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DIVISION OF WATER QUALITY

OROVILLE MOSQUITO ABATEMENT DISTRICT
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National Pollution Discharge Elimination System Pesticide Application Plan

The District has endeavored to respond to NPDES permit requirements in a comprehensive manner while limiting the redundancy inherent in permit sections. Sections requesting specific actions and equipment are reflective of an end-of-pipe point source permit being erroneously adapted to this non-point source situation. Vector control pesticide applications do not occur under static conditions and it is inappropriate for SWRCB to request site specific information that cannot be determined in advance.

Consequently, specific answers about exact treatment options and BMPs cannot be addressed ahead of time. BMPs are discussed in general terms only. Larval development sources and the scope of any adult infestation continually change and regardless of those listed in this document, the District will utilize all appropriate BMPs to minimize pesticide use.

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

1. Description of Target Area

For Map of target area see attachment 1: Map of Oroville Mosquito Abatement District

General written description of District boundaries:

The Oroville MAD encompasses approximately 12 square miles, in Butte County, California. District boundaries are as follows:

Western boundary: 18th Street in Thermalito, CA
Southern boundary: An east/west line equal to Palm Avenue on the south side of Oroville, CA
Eastern boundary: A straight line roughly the equivalent of Oak Avenue in Oroville, CA
Northern boundary: An east/west line approximately 100 yards shout of Garden Drive

No known water of the United States is treated directly by the Oroville Mosquito Abatement District. There is potential for spray drift to reach waters of the United States during adulticied applications within the District. The following waters of the United States are within or on the periphery of the District:

Feather River
Thermalito Fore bay
Ponds within Oroville State Wildlife Area
Ruddy Creek

The District does not access any property owned by a Federal, State, or Local agency that contains a water of the United States. Further the District does not ask for or receive permission to work in any such area.

2. Factors Influencing Pesticide Applications

Larval Control Decision Process

If possible, a site will be eliminated through physical action (i.e. filling a tire rut with sand or draining an unused swimming pool)

If a site cannot be eliminated, biological control through mosquito fish (*Gambusia affinnis*) is the next option considered.

If a mosquito larval development source cannot be addressed through source elimination or mosquito fish, a least toxic option pesticide is considered (i.e. methoprene (Altosid)).
If mosquito pupae are present in a larval development site, that site is treated with Golden Bear oil.

Adult Control Decision Process

Adult mosquito control is a last resort option that is utilized when:

Mosquito trap data indicates a large population of adult mosquito's
Telephone calls to the district indicate a significant level of mosquito annoyance
There is an elevated risk of mosquito-vectored disease transmission

3. Types of Pesticides Used and Application Methods

All pesticides are applied in accordance with label directions.

Zoecon Altosid Pellets EPA Registration #: 2724-448 and 2724-375

Zoecon Altosid XR Extended Residual Briquettes: EPA Registration #: 70589-1

Altosid (methoprene) pellets and briquettes are used to prevent mosquito larvae from maturing and emerging as adults from a known larval development source. Pellets are applied through a power backpack blower / spreader; Briquettes are applied singly by hand.

Mosquito Larcicide GB-1111 EPA Registration #: 8329-72

BVA 2 Mosquito Larvicide Oil EPA Registration #: 70589-1

Surface Oils – These are physical control products applied when late instar mosquito larvae or mosquito pupae are present. A pressurized hand can is used to apply oil as needed.

Adulticides

Allpro Evoluer 4-4. EPA Registration #: 769-982
Active ingredients are permethrin and PBO

Adulticides are applied as an ultra-low volume aerosol spray through truck mounted Phoenix or London Fog brand ULV sprayers. Applications take place during the evening or early morning, beginning at sunset or ending at sunrise, during the time when the sun is below the horizon.

4. Description of Anticipated Application Areas

Any product included in attachments E and F of the General NPDES Vector Control Permit may be applied anywhere within district boundaries,

Larval control

Larval sources within the district include residential (i.e. pools, boats, animal troughs), natural sources (i.e. natural ponds, old stream oxbows), and industrial (i.e. log deck).

Adult control

Adulticides may be applied anywhere within district boundaries.

5. Other Best Management Practices Utilized by the District / Alternatives Considered

Public education is one mosquito control method utilized by the District.
Specific activities include working with local newspaper to print articles about mosquitoes, mosquito-borne diseases, and eliminating back-yard mosquito sources. District personnel also work directly with residents and business owners to eliminate problems like excess irrigation, clogged storm drains, unmaintained pools, and removal of miscellaneous containers that may hold water.

While the Oroville MAD works hard to form cooperative relationships with landowners, under extreme circumstances and with the approval of the mosquito board; legal abatement proceedings may be initiated against a landowner within the district to eliminating an ongoing mosquito source.

Treating a mosquito larval source to prevent adult mosquito emergence or applying an adulticide to reduce an existing population of adult mosquitoes are control options. Detail on these options is provided below, but to summarize there is a stepwise process of decision making that moves from use of lowest environmental impact and least intrusive larval control products applied by hand to spraying adulticides over relatively large areas via ULV application.

6. Anticipated Pesticide Use

This is only an estimate of use based on actual use during 2010, or estimated average use for products not used during 2010, Actual use may be greater or less than the estimate depending on weather, precipitation, and many other factors that cannot be anticipated. Because the use of mosquito control BMPs is a long-standing policy at the district, overall pesticide use is not expected to change. Actual use will vary depending on weather, precipitation, and many other factors that cannot be anticipated.

Altosid pellets: 12 lbs.

Altosid briquettes: 20 lbs.

Golden Bear: 5 gallons

Evoluer 4-4: 111 gallons

At its discretion, the District may apply any pesticide included in attachments E and F of the Vector Control General Permit anywhere within district boundaries.

7. Monitoring Locations

Please see MVCAC coalition monitoring plan.

The District will complete visual monitoring for 10% of pesticide applications that meet the following criteria:

Larvicide applications directly to a Water of the United States (none expected)

Any adulticide application (adulticides are never applied directly to water) where incidental deposition of the product applied or a residual from that application may be reasonably expected to enter a Water of the United States.

Monitoring will be done on the first application meeting criteria stipulated above and every 10th application thereafter.

8. Evaluation of BMPs

For BMPs that may be utilized within the district, please see table below:

(See: Best Management Practices for Mosquito Control in California, (CDPH, 2010))

Larval Habitat type	Page #
Backyard sources	4
Ditches and drains	6
Storm water infrastructure	14
Roadsides and similar	17

Adulticide BMPs:
Use properly functioning appropriately calibrated equipment

Apply after sunset or near dawn when mosquitoes are most active
Apply only under appropriate atmospheric equipment.

9. Description of BMPs to be implemented

A. Spill protection
Keep product in original containers or appropriately labeled pesticide container
Store chemical tanks and containers in secure location or in otherwise locked condition when not in use
Maintain a well-stocked spill containment and clean-up kit in vehicle
Driver will avoid all identifiable road hazards

B. Educate staff on environmental effects of pesticides
Attend continuing education talks and MVCAC workshops on pesticides, pesticide safety, and NPDES

C. Amount used
Products will be applied according to label directions based on surveillance results (presence of larvae or adult population above threshold)

D. BMPs for each application mode
All pesticides will be applied in accordance with label instructions.

Larvicide application devices (power blower or hand can) are calibrated for amount applied (flow) / unit time
Sites are mapped with site area being determined
Personnel are taught to visually assess application rate, as well as to measure products used against area treated

For adult spraying, only properly calibrated, properly functioning equipment will be used. Spray routes will be mapped to insure maximum efficiency while avoiding overlap of application, and routes will be designed to minimize potential deposition into Waters of the United States based on wind, weather, and vehicle access routes.

E. BMPs for each product

Larvicides

Methoprene products will be applied only to waters containing or those with a documented history of flooding and producing mosquito larvae. Sites will be retreated based on expected life of product for permanently wet areas, or when it can be determined that the product is near the end of its effective life (pupae collected from site emerge as adults) for intermittently flooded areas. Typically the area treated will be determined through larval surveillance.

Larval oil products will be applied according to the label only in areas where there is a predominance of late instar mosquito larvae and pupae present.

Adulticides will be applied according to the label when populations of mosquitoes have met or exceeded treatment thresholds, at a time when adults are active and environmental conditions are suitable for an effective application.

F. BMPs for each environment

Universally applicable BMPs will be used as a regular course of action by the District. Additional BMPs that will be used include insuring adequate flow in water conveyance structures, maintaining storm water collection devices so they drain in less than 96 hours or if designed to hold water – inspect sources weekly and treat as needed. For other sites, any and all applicable BMPs may be used. (Please also refer to previous section 8 for additional information)

10. Identification of Problem

A. Thresholds for treatment

Larval:
Presence of larvae is sufficient to warrant control measure
Any intermittently wet site with a documented history of mosquito larvae and is known to be a larval development site may be pre-treated

Adult:
Citizen annoyance complaints – 3 in a neighborhood
New Jersey light trap counts – 10+ females in a trap in 5 days
Landing rate counts – 3-5 landing within 60 seconds

B. Target vector species

Genera: *Annopheles* and *Culiseta*: Winter to early spring mosquitoes
Altosid briquettes are used beginning in February
Adult spraying may be necessary depending on population

Aedes sierrensis: Spring mosquitoes
Adulticiding may be necessary based on nuisance calls

Culex and floodwater *Aedes:* Summer and fall mosquitoes
Physical control, biological control, larviciding, and adult control as needed

C. Identify known larval sources and source elimination

Any container, ditch, swimming pool, boat, wheelbarrow, etc. that holds standing or slowly flowing water for more than 96 hours (4 days) can produce mosquitoes.

Source reduction is the District's preferred method, 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 the Best Management Practices for Mosquito Control in California.

The District maintains an ongoing database of previously identified larval development sources (including maps and written descriptions) that are the framework for an ongoing larval control program. Sites that can be eliminated are noted and occasionally checked to insure the site does not again become a larval development site. Sites that cannot be eliminated through application of BMPs are routinely inspected and treated when larvae are present.

D. New source identification and pattern identification

The Oroville MAD has long been established and personnel routinely examine past inspection and treatment records, and work with local agricultural interests to predict likely larval development source locations; and the timing of adult mosquitoes moving into the District. The District was doing this type analysis long before the introduction of NPDES permitting into the United States and will continue to do so.

The District uses this information to work with landowners to minimize mosquito production, to appropriately time public outreach efforts, and to hire seasonal personnel as needed.

11. Examination of Alternatives

The District has an ongoing program of public information and outreach designed to create general mosquito awareness in residents. Part of the message is where mosquito larvae develop and how to avoid creating larval development sites. The other part of the message is what actions residents can take to reduce adult mosquito populations on their property, what personal protective measures can be taken to reduce annoyance and disease risk, and where to call if there is a significant problem with adult mosquitoes.

Larval Control Decision Process

Sites are surveyed prior to any action to determine if mosquito larvae represent or if it is likely that the site will produce mosquito larvae in the foreseeable future.

If there are not larvae present or any mosquito emergence from the site is unlikely to pose a nuisance or disease risk, the site is documented for future inspection and no action is taken.

If a site can be eliminated District personnel will work with a landowner to eliminate a source. The District (with the approval of the Mosquito Board) may initiate a legal abatement proceeding against any landowner who is resistant to eliminate such a source. Source elimination may be accomplished by removing the source of water, or it may be through physical action (i.e. filling a tire rut with sand, removing vegetation to allow wave action, draining an unused swimming pool, etc.).

If a source cannot be eliminated, the second BMP implemented as an alternative to pesticide use is biological control of mosquito larvae with mosquito fish (*Gambusia affinnis*).

The next BMP alternative is larval control with pesticides, after all alternative actions have been considered. If a mosquito larval development source cannot be addressed through source elimination or mosquito fish, a least toxic option pesticide is considered (i.e. methoprene (Altosid)).

If mosquito pupae are present in a larval development site, control with the least toxic option (Altosid) must be rejected as an option and the site is treated with GB-1111 or BVA 2 oil.

Adult Control Decision Process

When considering adult control – the District always considers the option of not spraying, or spraying only a portion of the district. The District will only spray when conditions indicate it is necessary and will always spray the smallest area that will ensure an efficacious application.

Adult mosquito control is a last resort option that is utilized only in accordance with one or more of the following BMP criterion:

Surveillance (mosquito population)

Mosquito trap data indicates a large population of adult mosquitoes
Telephone calls to the district indicate a significant level of mosquito annoyance

Surveillance (disease risk)

When species captured and/or there is documented presence of mosquito vectored disease activity in the region (See California Mosquito-Borne Virus Surveillance and Response Plan (see Emergency Planning section on page 16) indicate there is an elevated risk of mosquito-vectored disease transmission to humans.

Once the District has determined it is necessary to spray adults, the following BMPs are implemented during planning and execution of the application:

Determine the smallest area that can be sprayed to achieve an efficacious application
Plan application to cover the area as efficiently as possible

Implement the application only when weather conditions are appropriate, and mosquito populations are active

12. Correct Use of Pesticides

The district is uncertain what SWRCB may mean by "correct use of pesticides". The District will always apply the least toxic, effective product listed in attachments to the NPDES permit, that is within budget limitations. Products are always applied in accordance with the label using correctly calibrated equipment, at an appropriate time, and under appropriate environmental conditions only where necessary to reduce existing (documented) populations of larval or adult mosquitoes.

Budget limitations and common sense dictate treating the minimum area that will result in effective mosquito control, and doing those applications during appropriate environmental conditions.

13. Website

The District does not have its own website. However, the District utilizes the local news paper (Oroville Mercury Register) to inform residents prior to each season of the District intent to begin mosquito control operations. The District keeps and maintaines an individual call notification list to inform residents of pending adulticide operations in or around their areas, based on individual request.

Section 2

The Discharger shall update the PAP periodically and submit the revised PAP to the State Water Board for approval if there are any changes to the original PAP

D. Best Management Practices (BMPs)

The District's BMPs are described in the Best Management Practices for Mosquito Control in California, and the California Mosquito-Borne Virus Surveillance and Response Plan. (htttp://www.westnile.ca.gov/resources.php)

1. Identify the Problem

The District collects adult mosquito surveillance data and dead bird reports to guide mosquito control activities.

The district analyzes existing surveillance data and agricultural data to identify new or unidentified sources of vector problems as well as areas that have recurring vector problems.

2. Examine the Possibility of Alternatives to Treatments

The District has an ongoing program of public information and outreach designed to create general mosquito awareness in residents. Part of the message is where mosquito larvae develop and how to avoid creating larval development sites. The other part of the message is what actions residents can take to reduce adult mosquito populations on their property, what personal protective measures can be taken to reduce annoyance and disease risk, and where

If there are not larvae present or any mosquito emergence from the site is unlikely to pose a nuisance or disease risk, the site is documented for future inspection and no action is taken.

If a site can be eliminated District personnel will work with a landowner to eliminate a source. The District (with the approval of the Mosquito Board) may initiate a legal abatement proceeding against any landowner who is resistant to eliminate such a source. Source elimination may be accomplished by removing the source of water, or it may be through physical action (i.e. filling a tire rut with sand, removing vegetation to allow wave action, draining an unused swimming pool, etc.).

If a source cannot be eliminated, the second BMP implemented as an alternative to pesticide use is biological control of mosquito larvae with mosquito fish (*Gambusia affinnis*).

The next BMP alternative is larval control with pesticides, after all alternative actions have been considered. If a mosquito larval development source cannot be addressed through source elimination or mosquito fish, a least toxic option pesticide is considered (i.e. methoprene (Altosid)).

If mosquito pupae are present in a larval development site, control with the least toxic option (Altosid) must be rejected as an option and the site is treated with GB-1111 or BVA 2 oil.

This along with additional practices described Best Management Practices for Mosquito Control in California that are used by this agency describe the District mosquito management plan. Specific sections of the BMP manual are referred to previously.

3. Correct Use of Pesticides

a. Any errors in application or pesticide spills are reported as required to CDPR,. CDPH, and per this permit also to SWRCB.

b. Staff pesticide application and spill training

This is an existing practice of the District, and is required to comply with Department of Pesticide Regulation's (DPR), and the terms of our Cooperative Agreement with the California Department of Public Health. All pesticide applicators receive annual safety and spill training in addition to their regular continuing education and are either certified or work directly under the supervision of a Certified Vector Control Technician.

4. Spill Containment, Training, and Equipment Calibration

a. Measures to prevent a pesticide spill

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

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

Application equipment is calibrated at least once each year and is part of the Cooperative Agreement with CDPH.

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

Applicators are required to complete pesticide training yearly.

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

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

e. Descriptions of specific BMPs for each type of environmental setting

Please see the Best Management Practices for Mosquito Control in California

Section E. Pesticide Application Log

The Discharger shall maintain a log for each pesticide application. The application log shall contain, at a minimum, the following information, when practical, for larvicide or adulticide applications

1. Date of application
2. Location of the application and target areas (e.g. address, crossroads, or map coordinates)
3. Name of applicator
4. Names of the water bodies treated if known / named (i.e. canal, creek, lake, etc.)
5. Application details such as name of pesticide applied, time application begins and ends, application rate, total area treated, equipment used if any, any other components included in application (besides water), dilution rate of pesticide if not diluted by water, total amount of pesticide applied

This is an existing practice of District as required to comply with DPR regulations and our Cooperative Agreement with CDPH.

References:

Best Management Practices for Mosquito Control in California. 2010. 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.

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.

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