SWRCB Received Date: 4/28/2016

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# 4A567800003

II. DISCHARGER INFORMATION

A. Name: VENTURA COUNTY ENVIRONMENTAL HEALTH DIVISION			
B. Mailing Address: 800 S. VICTORIA AVE., MAIL LOCATION #1730			
C. City: VENTURA	D. County: VENTURA	E. State: CA	F. Zip Code: 93009-1730
G. Contact Person: CHARLES GENKEL	H. Email address: charles.genkel@ventura.org	I. Title: MANAGER TECH. SERVICES	J. Phone: 805/648-9248

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: VENTURA COUNTY WATERSHED PROTECTION DISTRICT

☒ 2. Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.
Owner's name: VENTURA COUNTY WATERSHED PROTECTION DISTRICT
Name of the conveyance system: RIVERS, LAKES, STREAMS, CREEKS, ESTUARY

☒ 3. Directly to river, lake, creek, stream, bay, ocean, etc.
Name of water body: RIVERS, LAKES, STREAMS, CREEKS, ESTUARY

* 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

C. Period of Application: Start Date January 1ST, EACH YEAR End Date December 31ST, EACH YEAR

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.

B. Is the applicator familiar with its contents?

☒ Yes ☐ No

INSTRUCTIONS FOR COMPLETING THE NOTICE OF INTENT

WATER QUALITY ORDER 2016-XXXX-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

These instructions are intended to help you, the Discharger, to complete the Notice of Intent (NOI) form for the Statewide General National Pollutant Discharge Elimination System (NPDES) permit. **Please type or print clearly when completing the NOI form**. For any field, if more space is needed, submit a supplemental letter with the NOI.

Send the completed and signed form along with the filing fee and supporting documentation to the State Water Resources Control Board (State Water Board).

Section I – Notice of Intent Status

Indicate whether this request is for the first time coverage under this Order or a change of information for the discharge already covered under this Order. For a change of information or ownership, please supply the eleven-digit Waste Discharge Identification (WDID) number for the discharge.

Section II – Discharger Information

A. Enter the name of the Discharger.
B. Enter the street number and street name where correspondence should be sent (P.O. Box is acceptable).
C. Enter the city that applies to the mailing address given.
D. Enter the county that applies to the mailing address given.
E. Enter the state that applies to the mailing address given.
F. Enter the zip code that applies to the mailing address given.
G. Enter the name (first and last) of the contact person.
H. Enter the email address of the contact person.
I. Enter the contact person's title.
J. Enter the daytime telephone number of the contact person.

Section III – Billing Address

Enter the information **only** if it is different from Section II above.

A. Enter the name (first and last) of the person who will be responsible for the billing.
B. Enter the street number and street name where the billing should be sent (P.O. Box is acceptable).
C. Enter the city that applies to the billing address.
D. Enter the county that applies to the billing address.

VII. NOTIFICATION

Have potentially affected governmental agencies been notified?

☒ Yes ☐ No

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

VIII. FEE

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

☒ Yes ☐ NO ☐ NA

IX. CERTIFICATION

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

A. Printed Name: WILLIAM C. STRATTON

B. Signature: William C. Stratton **Date:** 4/27/16

C. Title: Director, Env. Health Division

X. FOR STATE WATER BOARD USE ONLY

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

Pesticide Application Plan
and
Statement of Best Management Practices
For The
County of Ventura Environmental Health Division
Vector Control Program

FOR WATER QUALITY ORDER NO. 2011-0039-DWQ STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT NO. CAG-990004 FOR DISCHARGERS OF AQUATIC PESTICIDES TO WATERS OF THE UNITED STATES FROM VECTOR CONTROL APPLICATIONS

BACKGROUND

The County of Ventura Environmental Health Division Vector Control Program (VCP) was formed pursuant to California Health and Safety Code Sections 2200-2280, to reduce the risk of vector-borne diseases or discomfort to the residents of Ventura County. This includes vector-borne diseases such as mosquito-borne encephalitis and malaria. The application of aquatic pesticides by the VCP staff is indirectly regulated by the Department of Pesticide Regulation (DPR). VCP staff is licensed by the California Department of Public Health (CDPH) to apply vector control pesticides. To satisfy licensing requirements, the VCP submits monthly pesticide use reports to the Ventura County Agricultural Commissioner's (CAC) office in accordance with a 1995 Memorandum of Understanding among DPR, CDPH. The VCP also has a cooperative agreement with CDPH pursuant to Health and Safety Code section 116180.

The VCP has implemented Best Management Practices (BMPs) based on the philosophy of integrated pest management (IPM). Pesticide use is only one element the IPM strategy. IPM emphasizes the use of physical and biological control techniques whenever possible and is based on a program of continuous monitoring of both adult and immature mosquito populations.

The VCP is within the jurisdiction of the Los Angeles Region Water Quality Control Board and is seeking coverage under the General National Pollutant Discharge Elimination System (NPDES) Permit (General Permit) to apply aquatic pesticides for vector control in waters of the United States.

The VCP only uses the following mosquito larvicides to control mosquito breeding:

a. Bacillus thuringiensis israelensis
b. B. sphaericus
c. methoprene
d. surfactants
   1. Aliphatic Petroleum Hydrocarbons
   2. Poly (oxy-1, 2-ethanediyl,) α-(C_{16-20} branched and linear alkyl)-ω-hydroxy (100%)

Research has shown these larvicides to have little or no lasting environmental impacts when directly applied to water bodies with the purpose and intent of killing mosquito larvae. These larvicides are extensively discussed in the General Permit, Attachment D, Section VI, B. Surface Water, subsection 1 Larvicides, items a, b, d and e. These aquatic larvicides degrade rapidly in the environment, thus the areal extent and duration of residues is considered negligible. When integrated with other strategies including vegetation management, surface acting agents, and predatory mosquito fish, these aquatic larvicides constitute safe and effective best management practices (BMPs).

Established VCP mosquito control practices, including physical control measures, biological control, and larvicide application, used by the VCP are non-toxic and are environmentally safe alternatives with proven BMPs. Additionally, aquatic larvicides applied at rates discussed in the General Permit, will not impact the physical parameters of the environment (i.e., temperature, salinity, turbidity and pH).

In the event of public health emergency declared by the County of Ventura Board of Supervisors, or the County Health Officer, it may be necessary for VCP to apply mosquito adulticides through aerial spraying. During this event, a pesticide MRP as set forth the General Permit, Attachment C, Section I, et. Seq., will be implemented.

Statement of Best Management Practices

INTRODUCTION

The basic components of an IPM program are: (1) surveillance of mosquito populations, (2) determination of treatment thresholds, (3) selection from a variety of control options including physical, cultural, biological and chemical techniques, (4) training and certification of applicators, and (5) public education.

I. MOSQUITO SURVEILLANCE

Surveillance of mosquito populations is essential for assessing the necessity, location, timing and choice of appropriate control measures. Surveillance reduces the areal extent and duration of pesticide use, by restricting treatments to areas where mosquito populations exceed established thresholds. The 19 mosquito species known in Ventura County differ in their biology, nuisance and disease potential and susceptibility to larvicides. Information on the species, density, and stages present is used to select an appropriate control strategy from integrated pest management alternatives.

A. Larval Mosquito Surveillance

VCP technicians are assigned to geographical districts within the County and conduct surveillance of 2,000 potential mosquitoes breeding sources. Technicians maintain an inventory of these sites and monitor them on a regular basis. When a site is surveyed, water is sampled with a 1-pint dipper to check for the presence of mosquito larva. Samples are examined in the field to determine the abundance, species, and life-stage of mosquito larva present. This information is evaluated and used as a basis for treatment decisions.

B. Adult Mosquito Surveillance

Although larval mosquito control is preferred, it is not possible to identify all larval sources. Therefore, adult mosquito surveillance is needed to pinpoint problem areas and locate previously unrecognized or new larval developmental sites. Adult mosquitoes are sampled using standardized trapping techniques (i.e., New Jersey light traps and carbon dioxide-baited traps).

Mosquitoes collected by these techniques are counted and identified to species. The spatial and seasonal abundance of adult mosquitoes is monitored on a regular basis and compared to historical data.

C. Service Requests

In addition to information obtained from adult mosquito surveillance, VCP tracks mosquito complaints from residents. Analysis of service requests allows district staff to gauge the success of control efforts and locate undetected sources of mosquito development. The VCP staff conducts public outreach programs and encourages local residents to contact them to request services. When such requests are received, technicians visit the area, interview residents and search for sources. Residents are asked to provide a sample of the insect causing the problem. Identification of these samples provides information on the species present and can be helpful in locating the source of the complaint.

II. PRE-TREATMENT DECISION-MAKING / SITE EVALUATIONS

A. Thresholds

Treatment thresholds are established for mosquito developmental sites where potential disease vector and/or nuisance risks are evident. Therefore, only those sources that represent imminent threats to public health or quality of life are treated. Treatment thresholds are based on the following criteria:

- Mosquito species present
- Mosquito stage of development
- Nuisance or disease potential
- Mosquito abundance
- Flight range
- Proximity to populated areas
- Size of source
- Presence/absence of natural enemies or predators
- Presence of sensitive/endangered species

B. Selection of Control Strategy

When thresholds are exceeded, appropriate control strategies are selected to minimize potential environmental impacts while maximizing efficacy. The method of control is based on the above threshold criteria but also:

- Habitat type
- Water conditions and quality
- Weather conditions
- Cost
- Site accessibility
- Size of site and number of other developmental sites

C. Types of Target Areas Inspected and Treated when needed

Any site that holds water for more than 96 hours can produce mosquitoes. Source reduction is VCP's preferred solution and whenever possible VCP works with the responsible party to effect long-term solutions to reduce or eliminate the need for continued applications of larvicides. The typical areas treated by the VCP include:

- Riparian Areas
- Watershed Protection Channels
- Wetlands
- Roadside Ditches
- Abandoned Swimming Pools/Spas
- Seasonal Ponds and Low Areas
- Backyard Ponds and Fountains
- Sumps and Drains
- Catch Basins
- Gutters
- Detention and Retention Basins

III. TREATMENT STRATEGIES / ALTERNATIVE CONTROLS

A. Source Reduction

Source reduction includes elements such as, physical control, habitat manipulation and water management, and forms an important component of the VCP IPM program.

B. Physical Control

The goal of physical control is to eliminate or reduce mosquito production at a particular site through habitat alteration. Physical control is usually the most effective mosquito control technique because it provides a long-term solution by reducing or eliminating mosquito developmental sites and ultimately reduces the need for chemical applications.

Physical control programs conducted by the VCP are limited to basic maintenance within water sources. These can include:

- Hand removal of sediments from existing watercourses
- Hand removal of debris, weeds and emergent vegetation in natural channels
- Clearance of brush for access to streams and wetland areas

C. Biological control

Biological control agents of mosquito larvae include predatory fish, predatory aquatic invertebrates and mosquito pathogens. Natural predators may sometimes be present in numbers sufficient to reduce larval mosquito populations. Biological control may be used in conjunction with chemical insecticides.

1. Mosquito fish (*Gambusia affinis*)

The mosquito fish, *Gambusia affinis*, is a natural predator of mosquito larvae and is used throughout the world as a biological control agent for mosquitoes. Although not native to California, mosquito fish are now ubiquitous throughout most of the State's waterways and tributaries, where they have become an integral part of aquatic food chains. They can be stocked in mosquito larval sources by VCP staff or distributed to the public for stocking in backyard ornamental ponds and other artificial containers.

The use of mosquito fish as a component of our IPM program may be environmentally and economically preferable to habitat modification or the

exclusive use of pesticides, particularly in altered or artificial aquatic habitats. Mosquito fish are self-propagating, have a high reproductive potential and thrive in shallow, vegetated waters preferred by many mosquito species. They prefer to feed at the surface where mosquito larvae concentrate. These fish can be readily mass-reared for stocking or collected seasonally from sources with established populations for redistribution. Stocking guidelines restrict the use of mosquito fish to habitats such as artificial containers, ornamental ponds, abandoned swimming pools, cattle troughs, stock ponds, etc. . . . where water quality is suitable for survival. Fish are generally stocked at population densities lower than those required for effective mosquito control and allowed to reproduce naturally commensurate with the availability of mosquito larvae and other prey.

Impact on water quality: Mosquito fish populations are unlikely to impact water quality.

2. Natural predators: aquatic invertebrates

Many aquatic invertebrates, including diving beetles, dragonfly and damselfly naiads, backswimmers, water bugs and hydra are natural predators of mosquito larvae. In situations where natural predators are sufficiently abundant, additional mosquito control measures including application of pesticides may be unnecessary.

Impact on water quality: As predatory invertebrates represent a natural part of aquatic ecosystems, they are unlikely to impact water quality. There are no established standards, tolerance, or EPA approved tests for aquatic invertebrate populations.

3. Microbial insecticides

Microbial insecticides contain naturally produced bacterial proteins that are toxic to mosquito larvae when ingested in sufficient quantity. Although they are biological agents, such products are labeled and registered by the Environmental Protection Agency as pesticides.

a. *Bacillus thuringiensis* var. *israelensis* (BTI)

Product names: Vectobac 12AS, Vectobac G, Vectobac WDG, Mosquito Dunks

BTI is highly target-specific and has been found to have significant effects only on mosquito larvae, and closely related insects (e.g., black flies and some midges). It is available in a variety of liquid, granular and pellet formulations, which provide some flexibility in application methods and equipment. BTI has no measurable toxicity to vertebrates and is classified by EPA as "Practically Non-Toxic" (Caution). BTI formulations contain a combination of five different proteins within a larger crystal. These proteins have varying modes of action and

synergistically act to reduce the likelihood of resistance developing in larval mosquito populations.

Bacterial insecticides must be fed upon by larvae in sufficient quantity to be effective. Therefore applications must be carefully timed to coincide with periods in the life cycle when larvae are actively feeding. Pupae and late 4th stage larvae do not feed and therefore will not be controlled by BTI. Low water temperature inhibits larval feeding behavior, reducing the effectiveness of BTI during the cooler months. High organic conditions also reduce the effectiveness of BTI. Cost per acre treated is generally higher than surfactants. An increased frequency of surveillance of larval sources ensures that bacterial insecticides can be applied during the appropriate stages of larval development to prevent adult mosquito emergence.

Impact on water quality: BTI contains naturally produced bacterial proteins generally regarded as environmentally safe. It leaves no residues and is quickly biodegraded. At the application rates used for mosquito control, BTI is unlikely to have any measurable effect on water quality. There are no established standards, tolerances or EPA approved tests related to BTI. Other naturally occurring strains of this bacterium are commonly found in aquatic habitats.

b. *Bacillus sphaericus* (BS)

Product names: Vectolex CG, Vectolex WDG

BS is another bacterial pesticide with attributes similar to those of BTI. The efficacy of this bacterium is not affected by the degree of organic pollution in larval development sites and it may actually cycle in habitats containing high densities of mosquitoes, reducing the need for repeated applications.

Like BTI, BS must be consumed by mosquito larvae and is therefore not effective against nonfeeding stages such as late 4th instar larvae or pupae. BS is also ineffective against certain mosquito species such as those developing in salt marshes, seasonal forest pools or tree holes. Toxicity of BS to mosquitoes is due to a single toxin rather than a complex of several molecules as is the case with BTI.

Information obtained from larval surveillance on the stage and species of mosquitoes present can increase the effectiveness of this material, restricting its use to sources containing susceptible mosquitoes. Development of resistance can be delayed by rotating BS with other mosquitocidal agents.

Impact on water quality: BS is a naturally occurring bacterium and is environmentally safe. It leaves no residue and is quickly biodegraded. At the application rates used in mosquito control programs, BS is unlikely to have any measurable effect on water quality. There are no established standards,

tolerances or EPA approved tests related to BS. Other naturally occurring strains of this bacterium are commonly found in aquatic habitats.

D. Other Control

a. Methoprene

Product Names: Altosid Briquets, Altosid XR Briquets, Altosid WSP

Methoprene is a larvicide that mimics the natural growth regulator used by insects. Methoprene can be applied as liquid or solid formulation or combined with BTI or BS to form a "duplex" application. Methoprene is a desirable IPM control strategy since affected larvae remain available as prey items for predators and the rest of the food chain. This material breaks down quickly in sunlight and when applied as a liquid formulation it is effective for only 3 to 5 days. Methoprene has been impregnated into charcoal-based carriers such as pellets and briquettes for longer residual activity ranging up to 150 days. The availability of different formulations provides options for treatment under a wide range of environmental conditions. Studies on nontarget organisms have found methoprene to be nontoxic to vertebrates and most invertebrates when exposed at concentrations used by mosquito control.

Methoprene products must be applied to larval stage mosquitoes since it is not effective against the other life stages. Monitoring for effectiveness is difficult since mortality is delayed. Methoprene use is not applied in vernal pools due to potential toxicity to certain nontarget crustacean and insect species.

Surveillance and monitoring can provide information on mosquito larval stage present, timing for applications and efficacy of the treatments.

Impact on Water Quality: Methoprene does not have a significant impact on water quality. It is rapidly degraded in the environment and is not known to have persistent or toxic breakdown products. Methoprene application rates have been shown to be effective against mosquitoes at levels far below those that can be detected by any currently available test.

b. Surfactants

Product Names: Golden Bear 1111, Agnique MMF
Active Ingredients: Aliphatic Petroleum Hydrocarbons (Golden Bear 1111), Poly (oxy-1, 2-ethanediyl,) α-($C_{16\text{-}20}$ branched and linear alkyl)-ω-hydroxy (100%) (Agnique MMF).

Surfactants are "surface-acting agents" that are either petroleum or isostearyl alcohol-based materials that form a thin layer on the water surface. These

materials typically kill surface-breathing insects by mechanically blocking the respiratory mechanism.

These materials are the only materials effective for reducing mosquito pupae since other larviciding strategies (i.e., methoprene, BTI and BS) are ineffective to that life stage. Agnique forms an invisible monomolecular film where as GB1111 forms a visible film on the water surface. Treatments are simplified due to the spreading action of the surfactant across the water surface and into inaccessible areas. These surfactants are considered "practically nontoxic" by the EPA.

The drawback of using oils in habitats where natural enemies are established is that surface-breathing insects, particularly mosquito predators, are similarly affected. As a general rule, surfactant use is considered after alternate control strategies have been ruled out or in habitats that are not supporting a rich macro-invertebrate community (i.e., manmade sites).

E. Cultural Practices

The VCP provides literature and education programs for homeowners and contractors on elimination of mosquito breeding sources from residential property. These sources include rain gutters, artificial containers, ornamental ponds, abandoned swimming pools, tree holes, septic tanks, and other impounded waters.

F. Vegetation Management

Vegetation Management consists of the removal of vegetation within mosquito developmental sites to promote water circulation, increase access of natural predators such as fish or provide VCP staff access for surveillance and treatment operations. Vegetation management is achieved either through recommendations to the landowner or by the use of hand tools by district staff.

Vegetation management is an effective long-term control strategy that is occasionally employed by VCP staff with limited use. This methodology utilizes water management and physical removal to manage vegetation within mosquito developmental sites. The presence of vegetation provides harborage for immature and adult mosquitoes by protecting them from potential predators as well as the effects of wind and wave action, which readily cause mortality. Vegetation reduction not only enhances the effects of predators and abiotic factors, but also reduces the need for chemical control. Several factors can limit the utilization of vegetation management. These include: sensitivity of the habitat, presence of special status species, size of the site, density and type of vegetation, species of mosquito and weather.

Physical removal of vegetation is used to clear obstructed channels and ditches to promote water circulation, effectiveness of predators and improve access for mosquito control personnel to enter mosquito developmental sites. Ditches and

channels can be cleared with a variety of tools ranging from shovels and small pruners to weed whackers. Most removal activities performed by VCP staff utilize small hand tools. Unfortunately, its effectiveness is temporary and labor intensive, and therefore requires routine maintenance on an annual or at least biennial basis. Other limiting factors include cost, the presence of sensitive species or habitats and the limited time period that VCP are allowed to perform the activity for many types of mosquito developmental sites.

IV. TRAINING AND CERTIFICATION

All VCP staff must be certified to apply public health pesticides or must be supervised by a certified applicator. The CDPH Vector-Borne Disease Section administers certification training and testing. All mosquito control personnel applying pesticides or overseeing the application of pesticides must obtain a Vector Control Technician certificate number. The Mosquito and Vector Control Association of California (MVCAC) provides training materials and exams are conducted by the CDPH. All certified applicators must maintain continuing education credit in at least two and as many as four subcategories. Category A (Laws and Regulations) and category B (Mosquito Biology) are mandatory for all certificate holders and require 12 and 8 continuing education units (CEU) respectively, in a two year period. Category C (Terrestrial Invertebrate Control) and Category D (Vertebrate Control) are optional both with 8 hours of CEU per two-year cycle.

VCP staff attends a number of educational and safety programs in our effort to provide ongoing education and training in the application of pesticides. Ultimate decisions regarding the need for and application of pesticides rest on the field staff based on information acquired from surveillance data. Training opportunities to accumulate CEU credits are made available by the MVCAC regional committees that develop training programs fine-tuned to the local ecology and unique problems of the region. Thirty-six hours of CEU credits are required each two-year cycle.

V. OVERSIGHT / REVIEW OF CONTROL

Ventura County VCP operates under the California Health and Safety Code and the California Government Code (reference Division 1, Administration of Public Health, Chapter 2, Powers and Duties; also Part 2, Local Administration, Chapter 8, State Aid for Local Health Administration; Division 3, Pest Abatement, Chapter 5, Mosquito Abatement Districts or Vector Control Districts, Sections 2200 - 2910). In addition, the VCP is signatory to the CDPH Cooperative Agreement (Pursuant to Section 116180, Health and Safety Code) and is required to comply with the following:

1. Calibrate all application equipment using acceptable techniques before using; maintain calibration records for review by the Ventura County Agricultural Commissioner's office. Section 5 is an example of calibration records.

2. Maintain for at least two years, pesticide use data for review by the CAC including a record of each pesticide application showing the target vector, the specific location treated, the size of the source, the formulations and amount of pesticides used, the method and equipment used, the type of habitat treated, the date of the application, and the name of the applicator.

3. Submit to the CAC each month a Pesticide Use Report on Department of Pesticide Regulation form PR-ENF-060. The report shall include the manufacturer and product name, the EPA registration number from the label, the amount of pesticide used, the number of applications of each pesticide, and the total number of applications, per county, per month.

4. Report to the CAC and the CDPH, any conspicuous or suspected adverse effects upon humans, domestic animals and other non-target organisms, or property from pesticide applications.

5. Require appropriate certification of its employees by CDPH in order to verify their competence in using pesticides to control pest and vector organisms, and to maintain continuing education unit information for those employees participating in continuing education.

6. Be inspected by the CAC on a regular basis to ensure that local activities are in compliance with state laws and regulations relating to pesticide use.

   Other agencies such as local fire departments, California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and others have jurisdiction and oversight over our activities. We work closely with these agencies to comply with their requirements.

VI. PUBLIC EDUCATION

An integral part of the VCP BMP is to provide information to the public to assist them in resolving their pest problems. The VCP provides public outreach in the form of presentations upon request, as well as through the media such as newspaper, television, and radio. Information is provided on biological, physical and cultural control methods that property owners and managers can use to preclude or reduce mosquitoes and other disease and nuisance pests within their jurisdictions.

Every calendar year, prior to the first application of larvicides, the VCP will notify potentially affected governmental agencies by posting a notification on our web site located at:

http://www.ventura.org/rma/envhealth/technical-services/vector/reports-notices.html

The notification will include information required under General Permit, Section VIII, Subsection B., Public Notification Requirements.

Monitoring and Reporting Program

Please See MVCAC NPDES Coalition Monitoring Plan.

I. CHARACTERIZATION OF PESTICIDE APPLICATION PROJECTS

Types of sources treated

Activities of the VCP are directed toward control of mosquitoes in their aquatic, larval stage. This approach allows control activities to be concentrated in localized areas using least toxic materials. Adult mosquitoes may occasionally be targeted for control, such as in the case of disease outbreaks. However, this approach requires the use of more potent pesticides applied over a greater area and is therefore avoided whenever possible. This Monitoring and Reporting Plan does not cover the use of adult pesticides.

There are 19 species of mosquitoes in Ventura County that vary in their seasonality and the type of sources in which their larvae develop. Mosquitoes are generally weak swimmers and cannot survive in waters with substantial flow or surface disturbance due to wind action. Therefore, larval development is largely restricted to small bodies of still water. The timing and location of pesticide applications follows seasonal changes in distribution of water sources. Many times heavy populations of immature mosquitoes are found in still, shallow water containing dense emergent vegetation. Species vary in their tolerance to salinity, degree of organic pollution and temperature extremes.

II. PESTICIDE USE AND ASSESSMENT OF IMPACTS

Pesticides currently used by VCP are those larvicides described on page 2 of this PAP. In the event of a declared public health emergency as described in this PAP, the VCP may utilize some of the approved adulticides described in the General Permit.

A. Bacterial Larvicides

Bacterial insecticides consist of the spores of certain species of bacteria containing naturally produced proteins, which are toxic to mosquito larvae when ingested in sufficient quantities. Although they are biologically derived agents, products containing them are labeled and registered by the Environmental Protection Agency (EPA) as pesticides.

1. *Bacillus thuringiensis* var. *israelensis* (BTI)

Product names: Vectobac 12AS, Vectobac G, Vectobac WDG, Mosquito Dunks

BTI is highly target-specific and has been found to have significant effects only on mosquito larvae, and closely related insects (e.g. blackflies and midges). It is available in a variety of liquid, granular and pellet formulations, providing some flexibility in application methods and equipment. BTI has no measurable toxicity to vertebrates and is classified by EPA as "Practically Non-Toxic" (Caution). BTI formulations contain a combination of five different proteins within a larger crystal. These proteins have varying modes of action and synergistically act to reduce the likelihood of resistance developing in larval mosquito populations.

Bacterial insecticides must be fed upon by larvae in sufficient quantity to be effective. Therefore applications must be carefully timed to coincide with periods in the life cycle when larvae are actively feeding. Pupae and late 4th stage larvae do not feed and therefore will not be controlled by BTI. Low water temperature inhibits larval feeding behavior, reducing the effectiveness of BTI during the cooler months. The presence of high concentrations of organic material in treated water also reduces the effectiveness of BTI. Cost per acre treated is generally higher than surfactants or organophosphate insecticides.

Increasing the frequency of surveillance for larvae can ensure that bacterial insecticides are applied during the appropriate stages of development to prevent adult mosquito emergence.

Impact on water quality: BTI contains naturally produced bacterial proteins, which are generally regarded as environmentally safe. Naturally occurring strains of this bacterium are ubiquitous in aquatic habitats. BTI leaves no residues and is quickly biodegraded. At the application rates used for mosquito control, this product is unlikely to have any measurable effect on water quality. There are no established standards, tolerances or EPA approved tests for this material.

There are five basic BTI formulations available for use: liquids, powders, granules, pellets, and briquets. Liquids, produced directly from a concentrated fermentation slurry, tend to have uniformly small (2-10 micron) particle sizes, which are suitable for ingestion by mosquito larvae. Powders, in contrast to liquids, may not always have a uniformly small particle size. Clumping, resulting in larger sizes and heavier weights, can cause particles to settle out of the feeding zone of some target mosquito larvae, preventing their ingestion as a food item. Powders must be mixed with an inert carrier before application to the larval habitat, and it may be necessary to mix them thoroughly to achieve a uniformly small consistency. BTI granules, pellets, and briquets are

formulated from BTI primary powders and an inert carrier. BTI labels contain the signal word “CAUTION”.

BTI is applied by VCP in a granular form, donut form or a liquid form. Application is by hand, backpack blower or hand sprayer. Persistence is low in the environment, usually lasting three to five days. Kills are usually observed within 48 hours of toxin ingestion.

2. *Bacillus sphaericus* (BS)

Product names: Vectolex CG, Vectolex WDG

BS is another bacterial pesticide with attributes similar to those of BTI. The efficacy of this bacterium is not affected by the degree of organic pollution in larval development sites and it may actually cycle in habitats containing high mosquito densities reducing the need for repeated applications.

Like BTI, BS must be consumed by mosquito immatures and is therefore not effective against nonfeeding stages such as late 4th instar larvae or pupae. BS is also ineffective against certain species of mosquitoes such as those developing in salt marshes, seasonal forest pools or tree holes. Toxicity of BS to mosquitoes is due to a single toxin rather than a complex of several molecules as is the case with BTI.

Information obtained from larval surveillance on the stage and species of mosquitoes present can increase the effectiveness of this material, restricting its use to sources containing susceptible mosquitoes. The development of resistance can be delayed by rotating BS with other mosquitocidal agents.

Impact on water quality: At the application rates used for mosquito control, BS is unlikely to have any measurable effect on water quality. It is a naturally occurring bacterium and like BTI, is found in most aquatic environments. There are no established standards, tolerances, or EPA approved tests for BS.

VectoLex-CG and Vectolex WDG are the trade names for the granular formulation of *B. sphaericus* (strain 2362). The product has a potency of 50 BSITU/mg (*Bacillus sphaericus* International Units/mg) and is formulated on a 10/14-mesh ground corncob carrier. The VectoLex label carries the “CAUTION” hazard classification. VectoLex is intended for use in mosquito breeding sites that are polluted or highly organic in nature, such as dairy waste lagoons, sewage lagoons, septic ditches, tires, and storm sewer catch basins. Application is by hand, backpack blower or hand sprayer. Best results are obtained when applications are made to larvae in the 1st to 3rd instars.

B. Methoprene

Product Names: Altosid Briquets, Altosid Briquets XR, Altosid WSP

Methoprene is a larvicide that mimics the natural growth regulator used by insects. Methoprene can be applied as liquid or solid formulation or combined with BTI or BS to form a "duplex" application. Methoprene is a desirable IPM control strategy since affected larvae remain available as prey items for predators and the rest of the food chain. This material breaks down quickly in sunlight and when applied as a liquid formulation is effective for only 24 hours. Methoprene can be impregnated into charcoal-based carriers such as pellets and briquettes for longer residual activity ranging from 30 to 150 days. The availability of different formulations provides options for treatment under a wide range of environmental conditions. Studies on nontarget organisms have found methoprene to be nontoxic to all vertebrates and most invertebrates when exposed at concentrations applied for control of mosquitoes.

Methoprene products must be applied to mosquitoes at the larval stage, since it is not effective against the other life stages. Monitoring for effectiveness is difficult since mortality is delayed. Use is restricted in vernal pools and certain other aquatic habitats where red-legged frogs are likely to occur.

Surveillance and monitoring can provide information on the stage of mosquito immatures present, so that timing of applications can maximize efficacy of the treatments.

Impact on Water Quality: Methoprene does not have a significant impact on water quality. It is applied and has been shown to be effective against mosquitoes at levels far below those that can be detected by any currently available test approved by the EPA. Studies on nontarget organisms have shown methoprene to be nontoxic to all vertebrates and most invertebrates when exposed at concentrations applied for control of mosquitoes.

Methoprene is a very short-lived material in nature, with a half-life of about two days in water, two days in plants, and ten days in soil (Wright 1976 in Glare & O'Callaghan 1999, La Clair et al 1998). The manufacturer has developed a number of formulations to maintain an effective level of the active material in the mosquito habitat (0.5-3.0 parts per **billion** = ppb[1]; (Scientific Peer Review Panel 1996)) for a practical duration, thus minimizing the cost and potential impacts associated with high-frequency repeat applications. Currently, five s-methoprene formulations are sold under the trade name of Altosid. These include Altosid Liquid Larvicide (A.L.L.) and Altosid Liquid Larvicide Concentrate, Altosid Briquets, Altosid XR Briquets, and Altosid Pellets. Altosid labels contain the signal word "CAUTION".

[1]Note that this concentration is measured in parts per **billion**, and is equivalent to 0.0005 to 0.003 ppm (parts per **million**) when comparing application rates and toxicity studies.

Altosid Briquets consist of 4.125% s-methoprene (.000458 lb. AI/briquet), 4.125% (wt./wt.) r-methoprene (an inactive isomer), and plaster (calcium sulfate) and charcoal to retard ultra violet light degradation. Altosid Briquets release methoprene for about 30 days under normal weather conditions and, as noted earlier, this means that the concentration of AI in the environment at any time is much lower than the value calculated from the weight of material applied. The recommended application rate is 1 Briquet per 100 sq. ft. in non-flowing or low-flowing water up to 2 feet deep. Small sites with any mosquito genera may be treated with this formulation. Typical treatment sites include storm drains, catch basins, roadside ditches, ornamental ponds and fountains, cesspools and septic tanks, waste treatment and settlement ponds, transformer vaults, abandoned swimming pools, and construction and other man-made depressions.

Altosid XR Briquets consist of 2.1% (wt./wt.) s-methoprene (.00145 lb. AI/briquet) embedded in hard dental plaster (calcium sulfate) and charcoal. Despite containing only 3 times the AI as the "30-day briquet", the comparatively harder plaster and larger size of the XR Briquet change the erosion rate allowing sustained s-methoprene release for up to 150 days in normal weather. The recommended application rate is 1 to 2 briquets per 200 sq. ft. in no-flow or low-flow water conditions, depending on the target species. Many applications are similar to those with the smaller briquets, although the longer duration of material release can also make this formulation economical in small cattail swamps and marshes, water hyacinth beds, meadows, freshwater swamps and marshes, woodland pools, flood plains and dredge spoil sites.

C. Surfactants

Product Names: Golden Bear 1111, Agnique MMF
Active Ingredients: Aliphatic Petroleum Hydrocarbons (Golden Bear 1111) Poly (oxy-1, 2-ethanediyl,) α-($C_{16\text{-}20}$ branched and linear alkyl)-ω-hydroxy (100%) (Agnique MMF)

Surfactants are "surface-acting agents" that are either petroleum-based or isostearyl alcohol agents that form a thin layer on the water surface. These materials typically kill surface-breathing insects by blocking the respiratory mechanism.

These materials are the only materials efficacious for reducing mosquito pupae since other larviciding strategies (i.e., methoprene, BTI and BS) are ineffective to that life stage. Agnique forms a monomolecular film that is visually undetectable. Treatments are simplified due to the spreading action of the surfactant across the water surface and into inaccessible areas. These

surfactants are considered “practically nontoxic” by the EPA. Agnique is labeled “safe for use” in drinking water.

The drawback of using oils in habitats where natural enemies are established is that surface-breathing insects, particularly mosquito predators, are similarly affected. GB1111 forms a visible film on the water surface.

As a general rule, surfactant use is considered after alternate control strategies or in habitats that are not supporting a rich macro-invertebrate community.

Golden Bear 1111 or simply GB-1111 is highly refined petroleum based “napthenic oil” with very low phytotoxicity and no detectible residual products within days after application. Volatility is very low (“non-volatile” according to the MSDS), and environmental breakdown presumably results primarily from natural microbial degradation into simple organic compounds. The label for GB-1111 contains the signal word “CAUTION”. GB-1111 contains 99% (wt./wt.) oil and 1% (wt./wt.) inert ingredients including an emulsifier. The nominal dosage rate is 3 gallons per acre or less. Under special circumstances, such as when treating areas with high organic content, up to 5 gallons per acre may be used. GB-1111 provides effective control on a wide range of mosquito species. Low dosages (1 gallon per acre) of oil work slowly, especially in cold water, and can take 4 to 7 days to give a complete kill. Higher dosage rates are sometimes used (up to 5 gallons per acre) to lower the kill time. It is typically applied by hand sprayer.

Agnique is the trade name for a reissued surface film larvicide, comprised of ethoxylated alcohol. According to the label, Agnique has very low vertebrate toxicity; an average persistence in the environment of 5-14 days at label application rates; and no toxic breakdown products, skin irritation, carcinogenicity, mutagenicity, or teratogenicity has been reported. Because of its similar mode of action and effectiveness against pupae, Agnique can be used as an alternative to Golden Bear 1111, especially in sites where the moderate temporary sheen associated with GB-1111 might be objectionable. Because the application rate of Agnique is much lower than that of Golden Bear, this potential shift would not include an increase in volume of materials applied.

Relevance of water quality analyses for the demonstration of full restoration following project completion:

Mosquito control “projects” are ongoing and do not have a specific duration or date of completion, since the goal is to prevent mosquito populations from exceeding specific injury levels rather than to eradicate them. As in the above “Statement of BMP”, surveillance of larval sources is conducted on a

continuous basis and treatments are applied as necessary to prevent significant nuisance or disease risks to the public. The materials used routinely by VCP are applied at extremely low dosages relative to the volume of the habitat, are inherently less-toxic or least-toxic materials and are not known to have measurable impacts on water quality. However, existing water quality conditions may have significant impacts on the selection and efficacy of control methods applied (see BMP).

In 2014, The County of Ventura Vector Control Program applied the following amount of public health pesticides. We anticipate applying a similar amount in 2015:

Pesticide	EPA#	Amount	
Valent Bio Sciences VectoBac G	73049-10	12,560.66	Pounds
Valent Bio Sciences VectoLex CG	73049-20	5,928.89	Pounds
Valent Bio Sciences VectoBac 12AS	73049-38	8.00	Gallons
Valent Bio Sciences VectoLex WDG	73049-57	.23	Ounces
Wellmark-Zoecon Altosid Briquets	2724-375	3.88	Pounds
Wellmark-Zoecon Altosid Briquets XR	2724-421	40.40	Pounds
Cognis-Agrosolutions Agnique MMF	53263-28	106.55	Ounces
Clarke Golden Bear 1111	8329-72	0.35	Gallons

III. EVALUATION OF THE EFFECTIVENESS OF BMP'S TO REDUCE DISCHARGES AND MINIMIZE AREA AND DURATION OF IMPACTS

Our Best Management Practices insure that all available least-toxic control methods are considered and that new methods are evaluated on an ongoing basis and, if effective, incorporated into our larval control programs. Implementation of BMP resulted in the complete elimination of the need to use conventional chemical insecticides (organophosphates and carbamates) as larvicides. Materials used by VCP are the least toxic available; the use of these materials virtually eliminates impacts on water quality which could be caused by the use of conventional chemical insecticides.

We will conduct an annual review of our BMPs to reflect any new practices and ensure that least-toxic methods and materials continue to be evaluated and incorporated as they become available. Any changes or revisions to our BMPs will be reported annually. VCP will comply with any and all requirements of the General Permit related to pesticides other than those described as BMP's in this document.

Attachment A
County of VenturaEHD
Larvicide Applications to
Waters of the U.S.