Health Department
LA County Department of Public Works
City of Agoura Hills
City of Beverly Hills
City of Calabasas
City of Culver City
City of El Segundo
City of Hawthorne
City of Hermosa Beach
City of Hidden Hills
City of Inglewood
City of Lawndale
City of Lomita
City of Los Angeles
City of Malibu
City of Manhattan Beach
City of Palos Verdes Estates
City of Rancho Palos Verdes
City of Redondo Beach
City of Rolling Hills
City of Rolling Hills Estates
City of Santa Monica
City of Torrance
City of West Hollywood
City of Westlake Village

Date: March 7. 2011

Subject: Notice of Intent to continue to apply aquatic larvicides 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-*****-DWQ) [General Permit No. CAG*****] adopted on March 1, 2011, by the State Water Resources Control Board, notice is hereby given that the Los Angeles County West Vector Control District intends to continue to perform larvicide applications as part of its Integrated Vector Management Program.

The District's activities are conducted year-round within a 680 square mile area contained within Los Angeles County. The areas that will be actually or potentially impacted by District activities include the following: Agoura Hills, Beverly Hills, Calabasas, Culver City, El Segundo, Hawthorne, Hermosa Beach, Hidden Hills, Inglewood, Lawndale, Lomita, the westerly portion of Los Angeles City, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Torrance, West Hollywood, Westlake Village, and unincorporated territory of the County of Los Angeles. Treated areas may be under the jurisdiction of Los Angeles County Public Works Flood Control and Watershed Management Divisions, CalTrans, the Army Corp of Engineers and the State Department of Parks and Recreation.

Applications are made in an effort to protect the public's health from vector-borne diseases, are based on key vector and arbovirus surveillance indicators and in strict compliance with pesticide label requirements.

The following materials may be used:

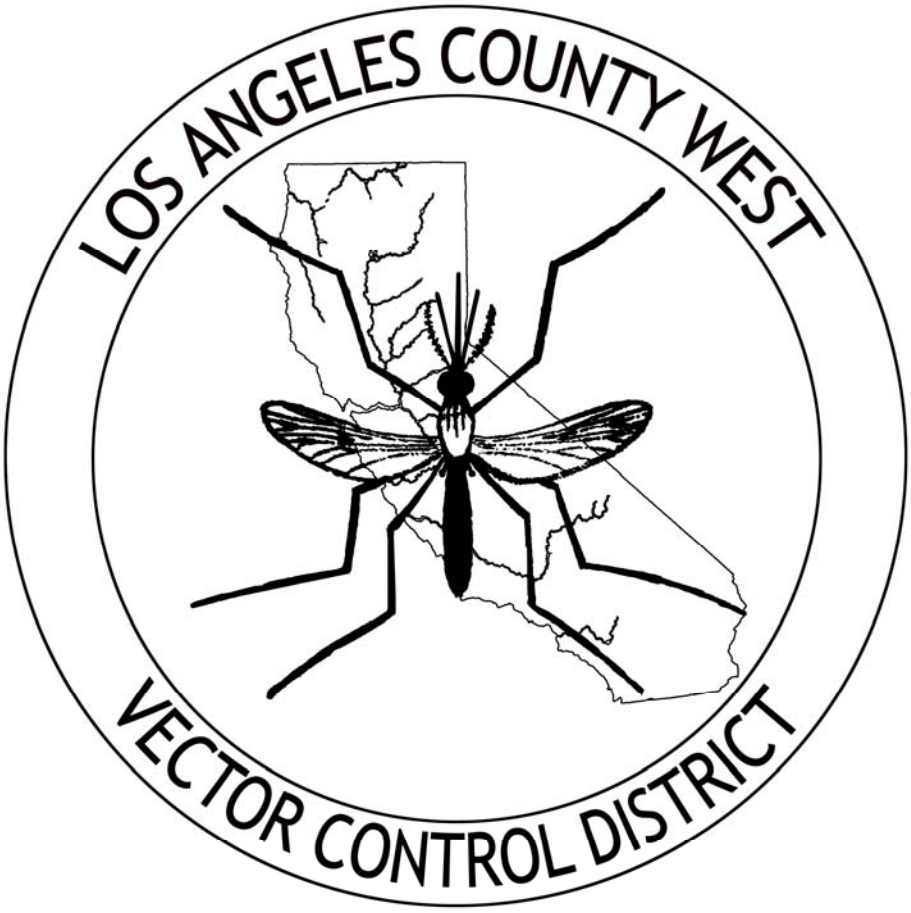
Trade Name	**Active Ingredient**
Agniue MMF	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alklyl)-ω-hydroxy
Agnique MMF-G	Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alklyl)-ω-hydroxy
Altosid Liquid Larvicide (A.L.L.)	(S)-Methoprene
Altosid Pellets	(S)-Methoprene
Altosid Briquets	(S)-Methoprene
Altosid Briquets XR	(S)-Methoprene
Altosid XR-G	(S)-Methoprene
Bactimos Briquets	*Bacillus thuringiensis* var. *israelensis*
Vectobac AS	*Bacillus thuringiensis* var. *israelensis*
Vectobac Granules	*Bacillus thuringiensis* var. *israelensis*
Vectolex CG	*Bacillus sphaericus*

If you have any questions regarding this Notice of Intent, please contact Robert Saviskas at the any of the numbers below.

Respectfully,

Robert Saviskas M.S., R.E.H.S.
Executive Director
Los Angeles County West Vector
& Vector-Borne Disease Control District
6750 Centinela Avenue Culver City, CA 90230
Ph.: (310) 915-7370 ext. 223
Fax: (310) 915-9148
Email: rsaviskas@lawestvector.org

APPENDIX C: DISTRICT'S MOSQUITO REDUCTION BEST MANAGEMENT PRACTICES



Mosquito Reduction Best Management Practices

Mosquito Reduction Best Management Practices

Implementation Policies

The Los Angeles County West 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 pesticides used in mosquito control operations, helping to protect public health, and contributing to the District's integrated pest management (IPM) approach to mosquito and vector control. Integrated Pest Management is an approach that focuses on site–specific, scientifically sound decisions to manage pest populations by matching a wide variety of techniques with the conditions found on site. These techniques are commonly grouped into four categories:

5. Source Reduction or Physical Control—environmental manipulation that results in a reduction of mosquito development sites
6. Biological Control—use of biological agents to limit larval mosquito populations
7. Chemical Control—larvicides (materials that kill immature larval mosquitoes) and adulticides (materials that kill adult mosquitoes)
8. Cultural Control—change the behavior of people so that their actions prevent the development of mosquitoes or the transmission of vector–borne disease. 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 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: reducing or eliminating breeding areas, increasing the efficacy of biological controls, increasing the efficacy of chemical controls, and improving access for control operations.

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 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, oil fields, storm water structures, sewage treatment facilities, residential properties, and cemeteries. Many of these sources produce significant mosquitoes due to management practices that promote favorable habitat for mosquitoes. While it is generally accepted that mosquito production 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 policies and procedures. 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.

Significant Mosquito Sources

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

- Mosquito production from the source is more than similar land uses, 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 production.

If left untreated, a Significant Mosquito Source 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 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 production include but are not limited to: poor water management, lack of emergent vegetation control, lack of effective refugia to maintain biological control populations, poor condition of water conveyance or drainage structures, practices that impede access to the source, and lack of notification of practices that would affect mosquito control operations.

Other factors such as treatment costs, proximity to population centers, vector-borne disease status, mosquito species produced, and the efficacy of available treatment options will be considered when evaluating a Significant Mosquito Source 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 Implementation Plan

Once the District has identified a Significant Mosquito source, it will present a draft BMP Implementation Plan 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 draft BMP Implementation Plan will contain at least the following:

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

The responsible party will have the opportunity to review and comment on the draft plan. Reasonable adjustments may be negotiated between the responsible party and the District to achieve a mutually agreeable plan. A reasonable time limit will be set at the beginning of the negotiation phase at which time the District will finalize any unresolved issues at its discretion. This time limit may be extended if all parties agree that there is reasonable cause to do so.

If the responsible party is unwilling to accept the terms of this cooperative process, the District may be forced to pursue an enforcement process including abatement.

Charges for Treatment Costs

The District is authorized by the Health and Safety Code to recover treatment costs for mosquito control operations. Since most treated properties in the District pay for a base level of mosquito control through the payment of property taxes, the District would consider charging for treatment costs that are above and beyond the normal level of treatment required by a similar mosquito source with similar land use. Since one of the primary goals of the BMP Policies is to reduce pesticide use in Los Angeles County, the District would only consider accepting charges for additional treatment in lieu of BMPs on a case–by–case basis for a limited period of time. As new BMPs are developed and efficacy of existing BMPs is researched further, the expectation would be that the charge for treatment portions of the BMP Implementation Plans would be replaced by non–pesticide based long–term mosquito management plans.

Appeal Process

The responsible party may submit comments in writing to the District Board of Trustees before the implementation deadline indicated on the Draft BMP Implementation Plan presented to the responsible party in Step #2 on Figure 1. After review, the Board will issue a determination which may include no change in the content of the Draft BMP Implementation Plan, an extension of the implementation deadline, a waiver of fees, or other appropriate action.

If the responsible party is a state agency, appeals may be made to the State Department of Health Services pursuant to the California Health and Safety Code.

BMP Implementation Process for Significant Mosquito Sources

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.

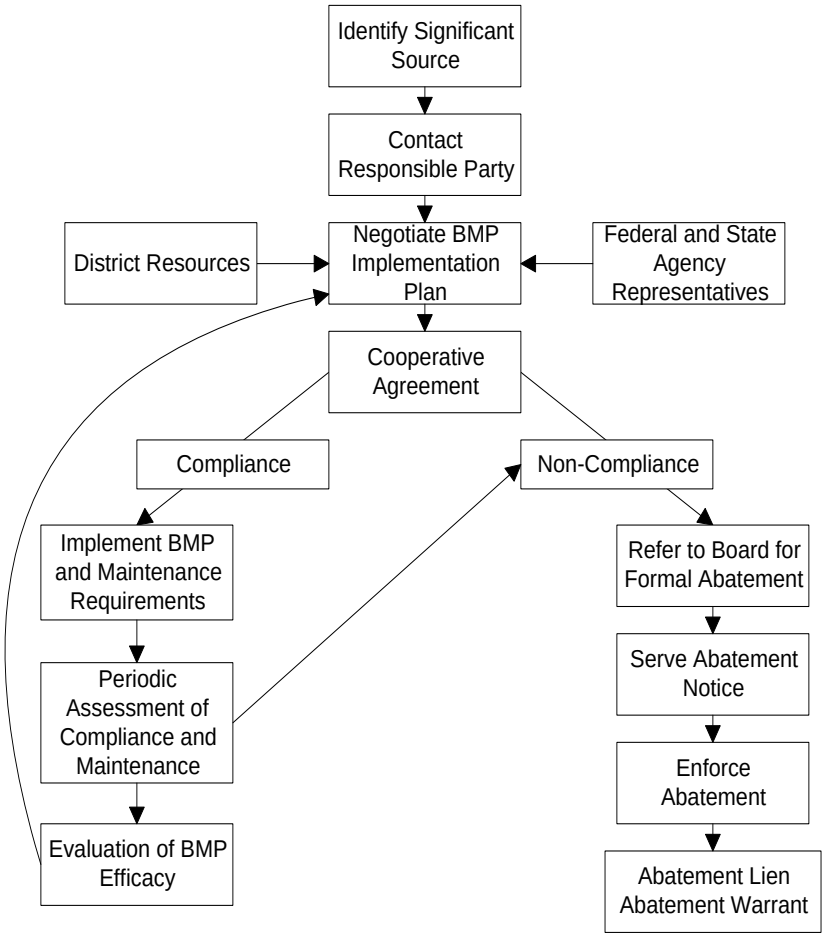
13. **Identify a Significant Mosquito Source**—The District will identify Significant Mosquito Sources based on the previously defined criteria.
14. **Contact Responsible Party**—The District will contact the responsible party (as defined in HSC §2060) of properties in Los Angeles County that have been identified as significant mosquito sources, that if untreated, would become a public nuisance (under HSC §2060). The Department 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 draft BMP Implementation Plan will be provided to the responsible parties. This plan will include an explanation of why the site was determined to be a significant mosquito source, including mosquito surveillance data, if requested.
15. **Negotiate BMP Implementation Plan**—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.
16. **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 said work, if any, to be paid by the responsible party; and requirements for maintenance to be performed by the responsible party. This agreement shall be subject to the same requirements as any other agreement covered by these policies.
17. **Coordinate with other regulatory agencies**—Other local, state, federal, and conservation agencies will be brought into the negotiation process to avoid or address any potential regulatory conflicts with the draft BMP Implementation Plan.

18. **Cooperative Agreement**—The cooperative agreement will formalize the relationship between the District and the responsible party holding both to the terms agreed upon in the BMP Implementation Plan. This document will also outline the consequences of non–compliance with the BMP Implementation Plan under the California Health and Safety Code.
19. **Implementation and Monitoring**—After successful implementation of the requirements, regular inspections of the property will be conducted to assess the responsible party's continued maintenance and compliance with the BMPs. The District reserves the right to renegotiate the BMP Implementation Plan 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.
20. **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 Implementation Plan 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 cooperative agreement.
21. **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 cooperative agreement, the case may be brought to the District Board of Trustees to begin the Formal Abatement process as defined in HSC §2061.
22. **Serve Abatement Notice**—Under guidance from the District Board of Trustees, the responsible party will be served an abatement notice directing them to comply with the cooperative agreement within the specified timeframe. Civil penalties of up to $1000 per day will be imposed for non–compliance pursuant to §2061 and §2063 of the California Health and Safety Code.
23. **Enforce Abatement**—Under the direction of the District Board of Trustees, civil penalties and treatment costs not paid within 60 days will be collected "at the same time and in the same manner as ordinary county taxes….and shall be subject

to the same procedure and sale in case of delinquency as are provided for ordinary county taxes." HSC §2065(b).

24. **Additional Abatement Actions**—Under the direction of the District Board of Trustees, and/or Executive Director, other measures such as an abatement warrant or abatement lien may be imposed pursuant to the California Health and Safety Code.

Figure 1: BMP Program Flowchart



Mosquito Biology

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

Mosquito Life Cycle

All mosquitoes share a similar life cycle with an aquatic stage (larvae) and an aerial stage (adult). Nearly all mosquito reduction best management practices (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 realize 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:

4. **Standing–water mosquitoes** prefer still water commonly found in ponds, unmaintained swimming pools, puddles, wetlands 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.

5. **Floodwater mosquitoes** commonly lay their eggs in moist soil. When they become submerged as in a seasonal wetland or irrigated pasture, the eggs hatch.

   Common Mosquito Reduction BMPs:

   a. Flood when air temperatures do not encourage rapid mosquito development (e.g. late fall rather than summer).
   b. Reduce or eliminate emergent vegetation by disking or mowing.
   c. Flood quickly to encourage all eggs to hatch at once and minimize the need for multiple larvicide applications.
   d. Contact the District to coordinate mosquito prevention with other mosquito control operations such as chemical and biological control.

6. **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:

   a. Drain containers of standing water.
   b. Cover, overturn, or create drainage holes that prevent standing water in the container.
   c. Identify and prevent sprinklers or other water from refilling containers.
   d. 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 virus and St. Louis encephalitis virus. The Encephalitis Mosquito can be found throughout Los Angeles County. Immature mosquitoes develop in wetlands, duck clubs, oil fields and many urban backyard sources. The adult mosquito prefers to feed on birds and mammals. It is most active during summer and fall.

Southern House Mosquito (*Culex quinquefasciatus*)

The Southern House Mosquito has been known to transmit West Nile virus and St. Louis encephalitis virus. It is common throughout Los Angeles County. Immature mosquitoes often develop in foul water sources such as storm drains, unmaintained swimming pools, cemetery vases, septic tanks, catch basins, waste treatment ponds, and even household containers. As adults, this specie does not normally move far from their breeding source unless overcrowded or there is a lack of available blood sources in or near the area. It prefers to feed on birds but will readily feed on humans. This mosquito is most active during the summer and fall, although it may be found at all times of the year.

Southern California Malaria Mosquito (*Anopheles hermsi*)

Anopheles hermsi can transmit the malaria parasite to humans and has been implicated in several malaria outbreaks in San Diego County. Immature stages have been collected in a variety of habitats including matted cattail stands, matted root systems of willow trees, river margins and the edges of canyon streams or pools matted with algae. While malaria does not normally occur in California anymore, this mosquito allows the potential for local outbreaks of malaria if a person gets infected elsewhere, and then is bitten by a local *Anopheles* mosquito.

Tule Mosquito (*Culex erythrothorax*)

Culex erythrothorax adults are medium-sized mosquitoes which can transmit West Nile virus. Larvae have been collected year-round in ponds, lakes, marshes, and streams where there is shallow water that supports extensive tule or cattail growth. Females usually remain close to the wetland habitat and utilize a broad range of blood sources,

including birds and humans. These mosquitoes can be voracious daytime biters of humans and other animals near their wetland habitat.

Cool Weather Mosquito (*Culiseta incidens*)

Culiseta incidens is generally associated with cool weather, although in west Los Angeles County it can be found year-round. Immature stages are found in clean water with some degree of shading, they can also be found in watering troughs, backyard ponds and unmaintained swimming pools. Although collections have been found containing the presence of West Nile virus, it is not believed that *Cs. incidens* plays much of a role, if any, in transmission of the disease. *Culiseta incidens* is believed however to be a vector of dog heartworm in southern California.

Floodwater Mosquitoes

California Salt Marsh Mosquito (*Aedes squamiger*)

Although *Aedes squamiger* has been found with West Nile virus it is not considered an efficient vector of the disease; however, they are an extreme public nuisance through their voracious biting behavior. The eggs are laid on mud and vegetation in the spring and hatch the following fall when the marsh is flooded due to rains. Adults than emerge the following spring. This mosquito develops in wetlands, duck clubs and irrigated pastures. It prefers to feed on mammals.

Black Salt Marsh Mosquito (*Aedes taeniorhynchus*)

This mosquito is a secondary vector for dog heartworm and is a severe outdoor pest. It is common in high tide pools, primarily those supporting growth of pickleweed (*Salicornia ambigua*). They feed primarily on mammals. Although several arboviruses have been isolated from *Ae. taeniorhynchus,* including eastern equine encephalitis (EEE), Venezuelan equine encephalitis (VEE), and West Nile virus (WNV), there is no evidence that this species transmits human disease in California.

Container mosquitoes

Western Treehole Mosquito (*Aedes sierrensis*)

This mosquito can transmit the dog heartworm parasite (*Dirofilaria immitis*), and is a severe outdoor pest. The western treehole mosquito is common in oak woodlands. Immature stages develop in tree rot holes. Female adults feed primarily on mammals, and are most active during late winter through early spring.

Asian Tiger Mosquito (*Aedes albopictus*)
This species of mosquito has not established in California yet, but is an aggressive exotic species that has invaded the eastern and southern US. Over the past 10 years there have been several cases where this mosquito was found in cargo containers in port areas in Los Angeles and San Francisco. This container breeding species is a potential vector for various vector–borne diseases such as Rift Valley Fever, Chikungunya Virus, Dengue Fever, and Yellow Fever. Should *Aedes albopictus* become established in California, the need for effective mosquito control practices will be even more important to protect public health.

STORM WATER SYSTEMS

Common Mosquito Development Sites

- Detention/retention basins
- Treatment wetlands
- 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, Culex erythrothorax*
- Underground/polluted or nutrient rich water: *Culex quinquefasciatus*

Special Concerns

Storm water facilities are often ideal mosquito development sites and support large populations of vectors of diseases such as West Nile Virus in close proximity to urban and residential areas. It is critical to consider mosquito development in storm water structures at the planning stages of new development and to identify appropriate actions to address mosquito problems in existing facilities. Coordination with the NPDES program will be critical in the success of this endeavor.

General Mosquito Reduction Principles

1. Maintain access for District staff to monitor and treat mosquito breeding sources.
2. Minimize emergent vegetation or surface debris in the water.
3. Contact the District for technical guidance or assistance in implementing mosquito reduction BMPs.

Mosquito Reduction BMPs for Storm Water Systems

Above Ground Structures

SW-26. Build shoreline perimeters as steep and uniform as practicable to discourage dense plant growth (Metzger, 2004).

SW-27. Whenever possible, maintain stormwater 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).

SW-28. Eliminate floating vegetation conducive to mosquito production (e.g., water hyacinth *Eichhornia* spp., duckweed *Lemna* and *Spirodela* spp., and filamentous algal mats) (Metzger, 2004).

SW-29. 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).

SW-30. Make shorelines 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).

SW-31. Design and obtain necessary approvals for all storm water ponds and wetlands to allow for complete draining when needed (Metzger, 2004).

SW-32. The effective swath width of most backpack or truck–mounted larvicide sprayers is approximately 20 feet (6 m) on a windless day. Because of these equipment limitations, all–weather road access (with provisions for turning a full-size work vehicle) should be provided along at least one side of large above–ground structures that are less than 25 feet (7.5 m) wide (Metzger, 2004).

SW-33. 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 storm water treatment device that might obstruct the path of larvicides to the water (Metzger, 2004).

SW-34. Vegetation should be controlled (by removal, thinning, or mowing) periodically to prevent barriers to access (Metzger, 2004).

SW-35. Design structures so they do not hold standing water for more than 72 hours. Special attention to groundwater depth is essential (Metzger, 2004).

SW-36. Use the hydraulic grade line of the site to select a treatment BMP that allows water to flow by gravity through the structure. Pumps are not recommended because they are subject to failure and often require sumps that hold water (Metzger, 2004).

SW-37. Avoid the use of loose riprap or concrete depressions that may hold standing water (Metzger, 2004).

SW-38. Avoid barriers, diversions, or flow spreaders that may retain standing water (Metzger, 2004).

SW-39. Use concrete or liners in shallow areas to discourage unwanted plant growth where vegetation is not necessary (Metzger, 2004).

SW-40. Where feasible, compartmentalize managed treatment wetlands so that the maximum width of ponds does not exceed two times the effective distance (40 feet [12 m]) of land based application technologies for mosquito control agents (Walton, 2003).

SW-41. Incorporate features that prevent or reduce the possibility of clogged discharge orifices (e.g., debris screens). The use of weep holes is not recommended due to rapid clogging (Metzger, 2004).

SW-42. Design distribution piping and containment basins with adequate slopes to drain fully and prevent standing water. The design slope should take into consideration buildup of sediment between maintenance periods. Compaction during grading may also be needed to avoid slumping and settling (Metzger, 2004).

SW-43. 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-44. Basins designed to be dry but remain wet should be corrected by retrofit, replacement, repair, or more frequent maintenance.

SW-45. Coordinate cleaning of catch basins, drop inlets, or storm drains with mosquito treatment operations.

SW-46. 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-47. Completely seal structures that retain water permanently or longer than 72 hours to prevent entry of adult mosquitoes (Metzger, 2004).

SW-48. Storm water 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-49. 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-50. Design structures with the appropriate pumping, piping, valves, or other necessary equipment to allow for easy dewatering of the unit if necessary (Metzger, 2004).

MANANGED WETLANDS

Common Mosquito Development Sites

- Permanent wetlands for habitat or species conservation
- Constructed vernal pools and other wetlands
- Seasonal wetlands
- Duck clubs

Common Mosquito Species

- Permanent wetlands: *Culex tarsalis, Culex erythrothorax, Culex quinquefasciatus*
- Seasonal wetlands: *Aedes* species

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. Maintain access for District staff to monitor and treat mosquito breeding sources.
2. Minimize emergent vegetation and surface debris on the water.
3. Contact the District for technical guidance, assistance in implementing mosquito reduction BMPs, or to coordinate flood–ups with mosquito control operations.

Specific Mosquito Reduction BMPs

Design and Maintenance

MW-38. Maintain all open ditches by periodically regularly removing trash, silt, and vegetation to maintain efficient water delivery and drainage (Kwasny et. al., 2004).

MW-39. 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-40. Inspect, repair, and clean water control structures of debris. Remove silt and vegetation build–up in front of structures that impede 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-41. Perform regular pump efficiency testing and make any necessary repairs to maximize output (Kwasny et. al., 2004).

MW-42. 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-43. 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 overland flooding and levee erosion (Kwasny et. al., 2004).

MW-44. Ensure adequately sized water control structures are in place. Increase size and number of water control structures if necessary to allow for complete draw–down and rapid flooding (Kwasny et. al., 2004; Walton, 2003).

MW-45. Inspect and repair levees at least annually (Kwasny et. al., 2004).

MW-46. Design managed wetland projects to include independent inlets and outlets for each wetland unit (Kwasny et. al., 2004).

MW-47. Construct or enhance swales so they are sloped from inlet to outlet and allow the majority of the wetland to be drawn down (Kwasny et. al., 2004).

MW-48. Install cross–levees to facilitate more rapid irrigation and flood–up. Build "underwater" levees that isolate irrigation water during the spring, but can be overtopped during fall and winter flooding (Kwasny et. al., 2004).

MW-49. Excavate deep channels or basins to maintain permanent water areas (> 2.5feet 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-50. Maintain separate permanent water reservoir that conveys water to seasonal 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-51. Encourage populations of insectivorous birds (e.g swallows) and bats by preserving nesting and roosting areas (Kwasny et. al., 2004).

Vegetation Management

MW-52. 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-53. 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).

Water Management

MW-54. 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-55. 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-56. Rapidly irrigate wetlands keeping the time water enters the pond to complete drawdown between 4 and 10 days (Kwasny et. al., 2004).

MW-57. Extended duration irrigations (generally 14–17 days) may be considered for weed control (e.g. cocklebur). Additional measures to offset the potential for increased mosquito production may be needed.

MW-58. Delay fall flooding to avoid increasing late–season mosquito production (Kwasny et. al., 2004).

MW-59. Implement additional BMPs for 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-60. 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-61. Encourage water circulation by providing a constant flow of water equal to discharge at drain structure (Kwasny et. al., 2004).

MW-62. Flood managed wetland as deep as possible at initial flood–up (18–24”). Shallow water levels can be maintained outside of the mosquito breeding season (Kwasny et. al., 2004).

MW-63. 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-64. Use a flood–drain–flood regime to control floodwater mosquitoes. Flood wetland to hatch larvae in the pond. Drain wetland to borrow or other ditch where larvae can be easily treated, drowned in moving water, or consumed by predators. Immediately re–flood wetland. (Kwasny et. al., 2004). *Note:*

This water management regime should be used only when it does not conflict with water quality regulations.

MW-65. Evaluate necessity of irrigation, especially multiple irrigations, based on spring habitat conditions and plant growth. Reduce number and duration of irrigations when feasible (Kwasny et. al., 2004).

MW-66. Where feasible, draw–down managed wetland in late March or early April. Irrigate in late April or early May when weather is cooler and mosquitoes are less of a problem (Kwasny et. al., 2004).

MW-67. Irrigate managed wetland before soil completely dries to prevent soil cracking between spring draw–down and irrigation (Kwasny et. al., 2004).

MW-68. Stock managed wetlands, especially brood ponds or permanent wetlands, with mosquito fish or encourage habitat for naturalized populations. Utilize water sources with mosquito fish to passively transport predators to newly flooded habitats (Kwasny et. al., 2004).

MW-69. 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-70. Where feasible, have an emergency plan that provides for immediate drainage into acceptable areas if a public health emergency occurs (Walton, 2003).

MW-71. Minimize fluctuations in water level to prevent large areas of intermittently flooded substrate or isolated pools from being created, particularly during mosquito season which can start as early as March and extend through October depending on weather (Kwasny et. al., 2004).

Coordination with District

MW-72. Consult with the District on agency–sponsored habitat management plans on private lands (e.g. Presley Program), and on the timing of wetland flooding on public and private lands - urge private landowners to do the same (Kwasny et. al., 2004).

MW-73. 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-74. 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

Common Mosquito Development Sites

- Unmaintained swimming pools and spas
- Decorative ponds and fountains
- Bird baths
- Water–filled containers
- Planter saucers
- Clogged rain gutters
- Poorly designed or damaged landscape irrigation systems
- Cemetery vases
- Koi ponds
- Stored or waste tires

Common Mosquito Species

- Cleaner water sources: *Culex tarsalis*
- Water with more organic material: *Culex quinquefasciatus, Culiseta incidens*

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 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 Mosquito Reduction Principles

1. Prevent or eliminate unnecessary standing water that remains for more than 72–96 hours during mosquito season which can start as early as March and extend through October depending on weather.
2. Maintain access for District staff to monitor and treat mosquito breeding sources.
3. Contact the LACWVCD for technical guidance or assistance in implementing mosquito reduction BMPs.

Specific Mosquito Reduction BMPs

Residential Areas

US-19. 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-20. 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-21. 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 without 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-22. Notify District of any ponds (including ponds with ornamental fish such as koi or goldfish) with permanent or seasonally permanent water. Allow district technicians to inspect and periodically stock mosquitofish or guppies to biologically control mosquito larvae.

US-23. Landscape irrigation drainage should be managed such that no water stands for more than 72 hrs during mosquito breeding season (generally April–October).

US-24. All underground drain pipes should be laid to grade to avoid low areas that may hold water for longer than 72 hrs.

US-25. Keep rain gutters clear of leaves and debris. Check for standing water in gutters after rain events during mosquito season.

US-26. 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-27. Repair leaks or damaged drainage system components US-9. to prevent standing water for more than 72 hours during mosquito season.

US-28. 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 hours during mosquito season.

Tire storage

US-29. 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.

US-30. Tires should never be stored in a pile. Tires should be stored on racks or in a stack not more than two rows wide.

US-31. Tires should be stored in a manner that allows inspections of each individual tire.

US-32. Waste tires should be picked up by the proper disposal entity on a regular basis.

US-33. 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.

Cemetery Flower Vases

US-34. Use a water–absorbing polymer material (super–absorbent polyacrylamide) which turns standing water into a gel. This eliminates the chance of mosquito development yet allows cut flowers to remain fresh.

US-35. Seek alternatives to in–ground or mounted flower vases which can hold water for 72–96 hours.

US-36. Dump out all vases weekly during the spring, summer, and fall.

SEWAGE TREATMENT FACILITIES

Common Mosquito Development Sites

- Sumps, drain pipes, gutters, containers and equipment
- Catch basins
- Offline underground pipes, reactor tanks, sump pumps and vaults
- Final clarifiers

Common Mosquito Species

- Above ground standing water and container sources: *Culex quinquefasciatus*, *Culex tarsalis*, *Culiseta incidens*
- Offline underground units and systems: *Culex quinquefasciatus*

Special Concerns

Sewage treatment plants can provide a challenge for mosquito personnel due to the size and scope of the facility and the difficulty in accessing and treating the various above and below ground breeding sources. Interagency relations and communications are key to ensure that mosquito control personnel are notified as soon as units are taken offline or

mosquito breeding sources are located. Thorough weekly inspections are necessary because of the size of a plant like Hyperion and the likelihood that systems will be taken offline or problems will develop without the proper people being notified. Negative feedback from the public is often immediate due to the close proximity Hyperion is to surrounding suburban neighborhoods and communities. This close proximity of people with a large producer of *Culex quinquefasciatus* creates the potential for a higher risk of disease transmission, such as West Nile virus.

General Mosquito Reduction Principles

1. All offline units and systems should be completely drained within 72 hrs. When water can't be completely drained, it should be pumped out using vacuum vehicles and/or submersible pumps. If water is refilled into these drained units/systems, vector control personnel should be notified immediately.
2. All access points, regardless of size, should be screened if these access points lead to areas of standing water. These screens should be checked monthly for integrity.
3. Vector control personnel must have full access to conduct weekly inspections of the entire plant, in addition to perform necessary treatments.
4. For news, information and questions, Mihran Sarkisian, Sanitation Wastewater Manager III, is the main contact for the Hyperion Sewage Treatment Plant.
5. Contact the LACWVCD for technical guidance or assistance in implementing mosquito reduction BMPs.

Mosquito Reduction BMPs for Sewage Treatment Plants

Above Ground Structures

SP-13. Routine inspections should be conducted on all equipment, gutters, containers, etc. for standing water and eliminated.

SP-14. Drains, gutters, grates, etc. should be maintained regularly and clear of all debris.

SP-15. Mosquito personnel should be notified immediately of any situation where standing water is created due to leaky pipes, faulty structures, or maintenance activities.

SP-16. In structures such as Hyperion's ornamental pond, mosquitofish should be used. In other permanent water sources, Altosid XR briquettes should be used for long-lasting control. In other temporary situations, Bti may be used as a cost effective alternative.

SP-17. For permanent sources, such as old digesters, treatment using Vectobac granules and/or Agnique via a mist blower pump is recommended.

SP-18. All aboveground access points and vents should be screened when possible to prevent entry to mosquitoes. These screens must be inspected on a routine basis for proper integrity.

SP-19. Whenever possible, aboveground standing water should be drained or pumped out as quickly as possible using vacuum vehicles or submersible pumps.

Underground Structures (Sumps, Vaults, Drop Inlets, Catch Basins)

SP-20. All underground vaults, sumps, pipes, etc. should be sealed as much as possible. All vents and other access points should be screened to prevent entry to mosquitoes. These screens should be for integrity on a routine basis.

SP-21. All offline units should be completely drained (i.e. absolutely no water contained); however, when draining completely is impossible the remaining water should be pumped out using vacuum vehicles or submersible pumps.

SP-22. For most permanent shallow water locations, Altosid XR briquettes should be used; while, for deeper water applications Bti may be more effective.

SP-23. For large underground vaults where access to the entire vault is extremely limited, a mist blower using Agnique MMF may be the most effective method of control to reach hard to reach locations.

SP-24. Any previously working systems that are brought offline for repair or maintenance should be notified to the appropriate mosquito control personnel immediately.

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