STATE WATER RESOURCES CONTROL BOARD
WATER QUALITY ORDER 2022-0077-EXEC

AMENDING

WATER QUALITY ORDER 2016-0039-DWQ
GENERAL PERMIT NO. CAG990004

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

The State of California, Water Resources Control Board (hereafter State Water Board) finds:

1. The State Water Board is authorized to prescribe statewide general National Pollutant Discharge Elimination System (NPDES) permits for categories of discharges that involve the same or similar operations and the same or similar types of waste pursuant to the California Water Code section 13263(i).
2. On September 22, 1989, the United States Environmental Protection Agency granted the State of California, through the State Water Board and the Regional Water Quality Control Boards, the authority to issue general NPDES permits pursuant to title 40 Code of Federal Regulations parts 122 and 123.
3. Section 122.28 of title 40 Code of Federal Regulations provides for issuance of general permits to regulate a category of point sources if:
    - The sources involve the same or substantially similar types of operations;
    - The discharges are the same type of waste;
    - The discharges require the same type of effluent limitations or operating conditions to protect the beneficial uses of the receiving waters;
    - The discharges require similar monitoring and reporting; and
    - The discharges are more appropriately regulated under a general order rather than individual permits.
4. On March 1, 2016, the State Water Board adopted Water Quality Order 2016-0039-DWQ, a Statewide NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the United States from Vector Control Applications (Vector Control Permit). The Vector Control Permit regulates point source discharges of biological and residual pesticides resulting from larvicide and adulticide spray applications for vector control. The Vector Control Permit covers only pesticides using active ingredients that are approved by the United States Environmental Protection Agency and registered by the California Department of Pesticide Regulation for direct or spray applications in accordance with specific application rates.

5. The discharge of biological and residual pesticides resulting from direct and spray applications for vector control covered by the Permit include: 1) larvicides containing monomolecular films, methoprene, *Bacillus thuringiensis subspecies isralensis* (or *Bti*), *Bacillus sphaericus* (or *B. Sphaericus*), temephos, petroleum distillates, or spinosad; and 2) adulticides containing malathion, naled, pyrethrin, deltamethrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, resmethrin, sumithrin, piperonyl butoxide (PBO), or N-octyl bicycloheptene dicarboximide (or MGK-264).
6. Section III.Q of the Vector Control Permit provides delegation authority from the State Water Board to the Executive Director to amend the permit specifically to:
    1) Add new active ingredients currently registered by the California Department of Pesticide Regulation for vector control, and the applicable receiving water limitations; and
    2) Grant a regulatory exception to dischargers from complying with receiving water limitations for pesticide active ingredients that are priority pollutants per the State Water Board:
        - California Ocean Plan, and
        - Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.
7. On April 8, 2022, the Mosquito and Vector Control Association of California requested that the State Water Board add a Department of Pesticide Regulations-registered active ingredient known as pyriproxyfen technically identified as 2-[1-methyl-2-(4-phenoxyphenoxy)ethoxy] pyridine to the permit to reduce mosquito and vector threats to public health. The Association represents over 65 special districts and other subdivisions of local government responsible for mosquito and vector control.
8. Pyriproxyfen has been registered as an active ingredient by the Department of Pesticide Regulation since 1999 primarily for the control of red imported fire ants, fleas, and ticks. However, this active ingredient was approved for use for mosquitoes by the Department of Pesticide Regulation in 2019. Adding this active ingredient to the suite of limited tools available to the Association's member agencies would be an immense help in the efforts to protect public health.
9. Review of environmental fate, toxicity data, and properties of pyriproxyfen, support the addition of this active ingredient and the applicable receiving water monitoring trigger of 6.5 ug/L The specific details of this addition are discussed in the attached amended Vector Control Permit (Attachment 1).

IT IS HEREBY ORDERED THAT:

Pursuant to California Water Code section 13377 and the authority delegated by Order 2016-0039-DWQ, Water Quality Order 2016-0039-DWQ is hereby amended to add the active ingredient of pyriproxyfen and all pertaining findings, monitoring and reporting requirements as shown in Attachment 1 of this Order, and is effective upon the Executive Director's Approval.

October 4, 2022

Date

Eileen Sobeck

Executive Director

ATTACHMENT 1 TO WATER QUALITY ORDER 2022-0077-EXEC

STATE WATER RESOURCES CONTROL BOARD

1001 I STREET, SACRAMENTO, CALIFORNIA 95814

State Water Resources Control Board Vector Control Permit page (https://www.waterboards.ca.gov/water_issues/programs/npdes/pesticides/vector_control.html).

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GENERAL PERMIT NO. CA6990004

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

The following Dischargers may apply for coverage under this Order in compliance with the waste discharge requirements as set forth in this Order:

Table 1. Discharger Information

Dischargers	Dischargers of biological and residual pesticides to waters of the United States (U.S.) for vector control.

Table 2. Administrative Information

The State Water Resources Control Board (hereinafter State Water Board) adopted Order 2016-0039-DWQ on:	**March 1, 2016**
Order 2016-0039-DWQ became effective on:	**July 1, 2016**
Order 2016-0039-DWQ shall expire on:	**June 30, 2021**

The U.S. Environmental Protection Agency (U.S. EPA) and the State Water Board have classified this discharge as a **minor** discharge.

Certification

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the State Water Board on March 1, 2016.

AYE: Chair Felicia Marcus
Vice Chair Frances Spivy-Weber
Board Member Tam M. Doduc
Board Member Steven Moore
Board Member Dorene D'Adamo

NAY: None

ABSENT: None

ABSTAIN: None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

GENERAL NPDES PERMIT FOR BIOLOGICAL AND RESIDUAL
PESTICIDE DISCHARGES FROM VECTOR CONTROL APPLICATIONS
ORDER 2016-0039-DWQ NPDES NO. CAG990004

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GENERAL NPDES PERMIT FOR BIOLOGICAL AND RESIDUAL
PESTICIDE DISCHARGES FROM VECTOR CONTROL APPLICATIONS
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TABLES

ATTACHMENTS

I. DISCHARGE INFORMATION

Pesticide formulations may include "active ingredients"[1] and "inert ingredients."[2] Adjuvants[3] or surfactants may be added to the ingredients in the application equipment that is used in the delivery of the pesticide. As part of the registration process of pesticides for use in California, United States Environmental Protection Agency (U.S. EPA) and the California Department of Pesticide Regulation (DPR) evaluate data submitted by registrants to ensure that a product used according to label instructions will cause no harm or adverse impact on non-target organisms that cannot be reduced or mitigated with protective measures or use restrictions. The Clean Water Act (CWA), at section 301(a), broadly prohibits the discharge of any pollutant to waters of the U.S.*, except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Biological and residual pesticides* discharged into surface waters constitute pollutants within the meaning of the CWA even if the discharge is in compliance with the registration requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Therefore, coverage under an NPDES permit is required.

The discharge of biological and residual pesticides to waters of the U.S. from larvicide* and adulticide*[4] applications for vector control[5] throughout the State of California may pose a threat to existing and potential beneficial uses of waters of the U.S. if not properly controlled and regulated. Therefore, this Order incorporates discharge prohibitions contained in water quality control plans (Basin Plans), as implemented by the State Water Board and the nine Regional Water Quality Control Boards (Regional Water Boards).

II. PERMIT COVERAGE AND APPLICATION REQUIREMENTS

A. Coverage

This Order covers the point source discharge of biological and residual pesticides resulting from direct and spray applications for vector control using: 1) larvicides containing monomolecular films, methoprene, *Bacillus*

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[1] Active ingredients are manufacturer disclosed ingredients that yield toxic effects on target organisms.

[2] Inert ingredients are additional ingredients and are often trade secrets; therefore, they are not always disclosed by the manufacturer.

[3] Adjuvants are ingredients that are added to pesticides during an application event and are often trade secrets. These ingredients are chosen by the Discharger, based on site characteristics, and typically increase the effectiveness of pesticides on target organisms.

[4] This General Order does not cover biological pesticides for adulticide applications.

[5] Vector is defined in this General Permit as mosquitoes, black flies, and midges.

* Defined in Attachment A – Definitions.

thuringiensis subspecies isralensis (or *Bti*), *Bacillus sphaericus* (or *B. Sphaericus*), temephos, petroleum distillates, pyriproxyfen or spinosad; and

2) adulticides containing malathion, naled, pyrethrin, deltamethrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, resmethrin, sumithrin, piperonyl butoxide (PBO), or N-octyl bicycloheptene dicarboximide (or MGK-264).

This Order also covers the point source discharge of residual pesticides from the application of minimum risk pesticides which are pesticides that U.S. EPA has exempted from FIFRA requirements when used only in the manner specified in 40 C.F.R. section 152.25. Products containing active ingredients listed in 40 C.F.R. section 152.25(f) are exempt from the requirements of FIFRA, alone or in combination with other substances, provided that all of the criteria of 40 C.F.R. section 152.25 are met. A pesticide product exempt under 40 C.F.R. section 152.25(f) may include only inert ingredients listed in the most current list of inert ingredients approved for use in minimum risk pesticide products at U.S. EPA's website: http://www2.epa.gov/minimum-risk-pesticides/inert-ingredients-approved-useminimum-risk-pesticide-products.

Dischargers may use larvicides and adulticides that are currently registered by DPR and new larvicides and adulticides that will be registered by DPR using the same active ingredients listed above for vector control applications. In addition, Dischargers may use minimum risk pesticide products for vector control applications.

Users of products containing these active ingredients and inert ingredients for the minimum risk pesticide products are required to obtain coverage under this Order prior to application to waters of the U.S. This Order covers the discharge of residuals from: (1) larvicides and adulticides that are currently registered in California; and (2) minimum risk pesticide products.

B. Discharger

A Discharger under this Order includes any entity involved in the application of vector control pesticides that results in a discharge of biological and residual pesticides to waters of the U.S., and meets either or both of the following two criteria:

1. The entity has control over the financing for or the decision to perform pesticide applications that result in discharges including the ability to modify those decisions; or
2. The entity has day-to-day control of pesticide application or performs activities that are necessary to ensure compliance with this Order. For example, the entity is authorized to direct workers to carry out activities required by this Order or perform such activities themselves.

C. Application

To obtain authorization under this Order, Dischargers must submit a complete application to the State Water Board as described below:

1. A Notice of Intent (shown as Attachment E) signed in accordance with the signatory requirements of the Standard Provisions in Attachment B;
2. An application fee; and
3. A Pesticide Application Plan (PAP)

The State Water Board's Deputy Director of the Division of Water Quality (Deputy Director) or his/her designee may issue a Notice of Exclusion[6] which terminates coverage under this Order, requires submittal of an application for an individual permit or alternative general permit, or denies coverage under this Order.

Permit coverage will be effective when all of the following have occurred:

1. The Discharger has submitted a complete permit application;
2. The PAP has been posted on the State Water Board's website for a 30-day comment period[7] and approved by the Deputy Director or his/her designee; and
3. The Deputy Director or his/her designee has issued a Notice of Applicability (NOA). The NOA will specify the pesticide products or type(s) of pesticides that may be used and any Regional Water Board specific conditions and requirements not stated in this Order. Any such region-specific conditions and requirements shall be enforceable. The Discharger is authorized to discharge starting on the date of the NOA.

D. Fees

The fee for enrollment under this Order shall be based on section 2200(b)(6) of title 23, California Code of Regulations, which is available at http://www.waterboards.ca.gov/resources/fees/water_quality/ and is payable to the State Water Board.

[6] A Notice of Exclusion states and justifies why the Discharger or proposed Discharger is not eligible for coverage under this General Permit. This justification can include, but is not limited to, the necessity to comply with a total maximum daily load, protect sensitive water bodies, or be consistent with other resource agency directives such as a biological opinion from the United States Fish and Wildlife Service. The Notice of Exclusion can also indicate that the coverage is denied if feasible alternatives to the selected pesticide application project are not analyzed.

[7] See Waterkeeper Alliance, Inc. v. EPA, 399 F.3d 486 (2nd Cir. 2005).

E. Terminating Coverage

To terminate permit coverage, a Discharger must submit a complete and accurate Notice of Termination provided in Attachment F. The Discharger's authorization to discharge under this Order terminates on the date of the coverage termination letter issued by the Deputy Director or his/her designee. Prior to the termination effective date, the Discharger is subject to the terms and conditions of this Order and is responsible for submitting the annual fee and all reports associated with this Order.

A Discharger must submit a Notice of Termination when one of the following conditions occurs:

1. The Discharger has ceased all discharges from the application of pesticides for which it obtained Order coverage and does not expect to discharge during the remainder of the permit term; or
2. The Discharger has obtained coverage under an individual permit or an alternative general permit for all discharges required to be covered by an NPDES permit.

III. FINDINGS

The State Water Board finds:

A. Background

1. An NPDES permit is required for applications of pesticides that result in a discharge of pollutants to waters of the U.S. Courts have determined that pesticides may constitute chemical wastes or biological materials within the meaning of the CWA.[8] Under current case law, whether a permit is required depends upon whether it is a biological or chemical pesticide and, for chemical pesticides, whether there is any residue or unintended effect from its application.
2. U.S. EPA's 2006 regulation attempting to exempt certain FIFRA-compliant applications of pesticides was invalidated and vacated by the Sixth Circuit Court of Appeals in 2009.[9] A two-year stay of the effect of that decision was granted, such that the invalidated regulation remained in effect until April 9, 2011.
3. Although the point at which a pesticide becomes a pollutant may not be known, a permit is required if a pollutant will be deposited into waters of the

[8] Headwaters, Inc. v. Talent Irrigation District, (9th Cir. 2001) 243 F.3d 526; League of Wilderness Defenders v. Forsgren (9th Cir. 2002) 309 F.3d 526; Fairhurst v. Hagener (9th Cir. 2005) 422 F.3d. 1146.

[9] National Cotton Council v. U.S. EPA (6th Cir. 2009) 553 F.3d 927.

U.S. This Order is intended to regulate applications of pesticides that result in a discharge of pollutants to waters of the U.S., consistent with the CWA.

4. In 2001, the State Water Board adopted Water Quality Order 2001-0012-DWQ, Statewide General NPDES Permit for Discharges of Aquatic Pesticides to Waters of the U.S. Issued in response to a Ninth Circuit Court of Appeals decision,[10] Order 2001-0012-DWQ covered broad categories of aquatic pesticide use in California. When that permit expired in 2004, it was replaced by Orders 2004- 0008-DWQ (larvicide discharges for vector control) and 2004-0009-DWQ (aquatic herbicide discharges for weed control). In 2011, the State Water Board adopted Order 2011-0002-DWQ to replace Order 2004-0009-DWQ.

5. Order 2011-0002-DWQ required the State Water Board to conduct a toxicity study to determine if residues, including active ingredients, inert ingredients, and degradation byproducts, in any combination, from pesticide applications cause toxicity to the receiving water or add toxicity to it if there is preexisting toxicity prior to pesticide applications. Order 2011-0002-DWQ contained a provision that the order be reopened and modified to incorporate toxicity monitoring requirements if the State Water Board-funded toxicity study demonstrated probable toxicity for particular pesticide ingredients. The toxicity study was completed in December 2012. Based on that study, the State Water Board determined that there were no significant impacts to waters of the U.S. from pesticide applications for vector control. Thus, the State Water Board did not add toxicity testing requirements to Order 2011-0002-DWQ.

6. In 2012, the State Water Board adopted Order 2012-0003-DWQ, to add more pesticide products to Order 2011-0002-DWQ. In 2014, the State Water Board adopted Order 2014-0106-DWQ to delete the list of adulticide and larvicide products in Attachments E and F, respectively, of Order 2011-0002-DWQ. In addition, in 2014, the State Water Board's Executive Director amended the Monitoring and Reporting Program (MRP) of Order 2011-0002-DWQ to modify the MRP requirements. This Order will replace Order 2011-0002-DWQ.

B. Legal Authorities

This Order is issued pursuant to section 402 of the federal CWA and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the California Water Code (commencing with § 13370). Section 122.28(a)(1) of title 40 of the Code of Federal Regulations [40 C.F.R. § 122.28(a)(1)] allows NPDES permits to be written to cover a category of discharges within the State

[10] Headwaters, Inc. v. Talent Irrigation District (9th Cir. 2001) 243F.3d 526.

political boundaries as a general NPDES permit. U.S. EPA Region 9 has granted the State Water Board the authority to issue general NPDES permits.

This Order shall serve as a general NPDES permit for point source discharges of biological and residual pesticides to waters of the U.S. from larvicide and adulticide applications for vector control. This Order also serves as general waste discharge requirements pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with § 13260).

C. Background and Rationale for Requirements

The State Water Board developed the requirements in this Order based on information submitted as part of the applications from the Mosquito Vector Control Association of California (which represents the vast majority of governmental vector control program in the California), through monitoring and reporting programs, and through special studies. The Fact Sheet (Attachment D), which contains background information and rationale for requirements in this Order, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through F are all incorporated into this Order.

D. California Environmental Quality Act

Pursuant to California Water Code section 13389, State and Regional Water Boards are exempt from the requirement to comply with chapter 3, division 13 of the Public Resources Code when adopting NPDES permits.

E. Related Pesticide Regulations

U.S. EPA, DPR, county agricultural commissioners, and the California Department of Public Health (CDPH), regulate pesticide uses in California. The applicable responsibility of each agency is summarized below:

1. United States Environmental Protection Agency

U.S. EPA has the sole jurisdiction of pesticide label language according to the FIFRA. Label language and any changes thereto must be approved by U.S. EPA before the product can be sold in this country.

As part of the labeling process, U.S. EPA evaluates data submitted by registrants to ensure that a product, if it is used in accordance with label instructions, will cause no harm (or “adverse impact”) on non-target organism. Pesticide registrants are required to submit data on the effects of pesticides on target pests (efficacy) as well as effects on non-target pests. Data on non-target effects include plant effects (phytotoxicity), fish and wildlife hazards (ecotoxicity), impacts on endangered species, effects on the environment, environmental fate, breakdown products, leachability, and persistence. However, FIFRA is not necessarily as protective of water quality as the CWA.

2. California Department of Pesticide Regulation

DPR regulates the sale and use of pesticides in California. DPR is responsible for reviewing the toxic effects of pesticide formulations and determining whether a pesticide is suitable for use in California through a registration process. DPR also reviews data submitted by the registrants. Although DPR cannot require manufacturers to make changes in labels, it can refuse to register products in California unless manufacturers address unmitigated hazards by amending the pesticide label. Consequently, many pesticide labels that are already approved by U.S. EPA also contain California-specific requirements.

DPR also conducts scientific evaluations of potential health and environmental impacts and provides county agricultural commissioners with information in the form of suggested permit conditions for the Use Permit if the proposed use is a restricted material.[11] DPR's suggested permit conditions reflect minimum measures necessary to protect people and the environment.

3. County Agricultural Commissioners

County agricultural commissioners also regulate sale and use of pesticides in California. In addition, county agricultural commissioners issue Use Permits for applications of pesticides that are deemed as restricted materials by DPR.

During the Use Permit permitting process, county agricultural commissioners determine if the pesticide use will result in substantial adverse environmental impact, whether appropriate alternatives were considered, and if any potential adverse effects are mitigated. The Use Permit conditions contain minimum measures necessary to protect people and the environment. The county agricultural commissioners also conduct pre-project inspections on at least five percent of projects.

4. California Department of Public Health

The state's pesticide regulation laws provide special procedures for vector control agencies that operate under a cooperative agreement with CDPH. The application of pesticides by vector control agencies is regulated by a special and unique arrangement among the CDPH, DPR, county agricultural commissioners, and vector control agencies. Vector control agencies are not directly regulated by DPR. CDPH provides regulatory

[11] DPR designates a pesticide as a restricted material in California if it poses hazards to public health, farm workers, domestic animals, honeybees, the environment, wildlife, or crops other than those being treated ("Regulating Pesticides: A Guide to Pesticide Regulation in California," October 2001, DPR).

oversight for vector control agencies that are signatory to the cooperative agreement and all individuals working for those agencies.

F. Technology-Based Effluent Limitations

Section 301(b) of the CWA and implementing U.S. EPA permit regulations at section 122.44, title 40 of the Code of Federal Regulations (40 C.F.R. § 122.44), require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards.

G. Water Quality-Based Effluent Limitations

Section 301(b) of the CWA and 40 C.F.R section 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. The federal regulation mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard. Section 122.44(k)(3) of 40 C.F.R. allows the use of other requirements such as best management practices (BMPs) in lieu of numeric effluent limits if the latter are infeasible. The State Water Board finds that numeric effluent limits for pollutant discharges associated with the application of pesticides are infeasible because:

1. This Order regulates biological and residual pesticides which are pesticide ingredients or degradation by-products that are present after the use of the pesticide for vector control. Therefore, the exact effluent is unknown;
2. It would be impracticable to provide effective treatment of biological and residual pesticides to protect water quality, given that typically, pesticide applications consist of numerous short duration intermittent pesticide releases to waters of the U.S. from many different locations; and
3. Treatment may render the pesticides useless for pest control.

The effluent limitations contained in this Order are narrative and include requirements to develop and implement a PAP that describes appropriate BMPs, including compliance with all pesticide label instructions, as well as requirements to comply with receiving water limitations.

The BMPs required herein are intended to: 1) minimize the area and duration of impacts caused by the discharge of biological and residual pesticides in the target area* and 2) allow for restoration of water quality and protection of beneficial uses of the receiving waters to pre-application quality following completion of an application event.

H. Receiving Water Monitoring Triggers

Following pesticide applications in or near surface waters, residual pesticides may cause both acute and chronic toxicity to aquatic life. Regional Water Boards in their Basin Plans include a narrative toxicity objective ("no toxics in toxic amounts"), which specifically prevents the presence of toxic substances, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. Since information regarding residual pesticides deposited in the receiving water as a result of larvicide and adulticide applications for vector control is not adequate to develop receiving water limitations for individual and combinations of pesticides, this Order only contains receiving water monitoring triggers for residual pesticides of concern. The monitoring triggers will be used to assess whether the discharge of residual pesticides has the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard. If monitoring data for residual pesticides show exceedance of the monitoring triggers, the Discharger shall, at a minimum, evaluate its application methods, BMPs, and the appropriateness of using alternative products. As a result of the evaluation, this Order may be reopened to add numeric Receiving Water Limitations for the residual pesticides exceeding the triggers. This Order includes an Instantaneous Maximum Receiving Water Monitoring Trigger for residual pesticides of concern. Receiving Water Monitoring Triggers for residual pesticides of concern are summarized in Section VII, Table 4 (Receiving Water Monitoring Triggers) of this Order.

I. Beneficial Uses in Basin Plans

The typical relevant beneficial uses identified in the Regional Water Boards' Basin Plans include: municipal and domestic supply* , agricultural irrigation, stock watering, process supply*, service supply, hydropower supply*, water contact recreation*, canoeing and rafting recreation, other non-contact water recreation*, warm freshwater aquatic habitat*, cold freshwater habitat, warm fish migration habitat*, cold fish migration habitat*, warm and cold spawning habitat*, wildlife habitat*, navigation*, rare, threatened, or endangered species habitat*, groundwater recharge*, and freshwater replenishment*. Requirements of this Order implement the applicable Basin Plans.

J. National Toxics Rule and California Toxics Rule

U.S. EPA adopted the National Toxics Rule on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About 40 criteria in the National Toxics Rule were applicable in California. On May 18, 2000, U.S. EPA adopted the California Toxics Rule. The California Toxics Rule promulgated new toxics criteria for California and, in addition, incorporated the previously adopted National Toxics Rule criteria that were applicable in the state. The

California Toxics Rule was amended on February 13, 2001. These rules contain water quality standards for priority pollutants.*

K. State Implementation Policy

The State Water Board adopted the SIP in March 2000 and amended it in February 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control.

As stated in Finding III.A.5, the State Water Board conducted a toxicity study which determined that there were no significant impacts to waters of the U.S. from pesticide applications for vector control. Based on the toxicity study, the State Water Board did not add toxicity testing requirements to Order 2011-0002-DWQ. Thus, this Order also does not contain toxicity testing requirements. However, this Order includes a narrative receiving water limitation for toxicity. Therefore, this Order is consistent with the SIP.

L. Antidegradation Policy

Section 131.12 of 40 C.F.R. requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Basin Plans implement, and incorporate by reference, both the state and federal antidegradation policies.

This Order requires that discharges must be consistent with the provisions of 40 C.F.R. section 131.12 and Resolution 68-16. The conditions of this Order require residual pesticide discharges to meet applicable water quality objectives. Specifically, the Order sets receiving water limitations for malathion and receiving water monitoring triggers for the other active ingredients of chemical pesticides.

The Order requirements are protective of the broad range of beneficial uses set forth in basin plans throughout the state, constituting best control available consistent with the purposes of the pesticide application in order to ensure that pollution or nuisance will not occur. The conditions also ensure maintenance of the highest water quality consistent with maximum benefit to the people of state. The nature of pesticides is to be toxic in order to protect beneficial uses such as human health or long-term viability of native aquatic life. The Fact Sheet (Attachment D) of this Order provides examples of control programs where resource agencies used pesticides to protect beneficial uses such as long-term viability of native aquatic life.

Given the nature of a general permit and the broad range of beneficial uses to be protected across the state, data analysis of specific water bodies is infeasible. While surface waters may be temporarily degraded, water quality standards and objectives will not be exceeded. The nature of pesticides is to be toxic in order to protect human health. However, compliance with receiving water limitations and other permit requirements is required. Therefore, this Order is consistent with state and federal antidegradation policies.

M. Endangered Species Act

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Wildlife Code §§ 2050 et seq.) or the Federal Endangered Species Act (16 U.S.C. §§ 1531 et seq.). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

N. Monitoring and Reporting

Section 122.48 of title 40 C.F.R. requires that all NPDES permits specify requirements for recording and reporting monitoring results. California Water Code sections 13267 and 13383 authorize the State and Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The Monitoring and Reporting Program is provided in Attachment C.

O. Standard and Special Provisions

Attachment B provides the Standard Provisions which apply to all NPDES permits in accordance with 40 C.F.R. section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 C.F.R. section 122.42. The Discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 C.F.R. section 122.42. In addition, the Discharger must comply with all the Special Provisions which are provided in Section IX.C of this Order.

P. Notification of Interested Parties

The State Water Board has notified interested agencies and persons of its intent to prescribe waste discharge requirements and has provided them with an opportunity to submit comments. Details of the notifications are provided in the Fact Sheet of this Order.

Q. Delegation to Executive Director

This Order covers the application of pesticides which are based on active ingredients that are currently registered by DPR for vector control. When DPR registers a new active ingredient for vector control, this Order must be reopened to add the new active ingredient and its receiving water limitations to the Order before the Discharger may begin using the new active ingredient. In addition, when DPR registers a new active ingredient that is also a priority pollutant and the State Water Board has added the new active ingredient to this Order, this Order may also be reopened to allow the Discharger to obtain an exception from meeting receiving water limitations for the priority pollutant in accordance with SIP section 5.3. Furthermore, this Order may be reopened to allow dischargers to obtain an exception from meeting receiving water limitations for pollutants discharged into the Pacific Ocean in accordance with the California Ocean Plan. Amending this Order on a case-by-case basis is resource intensive for the State Water Board. Thus, this Order contains a delegation from the State Water Board to the Executive Director or his/her designee to amend this Order to add: (1) new active ingredients that have been registered by DPR along with their receiving water limitations; and (2) Dischargers to the SIP and California Ocean Plan exception list.

R. Consideration of Public Comment

The State Water Board, in a public meeting, heard and considered all comments pertaining to discharges to be regulated by this Order. Details of the Public Hearing are provided in the Fact Sheet of this Order.

THEREFORE, IT IS HEREBY ORDERED, that this Order supersede Order 2011-0002- DWQ upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the State Water Board and Regional Water Quality Control Boards from taking enforcement action for past violations of the previous Order 2011-0002-DWQ. IT IS ALSO HEREBY ORDERED that in order to meet the provisions contained in division 7 of the California Water Code (commencing with § 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder:

A. The Discharger shall comply with the requirements in this Order.

B. The Executive Director or his/her designee is authorized to amend this Order to: (1) add active ingredients for vector control that are registered by DPR or that U.S. EPA exempts from FIFRA because they pose minimum risks to human health and the environment; and (2) grant exceptions in accordance with the SIP and the California Ocean Plan. If the Executive Director or his/her

designee adds an active ingredient that is newly registered by DPR, the receiving water limitation of the new active ingredient shall be consistent with the water quality objectives in the California Ocean Plan and Regional Water Board Basin Plans, and California Toxics Rule criteria.

IV. DISCHARGE PROHIBITIONS

A. The discharge of biological and residual pesticides at a location or in a manner different from that described in this Order is prohibited.

B. The discharge of biological and residual pesticides shall not create a nuisance as defined in section 13050 of the California Water Code.

C. The discharge of biological and residual pesticides from larvicide and adulticide applications for vector control shall not cause, have a reasonable potential to cause, or contribute to an in-stream excursion above any applicable standard or criterion promulgated by U.S. EPA pursuant to section 303 of the CWA, or water quality objective adopted by the State or Regional Water Boards. For larvicide applications, this prohibition shall apply outside the treatment area during treatment and in the treatment area after treatment has been completed.

D. The discharge of biological pesticides and residual chemical pesticides from pesticide products that are based on active ingredients not listed in this Order or that do not have current DPR registration is prohibited.

V. EFFLUENT LIMITATIONS

A. The discharge of biological and residual pesticides must meet applicable water quality standards; and

B. Dischargers shall implement BMPs when applying pesticides. The BMPs must be provided in the PAP, which is described in Section VIII.C.

VI. RECEIVING WATER LIMITATIONS

The discharge shall not result in any of the following:

A. Cause or contribute to an exceedance of the numeric Receiving Water Limitation shown in Table 3 below.

Table 3. Receiving Water Limitation

Ingredient	Unit	Instantaneous Maximum	Basis
Malathion	µg/L	0.1	U.S. EPA's Ambient Water Quality Criteria

B. **Floating Material.** Floating material to be present in amounts that cause nuisance or adversely affect beneficial uses.

C. **Settleable Substances.** Substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

D. **Suspended Material.** Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.

E. **Taste and Odors.** Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses or domestic or municipal water supplies.

F. **Toxic Pollutants.** Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.

G. **Temperature.** The ambient temperature to increase more than 5ºF.

H. **Color.** Esthetically undesirable discoloration.

I. **Aquatic Communities.** Aquatic communities and populations, including vertebrates, invertebrates, and plant species to be degraded, except for target species.

VII. RECEIVING WATER MONITORING TRIGGERS

The Receiving Water Monitoring Triggers shown in Table 4 below will be used to assess whether the discharge of residual pesticides has the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard.

Table 4. Receiving Water Monitoring Triggers

Pesticide Type	Active Ingredient	Unit	Instantaneous Maximum Monitoring Triggers	Basis
Larvicide	Temephos	µg/L	8	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Larvicide	Pyriproxyfen	µg/L	6.5	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Naled	µg/L	0.014	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Pyrethrin	µg/L	0.14	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Deltamethrin	µg/L	0.00017	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Etofenprox	µg/L	0.0019	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Lambda-Cyhalothrin	µg/L	0.00041	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Permethrin	µg/L	0.0019	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Prallethrin	µg/L	0.39	U.S. EPA's Office of Pesticides' Ecotoxicity Database

Pesticide Type	Active Ingredient	Unit	Instantaneous Maximum Monitoring Triggers	Basis
Adulticides	Resmethrin	µg/L	0.028	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Adulticides	Sumithrin	µg/L	0.0025	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Synergists	Piperonyl Butoxide (PBO)	µg/L	49	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Synergists	PBO (in PBO/Resmethrin Mixture)	µg/L	0.13	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Synergists	PBO (in PBO/ Pyrethrin Mixture)	µg/L	0.014	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Synergists	MGK-264	µg/L	16.9	U.S. EPA's Office of Pesticides' Ecotoxicity Database

VIII. Pesticide Use Requirements

A. Application Schedule

The Discharger shall provide a phone number or other specific contact information to all persons who request the Discharger's application information. The Discharger shall provide the requester with the most current application information. Information may be made available by electronic means, including posting prominently on a well-known webpage.

B. Public Notice Requirements

Every calendar year, prior to the first application of pesticides, the Discharger shall notify potentially affected governmental agencies and, if the Discharger has a website, post the notification at its website. The notification shall include the following information:

1. A statement of the Discharger's intent to apply pesticide(s);
2. Name of pesticide(s);
3. Purpose of use;
4. General time period and locations of expected use;
5. Any water use restrictions or precautions during treatment; and
6. A phone number that interested persons may call to obtain additional information from the Discharger.

C. Pesticides Application Plan

The Discharger shall develop a 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;
2. Discussion of the factors influencing the decision to select pesticide applications for vector control;
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;
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;
5. Other control methods used (alternatives) and their limitations;
6. How much product is needed and how this amount was determined;
7. Representative monitoring locations* and the justification for selecting these locations;
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
9. Description of the BMPs to be implemented. The BMPs shall include, at a minimum:
    a. measures to prevent pesticide spill;
    b. measures to ensure that only a minimum and consistent amount is used;

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

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

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

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

10. Identification of the problem. Prior to first pesticide application covered under this Order that will result in a discharge of biological and residual pesticides to waters of the U.S., 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;

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

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

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

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

    a. Evaluating the following management options, in which the impact to water quality, impact to non-target organisms, vector resistance, feasibility, and cost effectiveness should be considered:

        - No action
        - Prevention
        - Mechanical or physical methods
        - Cultural methods
        - Biological control agents

- Pesticides

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

b. Applying pesticides only when vectors are present at a level that will constitute a nuisance.

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.

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

D. Pesticide Application Package Approval and Modification

The Discharger shall include the PAP in the application package which must be submitted to the Deputy Director or his/her designee for approval. After receipt of a complete application package, the Deputy Director or his/her designee will issue an NOA which will provide regulatory coverage for the Discharger under this Order. The Discharger shall also submit major changes to the PAP to the Deputy Director or his/her designee for approval. Examples of major changes include using a different product other than what is specified in the PAP, changing an application method that may result in different amounts of pesticides being applied, or adding or deleting BMPs. Since the PAP shall include ALL (1) the water bodies or water body systems in which pesticides are being planned to be applied or may be applied to control vectors and (2) the application areas and the target areas in the system that are being planned to be applied or may be applied, changes in monitoring locations are not considered major changes. However, the Discharger must report these changes in the annual report.

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. The names of the water bodies treated (e.g., specific canal, creek, lake, etc.);
5. Application details, such as application started and stopped, pesticide application rate or concentration, pesticide(s) and adjuvants used by the Discharger, and volume or mass of each component discharged. For larvicides, application details shall also include flow rate of the target area, surface water area, and volume of water treated;
6. Visual monitoring assessment for larvicide applications and adulticide applications, unless inappropriate; and
7. Certification that applicators followed the PAP.

IX. PROVISIONS

A. Standard Provisions

1. All Dischargers authorized to discharge under this Order shall comply with the Federal Standard Provisions included in Attachment B of this Order.
2. This Order does not authorize the discharge of biological and residual pesticides or their degradation byproducts to waters of the U.S. that are impaired by the same pesticide active ingredients. Impaired waters are those waters not meeting water quality standards pursuant to section 303(d) of the CWA. California impaired waters, as approved by the State Water Board, are listed on the GIS Public State Water Board webpage http://gispublic.waterboards.ca.gov/webmap/303d_2012/files/2012_USEPA_appr ov_303d_List_Final_20150807.xlsx.
3. The State Water Board may use this Order to regulate the discharge of biological and residual pesticides to waters of the U.S. classified as Outstanding National Resource Waters (Lake Tahoe and Mono Lake) or as a water body impaired by unknown toxicity only after the following conditions are satisfied: (a) the proposed project will comply with the limitations and discharge requirements specified in the Order; and (b) if required, the proposed pesticide application qualifies for and has been granted a Basin Plan prohibition exception prior to discharge.
4. The Discharger must follow all FIFRA pesticide label instructions and any applicable Use Permits issued by a county agricultural commissioner.
5. The Discharger or its vector control technicians must be in compliance with the Cooperative Agreement issued by the CDPH to apply pesticides for public health vector control.
6. The Discharger must be licensed by DPR if such licensing is required for the pesticide application project.

7. The Discharger must comply with effluent limitations and must develop and implement a PAP.
8. In accordance with the PAP, Section VIII.C.12, the Discharger shall implement the identified alternative measures that are feasible and effective to the selected pesticide application project that could reduce potential water quality impacts.
9. This Order incorporates discharge prohibitions contained in water quality control plans, as implemented by the State and the nine Regional Water Boards.
10. All Dischargers authorized to discharge under this Order shall comply with the following provisions:
    a. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
        i. violation of any term or condition contained in this Order;
        ii. obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;
        iii. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and
        iv. a material change in the character, location, or volume of discharge (if applicable).
    b. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.
    c. The Discharger shall maintain a copy of this Order and make it available at all times to operating personnel. Key operating personnel shall be familiar with its content.
    d. To demonstrate compliance with title 16, California Code of Regulations, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.
    e. Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the State Water Board.
    f. All monitoring and analysis instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be

properly maintained and calibrated as necessary, at least yearly, to ensure their continued accuracy.

g. Each Discharger shall file with the State Water Board technical reports on self-monitoring performed according to the detailed specifications contained in the Monitoring and Reporting Program attached to this Order.

h. The State and Regional Water Board are authorized to enforce the terms of this Order under several provisions of the California Water Code, including, but not limited to, sections 13385, 13386, and 13387.

B. Monitoring and Reporting Program Requirements

1. The Discharger shall comply with the MRP, and future revisions thereto, in Attachment C of this Order.

2. The Deputy Director or his/her designee may add monitoring and reporting requirements to the MRP.

3. The Deputy Director or his/her designee may approve reductions in monitoring frequencies if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

C. Special Provisions

1. Reopener Provisions

a. This Order may be reopened for modification, or revocation and reissuance in accordance with the provisions contained in 40 C.F.R. section 122.62. This Order may also be reopened to add active ingredients that are newly registered by DPR and are used in pesticide products for vector control in California.

b. Conditions that necessitate a major modification of a permit are described in 40 C.F.R. section 122.62, including:

i. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this Order may be reopened and modified in accordance with the new or amended standards.

ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.

c. Acute and Chronic Toxicity. If the State Water Board revises its toxicity control provisions that would require the establishment of numeric acute and chronic toxicity limitations, this Order may be reopened to include numeric acute and chronic toxicity receiving water limitations based on the new provisions.

d. Endangered Species Act. If necessary, this Order may be reopened to add or modify Receiving Water Monitoring Triggers for residual pesticides of concern if U.S. EPA develops biological opinions regarding pesticides included in this Order.

e. Pesticide Active Ingredients. This Order covers the application of pesticides for vector control that are based on active ingredients that are currently registered by DPR and minimum risk pesticides as defined 40 C.F.R. section 152.25(f). The Executive Director may reopen this Order to add new pesticide active ingredients registered by DPR for vector control. The Executive Director may also reopen this Order to allow Dischargers to obtain an exception from meeting receiving water limitations in accordance with the SIP and the California Ocean Plan.

2. Reporting

a. **Twenty-Four Hour Report**

The Discharger shall report to the State Water Board and the appropriate Regional Water Board any noncompliance, including any effect of a pesticide's use that is unexpected or unintended, that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances and must include the following information:

i. The caller's name and telephone number;

ii. Applicator name and mailing address;

iii. Waste Discharge Identification D number;

iv. The name and telephone number of a contact person, if different than the person providing the 24-hour notice;

v. How and when the Discharger become aware of the noncompliance;

vi. Description of the location of the noncompliance;

vii. Description of the noncompliance identified and the U.S. EPA pesticide registration number for each product the Discharger applied in the area of the noncompliance; and

viii. Description of any steps the Discharger has taken or will take to correct, repair, remedy, cleanup, or otherwise address any adverse effects.

If the Discharger is unable to notify the State Water Board and the appropriate Regional Water Board within 24 hours, the Discharger must

do so as soon as possible and also provide the rationale for why the Discharger was unable to provide such notification within 24 hours.

b. **Five-Day Written Report**

The Discharger shall also provide a written submission within five (5) days of the time the Discharger becomes aware of the noncompliance. The written submission shall contain the following information:

i. Date and time the Discharger contacted the State Water Board and the appropriate Regional Water Board notifying of the noncompliance and any instructions received from the Regional Water Board;

ii. Information required to be provided in Section C.2.a above;

iii. A description of the noncompliance and its cause, including exact date and time and species affected, estimated number of individual and approximate size of dead or distressed organisms (other than the target species);

iv. Location of incident, including the names of any waters affected and appearance of those waters (sheen, color, clarity, etc.);

v. Magnitude and scope of the affected area (e.g. aquatic square area or total stream distance affected);

vi. Pesticide application rate, intended use site (e.g., banks, above, or direct to water), method of application, and name of pesticide product, description of pesticide ingredients, and U.S. EPA registration number;

vii. Description of the habitat and the circumstances under which the noncompliance activity occurred including any available data on ambient water, which is water in the immediate surrounding area, for pesticides applied;

viii. Laboratory tests performed, if any, and timing of tests. Provide a summary of the test results within five days after they become available;

ix. If applicable, explain why the Discharger believes the noncompliance could not have been caused by exposure to the pesticide from the Discharger's application; and

x. Actions to be taken to prevent recurrence of adverse incidents*

3. Corrective Action

a. **Situations Requiring Revision of Control Measures.** If any of the following situations occur, the Discharger must review and, as necessary, revise the evaluation and selection of the control

measures to ensure that the situation is eliminated and will not be repeated in the future:

i. An unauthorized release or discharge associated with the application of pesticides (e.g., spill, leak, or discharge not authorized by this or another NPDES permit) occurs;

ii. The Discharger becomes aware, or the State Water Board concludes, that the control measures are not adequate/sufficient for the discharge to meet applicable water quality standards or Receiving Water Monitoring Triggers for the concerned pesticides;

iii. Any monitoring activities indicate that the Discharger failed to:

- Follow the label instructions for the products used;
- Perform regular maintenance activities to reduce leaks, spills, or other unintended discharges of pesticides associated with the application of pesticides covered under this Order; or
- Maintain pesticide application equipment in proper operating condition by adhering to any manufacturer's conditions and industry practices, and by calibrating, cleaning, and repairing such equipment on a regular basis to ensure effective pesticide application and vector control. The Discharger must ensure that the equipment's rate of pesticide application is calibrated to deliver the precise minimum quantity of pesticide needed to achieve greatest efficacy against vectors.

b. **Corrective Action Deadlines.** If the Discharger determines that changes to the control measures are necessary to eliminate any situation identified in Section C.3.a above, the Discharger shall make such changes within 60 days. The Discharger shall take the corrective action before further discharge of the biological or residual pesticides will be allowed.

c. **Effect of Corrective Action.** The occurrence of a situation identified in Section C.3.a above may constitute a violation of this Order. Correcting the situation according to Section C.3.b does not absolve the Discharger of liability for any original violation. However, failure to comply with Section C.3.b constitutes an additional permit violation. The State Water Board will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations.

The State Water Board and the appropriate Regional Water Boards may impose additional requirements and schedules of compliance, including requirements to submit additional information concerning the

condition(s) triggering corrective action or schedules and requirements more stringent than specified in this Order. Those requirements and schedules will supersede those of Section C.3.b if such requirements conflict.

4. Adverse Incident to Threatened or Endangered Species or Critical Habitat

If the Discharger becomes aware of an adverse incident to a federally-listed threatened or endangered species or its federally-designated critical habitat, that may have resulted from the Discharger's pesticide application, the Discharger must immediately notify the National Marine Fisheries Service in the case of an anadromous or marine species, or the U.S. Fish and Wildlife Service in the case of a terrestrial or freshwater species. This notification must be made by telephone or email immediately when the Discharger becomes aware of the adverse incident and must include at least the following information:

a. The caller's name, telephone number, and email address;

b. Applicator name and mailing address;

c. The name of the affected species;

d. How and when the Discharger became aware of the adverse incident;

e. Description of the location of the adverse incident;

f. Description of the adverse incident, including the U.S. EPA pesticide registration number for each product applied in the area of the adverse incident; and

g. Description of any steps that have been taken or will be taken to alleviate the adverse impact to the species.

Additional information on federally-listed threatened or endangered species and federally-designated critical habitat is available from NMFS website (www.nmfs.noaa.gov) for anadromous or marine species or the U.S. Fish and Wildlife Service website (www.fws.gov) for terrestrial or freshwater species.

5. Change in Ownership

In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding Discharger of the existence of this Order by letter, a copy of which shall be immediately forwarded to the State Water Board.

To assume operation under this Order, the succeeding Discharger must apply in writing to the Deputy Director or his/her designee requesting

transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, address and telephone number of the persons responsible for contact with the State Water Board and a statement. The statement shall comply with the signatory and certification requirements in the federal Standard Provisions (Attachment B) and state that the new Discharger assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

Attachment A - DEFINITIONS

Active Ingredient

Active ingredients are manufacturer disclosed ingredients that yield toxic effects on target organisms.

Adjuvants

Adjuvants are ingredients that are added to pesticides during an application event and are often trade secrets. These ingredients are chosen by the Discharger, based on site characteristics, and typically increase the effectiveness of pesticides on target organisms.

Adverse Incident

Adverse Incident means a situation where the Discharger observes upon inspection or becomes aware of in which:

- A person or non-target organism may have been exposed to a biological or residual pesticide, and
- The person or non-target organism suffered an adverse or toxic effect.

Adverse or Toxic Effect

An “adverse or toxic effect” includes are impacts that occur within U.S. waters on nontarget plants, fish, or wildlife that is unusual or unexpected (e.g., effects are to organisms not otherwise described on the pesticide product label or otherwise not expected to be present) as a result of exposure to a biological or residual pesticide, and may include:

- Distressed or dead juvenile and small fishes
- Washed up or floating fish
- Fish swimming abnormally or erratically
- Fish lying lethargically at water surface or in shallow water
- Fish that are listless or nonresponsive to disturbance
- Stunting, wilting, or desiccation of non-target submerged or emergent aquatic plants
- Other dead or visibly distressed non-target aquatic organisms (amphibians, turtles, invertebrates, etc.)

An “adverse or toxic effect” also includes any adverse effects to humans (e.g., skin rashes) or domesticated animals that occur either directly or indirectly from a discharge to waters of the U.S. that are temporally and spatially related to exposure to a biological or residual pesticide (e.g., vomiting, lethargy).

Adulticides

Insecticides used to kill adult vectors.

Agricultural Supply

Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.

Application Area

The application area is the area to which pesticides are directly applied. It is the responsibility of the Discharger to determine the application area. The application area may be synonymous with the target area. (See Figure 1.)

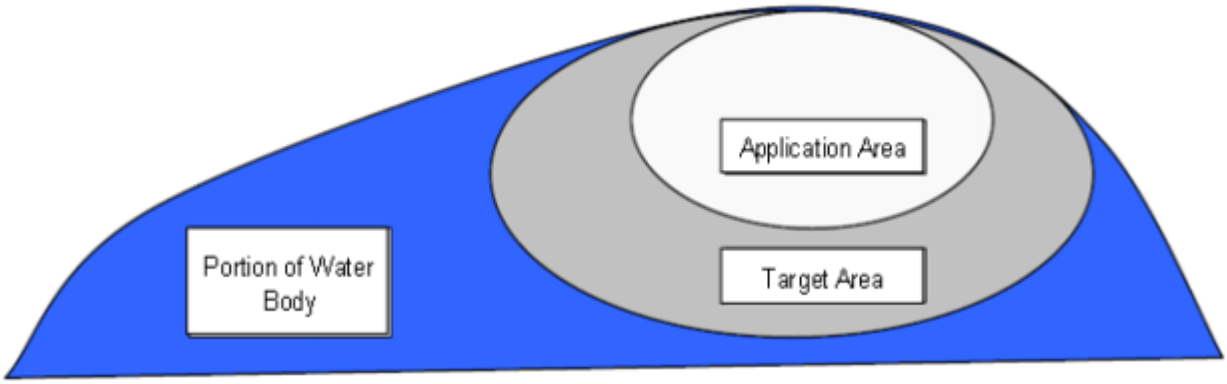

Figure 1. Location of application area and target area in a portion of a water body.

Application Event

The application event is the time that introduction of the pesticide to the application area takes place, not the length of time that the environment is exposed to the pesticide.

Biological Pesticides

A chemical which is derived from plants, fungi, bacteria, or other non-man-made synthesis and which can be used for pest control.

Cold Freshwater Habitat

Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Enclosed Bays

Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays do not include inland surface waters or ocean waters.

Estuaries

Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuaries do not include inland surface waters or ocean waters.

Freshwater Replenishment

Uses of water for natural or artificial maintenance of surface water quantity or quality.

Groundwater Recharge

Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Half-Life

Half-life is the time required for half of the compound introduced into an ecosystem to be eliminated or disintegrated by natural processes.

Hydropower Supply

Uses of water for hydropower supply.

Industrial Process Supply

Uses of water for industrial activities that depend primarily on water quality.

Inert Ingredients

Inert ingredients are additional ingredients and are often trade secrets; therefore, they are not always disclosed by the manufacturer.

Larvicides

Insecticides used to control vector larvae in their aquatic habitat. Larvicides include biological insecticides, such as the microbial larvicides Bacillus sphaericus and Bacillus thuringiensis israelensis, and other pesticides, such as petroleum distillates, temephos, methoprene, spinosad, pyriproxyfen and monomolecular films. Larvicide treatment of breeding habitats helps reduce the adult vector population in nearby areas.

Migration of Aquatic Organisms

Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

Municipal and Domestic Supply

Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Navigation

Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Non-Contact Water Recreation

Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, etc.

Point Source

Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Priority Pollutants

Priority pollutants are listed within the California Toxics Rule in 40 Code of Federal Regulations, section 131.38(b)(1). Criteria to protect aquatic life and human health are set for priority pollutants in the California Toxics Rule.

Rare, Threatened, or Endangered Species Habitat

Uses of water that support aquatic habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Receiving Waters

See Waters of the U.S.

Representative Monitoring Location

To be considered “representative,” at a minimum, a location must be similar in hydrology, pesticide use, and other factors that affect the biological and residual pesticide discharge to the areas being represented in that environmental setting.

Residual Pesticides

Residual pesticides are those portions of the pesticides that remain in the water after the application and its intended purpose (elimination of targeted pests) have been completed. Residual pesticides include also include excess amounts of pesticides during and after application.

Self-Monitoring

Sampling and analyses performed by a permittee to determine compliance with a permit or other regulatory requirements. All analyses must be conducted by a laboratory certified by the California Department of Public Health.

Source of Drinking Water

Any water designated as municipal or domestic supply in a Regional Water Board water quality control plan and/or as defined in State Water Resources Control Board Resolution 88-63.

Spawning, Reproduction, and/or Early Development

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Target Area

The target area is the area designated for vector control. This may be synonymous with the application area. (See Figure 1.)

Vector Management Area/Unit

Area of land, including any water, for which the discharger is conducting vector management activities covered by this permit

Warm Freshwater Habitat

Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Water Contact Recreation

Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Waters of the United States (Waters of the U.S.)

Generally refers to surface waters, as defined for the purposes of the federal Clean Water Act.

Wildlife Habitat

Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.)

Attachment B - STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE (IF APPLICABLE)

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 C.F.R. § 122.41(a).)
2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 C.F.R. § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)
2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

E. Inspection and Entry

The Discharger shall allow the Regional Water Quality Control Board (Regional Water Board), State Water Resources Control Board (State Water Board), United States Environmental Protection Agency (U.S. EPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i); Wat. Code, §§ 13267, 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of

this Order (33 U.S.C. § 1318(a)(4)(B)(i); 40 C.F.R. § 122.41(i)(1); Wat. Code, §§ 13267, 13383);

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(2); Wat. Code, §§ 13267, 13383);

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(3); Wat. Code, §§ 13267, 13383); and

4. Sample or monitor, at reasonable times, for the purposes of ensuring compliance with this Order or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i)(4); Wat. Code, §§ 13267, 13383.)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any condition of this Order. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the State Water Board. The State Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. § 122.41(l)(3); § 122.61.)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)

B. Monitoring results must be conducted according to test procedures under part 136 unless other test procedures have been specified in this Order. (40 C.F.R. § 122.41(j)(4); § 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the State Water Board Deputy Director of the Division of Water Quality (Deputy Director) or his/her designee at any time. (40 C.F.R. § 122.41(j)(2).)

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));
3. The date(s) analyses were performed (40 C.F.R. § 122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 C.F.R. § 122.41(j)(3)(v)); and
6. The results of such analyses. (40 C.F.R. § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and
2. Permit applications and attachments, permits and effluent data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or U.S. EPA within a reasonable time, any information which the Regional Water Board, State Water Board, or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or U.S. EPA copies of records required to be kept by this Order. (40 C.F.R. § 122.41(h); Wat. Code, § 13267.)

B. Signatory and Certification Requirements

All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.1, V.B.2, V.B.3, and V.B.4 below. (40 C.F.R. § 122.41(k).)

1. **For a municipality, state, federal, or other public agency:** All permit applications shall be signed by either a principal executive officer or ranking elected official. (40 C.F.R. § 122.22(a)(3).)
2. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.1 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
    a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.1 above (40 C.F.R. § 122.22(b)(1));
    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity or an individual or a position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and
    c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 C.F.R. § 122.22(b)(3).)
3. If an authorization under Standard Provisions – Reporting V.B.1 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.1 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)
4. Any person signing a document under Standard Provisions – Reporting V.B.1 or V.B.3 above shall make the following certification:

    “I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure 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 and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment C) in this Order. (40 C.F.R. § 122.41(l)(4).)
2. Monitoring results must be reported on a Self-Monitoring Report (SMR) or form as agreed by the Deputy Director or his/her designee and the Discharger
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 C.F.R. part 136 or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the SMR or other reporting form specified by the State Water Board (40 C.F.R. § 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 C.F.R. § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 C.F.R. § 122.41(l)(5).)

E. Planned Changes

The Discharger shall give notice to the State Water Board and Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted activity or discharge. Notice is required under this provision (40 C.F.R. § 122.41(l)(1)) only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in this Order nor to notification requirements under section 122.42(a)(1). (40 C.F.R. § 122.41(l)(1)(ii).)

F. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board and State Water Board of any planned changes in the permitted discharge or activity that may result in noncompliance with Order requirements. (40 C.F.R. § 122.41(l)(2).)

G. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.F above. (40 C.F.R. § 122.41(l)(7).)

H. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Discharger shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

The State Water Board and Regional Water Board is authorized to enforce the terms of this Order under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

Attachment C - MONITORING AND REPORTING PROGRAM

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ATTACHMENT C – MONITORING AND REPORTING PROGRAM

Title 40 of the Code of Federal Regulations (C.F.R.), section 122.48 requires that all National Pollutant Discharge Elimination System (NPDES) permits specify monitoring and reporting requirements. California Water Code sections 13267 and 13383 also authorize the State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) to require technical and monitoring reports. This Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements which implement federal and California laws and regulations.

This MRP allows coalitions of Dischargers doing similar applications within a given watershed or doing applications of similar environmental settings (agricultural, urban, and wetland) to collectively report all required data and information to the State Water Board. If the Discharger elects in its Pesticide Application Plan (PAP) to undertake reporting through a Coalition, then the Coalition will prepare and implement an MRP (pursuant to Attachment C) and act on behalf of the Discharger with respect to reporting. Otherwise, the Discharger will prepare and implement an individual MRP and submit individual reports to the State Water Board.

Review of existing water quality and toxicity data, the General Pesticide Permit Toxicity Study Report, and the Mosquito Vector Control Association of California's 2011-2012 annual report comprehensively indicated that visual observations, monitoring and reporting of pesticide application rates, and reporting of non-compliant applications will provide information necessary to determine compliance with the Statewide General NPDES Permit for Biological and Residual Pesticide Discharges from Vector Control Applications, NPDES CAG990004 (Vector Control Permit).

I. GENERAL MONITORING PROVISIONS

A. Visual Monitoring Requirements During Pesticide Applications

During any pesticide application under the Vector Control Permit, all Dischargers must, when considerations for safety and feasibility allow, visually assess the area to and around where pesticides are applied for possible and observable adverse incidents, as defined in Section I.C below, caused by application of pesticides, including the unanticipated death or distress of non-target organisms and disruption of wildlife habitat, recreational or municipal water use.

In consideration of safety and feasibility, visual monitoring is not required during the course of pesticide application when that application is performed in darkness or other circumstances that deem it infeasible for the inspector to note adverse effects. Additional circumstances that may render visual observations during pesticide application infeasible include applications made from:

1. An aircraft;

2. A moving road vehicle when the Applicator is the driver;
3. A watercraft when the Applicator is the driver; and
4. A moving off-road wheeled or tracked vehicle when the Applicator is the driver.

B. Visual Monitoring Requirements After Pesticide Applications

During any Discharger post-application surveillance of any pesticide application with discharges authorized under the Vector Control Permit, all Dischargers must visually assess the area to and around where pesticides were applied for possible and observable adverse incidents, as defined in Section I.C below, caused by application of pesticides, including the unanticipated death or distress of non-target organisms and disruption of wildlife habitat, recreational or municipal water use.

C. Adverse Incident Definition

An adverse incident is defined as an unusual or unexpected incident that a Discharger has observed upon inspection or of which the Discharger otherwise has become aware, in which:

1. There is evidence that a person or non-target organism has likely been exposed to a pesticide residue from a discharge to the waters of the U.S.; and
2. The person or non-target organism suffered a toxic or adverse effect.

The phrase “toxic or adverse effects” includes effects that occur within waters of the U.S. on non-target plants, fish or wildlife that are unusual or unexpected (e.g., effects are to organisms not otherwise described on the pesticide product label or otherwise not expected to be present) as a result of exposure to a pesticide residue, and may include:

1. Distressed or dead juvenile and small fishes;
2. Washed up or floating fish;
3. Fish swimming abnormally or erratically;
4. Fish lying lethargically at water surface or in shallow water;
5. Fish that are listless or nonresponsive to disturbance;
6. Stunting, wilting, or desiccation of non-target submerged or emergent aquatic plants; or
7. Other dead or visibly distressed non-target aquatic organisms (amphibians, turtles, invertebrates, etc.)

The phrase “toxic or adverse effects” also includes any adverse effects to humans (e.g., skin rashes) or domesticated animals that occur either from

direct contact with or as a secondary effect from a discharge (e.g., sickness from consumption of plants or animals containing pesticides) to waters of the U.S. that are temporally and spatially related to exposure to a pesticide residue (e.g., vomiting, lethargy).

D. Application Rate Monitoring

The Discharger or Coalition shall monitor the amount of adulticides and larvicides used during each application. Records of monitoring information shall include the following:

1. Name of discharger.
2. Date of application.
3. Location where application took place.
4. Number of acres treated.
5. Amount of material used for application.
6. Application Rate (amount/acre). The application rate must be within the range specified by the pesticide label. Application rate must be appropriate to the targeted species.
7. Pesticide name and United States Environmental Protection Agency (U.S. EPA) registration number.
8. Pesticide active ingredient and percent of active ingredient.
9. Range of application rate as required by the pesticide label. Application rate must be appropriate to the targeted species.
10. Name of water bodies that could be affected or map of treated area.
11. Instances of noncompliance reported at intervals and in a manner consistent with this MRP.

E. All monitoring instruments and devices used by the Discharger or Coalition to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their accuracy.

F. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this MRP.

II. MONITORING LOCATIONS AND SAMPLE TYPES

A. Monitoring Locations

Monitoring location information shall include a description of the treatment area, Geographic Positioning System coordinates and map of treated area, and pesticides being applied.

B. Monitoring Types

The Discharger or Coalition shall monitor application rates and visually assess the area to and around where pesticides are applied, in accordance with Section I.A through I.F, for possible and observable adverse incidents, as defined in Section I.C during application and during any post-application surveillance of any pesticide application with discharges authorized under the Vector Control Permit.

III. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER

Monitoring shall take place at locations that are planned for pesticide applications or locations at which pesticides may be applied, as described in the Discharger's PAP.

The PAP must consider watershed specific attributes and waste constituents, based on the characteristics of applications within the Discharger's area, as well as the receiving water quality conditions. Developing the details of a monitoring design requires clearly defining several inputs to the design and then organizing these in a logical framework that supports effective decision making about application rates and visual monitoring locations. The logical framework should describe:

A. The basic geographic and hydrographic features of the area, particularly application points and the pathway(s) of residue flows;

B. Pesticide application practices and how they are distributed in space and time;

C. Relevant knowledge about the transport, fates, and effects of pesticides, including best- and worst-case scenarios;

D. Description of the designated uses in each water body;

E. Relevant knowledge about the action of cumulative and indirect effects, and of other sources of impact;

F. Mechanisms through which pesticide applications could lead to designated use impacts, given the basic features of the area;

G. Known and potential impacts of pesticide applications on water quality, ranked in terms of relative risk, based on factors such as magnitude, frequency and duration; and

H. Other information necessary to assess the entire Discharger's area of influence.

A log shall be kept of the receiving water conditions throughout the water body reach bounded by the treatment area. Attention shall be given to the presence or absence of:

A. Floating or suspended matter;

B. Discoloration;

C. Bottom deposits;

D. Aquatic life;

E. Visible films, sheens, or coatings;

F. Fungi, slimes, or objectionable growths; and

G. Potential nuisance conditions. Notes on receiving water conditions shall be summarized in the monitoring report.

Notes on receiving water conditions shall be summarized in the monitoring report.

IV. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger or Coalition shall inform the State Water Board and the appropriate Regional Water Board 24 hours before the start of its first application of the year or at the earliest feasible time.
2. The Discharger or Coalition shall comply with all Standard Provisions (Attachment B) related to monitoring, reporting, and recordkeeping.
3. Upon written request of the State Water Board or the appropriate Regional Water Board, the Discharger or Coalition shall submit a summary monitoring report.
4. The Discharger or Coalition shall report to the State Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. § 11001 et seq.)
5. The Deputy Director of the Division of Water Quality or his/her designee may adjust monitoring frequencies to a less frequent basis if the Discharger or Coalition makes a request and the request is backed by statistical trends of monitoring data submitted.
6. The Deputy Director or his/her designee may add more monitoring and reporting requirements to the MRP.

B. Adverse Incident Reporting

1. Twenty-Four (24)-Hour Adverse Incident Notification

   Except as provided for in Section IV.B.5, if a Discharger observes or is otherwise made aware of an adverse incident, as defined in Section I.C, which may have resulted from a discharge from a pesticide application, the Discharger must immediately notify the appropriate Regional Water Board. This notification must be made by telephone within 24 hours of the

Discharger becoming aware of the adverse incident and must include at least the following information:

a. The caller's name and telephone number;

b. Discharger name and mailing address;

c. The name and telephone number of a contact person, if different than the person providing the 24-hour notice;

d. How and when the Discharger became aware of the adverse incident;

e. Description of the location of the adverse incident;

f. Description of the adverse incident identified and the pesticide product, including the U.S. EPA pesticide registration number, for each product applied in the area of the adverse incident;

g. Description of any steps the Discharger has taken or will take to correct, repair, remedy, clean up, or otherwise address any adverse effects; and

h. If known, the identity of any other Dischargers authorized for coverage under this permit for discharges from the pesticide application activities that resulted in the adverse incident.

If a Discharger is unable to notify the appropriate Regional Water Board within 24 hours, the Discharger must do so as soon as possible and also provide an appropriate rationale for why the Discharger was unable to provide such notification within 24 hours.

The adverse incident notification and reporting requirements are in addition to what the registrant is required to submit under Federal Insecticide, Fungicide, and Rodenticide Act section 6(a)(2) and its implementing regulations at 40 C.F.R. part 159.

2. Adverse Incident Notification Not Required

Reporting of adverse incidents is not required under the Vector Control Permit in the following situations:

a. A Discharger has been notified by the appropriate Regional Water Board or the State Water Board, and retains such notification, that the reporting requirement has been waived for this incident or category of incidents;

b. A Discharger receives information of an adverse incident, but that information is clearly erroneous; or

c. An adverse incident occurs to pests that are similar in-kind to potential target pests identified on the Federal Insecticide, Fungicide, and Rodenticide label.

3. Thirty-Day Adverse Incident Written Report

   Except as provided for in Section IV.B.5, within 30 days of a reportable adverse incident pursuant to in Section IV.B.1, the Discharger must provide a written report of the adverse incident to the appropriate Regional Water Board. The adverse incident report must include at least the following information:

   a. Information required to be provided in Section IV.B.1;

   b. Date and time the Discharger contacted the appropriate Regional Water Board notifying them of the adverse incident, the person's name the Discharger spoke with at the appropriate Regional Water Board, and any instructions received from them;

   c. Location of incident, including the names of any waters affected and appearance of those waters (sheen, color, clarity, etc.);

   d. A description of the circumstances of the adverse incident including species affected, estimated number of individual and approximate size of dead or distressed organisms;

   e. Magnitude and scope of the affected area (e.g., aquatic square area or total stream distance affected);

   f. Pesticide application rate, intended use site (e.g., on the bank, above waters, or directly to water), method of application, and the name of pesticide product and U.S. EPA registration number;

   g. Description of the habitat and the circumstances under which the adverse incident occurred (including any available ambient water data for pesticides applied);

   h. If laboratory tests were performed, an indication of which test(s) were performed, and when; a summary of the test results must be provided within five days after they become available, if not available at the time of submission of the 30-day report;

   i. Description of actions to be taken to prevent recurrence of adverse incidents; and

   j. Signature, date, and certification in accordance with Section V.B of Attachment B of the Vector Control Permit.

4. Adverse Incident to Threatened or Endangered Species or Critical Habitat

   Notwithstanding any of the other adverse incident notification requirements of this section, if a Discharger becomes aware of an adverse incident affecting a federally listed threatened or endangered species or its federally designated critical habitat which may have resulted from a discharge from the Discharger's pesticide application to the waters of the

U.S., the Discharger must immediately notify National Marine Fisheries Service Santa Rosa office by phone at (707) 575-6050 in the case of an anadromous or marine species, or the U.S. Fish and Wildlife Service at (916) 414-6600 in the case of a terrestrial or freshwater species. This notification must also be made by telephone to the appropriate Regional Water Board and the State Water Board, immediately upon the Discharger becoming aware of the adverse incident, and must include at least the following information:

a. The caller's name and telephone number;

b. Discharger name and mailing address;

c. The name of the affected species;

d. How and when the Discharger became aware of the adverse incident;

e. Description of the location of the adverse incident;

f. Description of the adverse incident and the pesticide product, including the U.S. EPA pesticide registration number, for each product applied in the area of the adverse incident; and

g. Description of any steps the Discharger has taken or will take to alleviate the adverse impact to the species.

Additional information on federally-listed threatened or endangered species and federally-designated critical habitat is available from the National Marine Fisheries Service (www.nmfs.noaa.gov) for anadromous or marine species or U.S. Fish and Wildlife Service (www.fws.gov) for terrestrial or freshwater species.

5. Notification and Reporting for Adverse Incidents Involving Multiple Dischargers

Where multiple Dischargers are authorized for a discharge that results in an adverse incident, notification and reporting by any one of the Dischargers constitutes compliance for all of the Dischargers, provided a copy of the written report required in Section IV.B.3 is also provided to all of the other authorized Dischargers within 30 days of the reportable adverse incident.

C. Annual Reports

Each Coalition or Discharger, including members of a Coalition, shall submit an Annual Report. Dischargers, who are members of a Coalition, may reference monitoring information in the Coalition's Annual Report.

1. Annual reports shall contain the following information:

a. An Executive Summary discussing compliance or violation of this Order and the effectiveness of the PAP to reduce or prevent the discharge of biological and residual pesticides for vector control;

b. A summary of monitoring data, including the identification of water quality improvements or degradation, and recommendations for improvements to the PAP, including proposed best management practices (BMPs), and monitoring program based on the monitoring results;

c. Identification of BMPs currently in use and a discussion of their effectiveness in meeting the requirements in this Order;

d. A discussion of BMP modifications addressing violations of this Order;

e. A map showing the location of each application area and the target area; f. Types and amounts of pesticides used at each application event during each application;

g. Information on surface area and/or volume of application and target areas and any other information used to calculate dosage, concentration, and quantity of each pesticide used;

h. Recommendations to improve the monitoring program, BMPs, and PAP to ascertain compliance with this Order; and

i. Pesticide Application Log.

2. The Discharger or the Coalition shall include in the Annual Report any updated information regarding specific monitoring locations from its PAP.

3. At any time during the term of this Order, the State Water Board or the appropriate Regional Water Board may notify Dischargers or Coalition of the requirement to electronically submit Self-Monitoring Reports (SMRs) and/or Discharge Monitoring Reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program website (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, each Coalition or Discharger shall submit hard copy SMRs and/or Discharge Monitoring Reports. The CIWQS website will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal

4. The Discharger or Coalition shall report the results for all monitoring specified in this MRP in the SMR. The Discharger or Coalition shall submit annual SMRs including the results of all required monitoring. If a Discharger or Coalition monitors any pollutant more frequently than required by the Vector Control Permit, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.

5. Monitoring reports shall be submitted to the State Water Board, to the attention of the Deputy Director or his/her designee, in accordance with the following schedule:

Table C- 1. Reporting Schedule

Reporting Frequency	Reporting Period	Annual Report Due
Annual	January 1 through December 1	March 1

D. Reporting Protocols

The Discharger or Coalition shall submit an Annual Report in accordance with the following:

1. To the extent feasible, the Discharger or Coalition shall arrange all reported information in a tabular format. The information shall be summarized to clearly illustrate whether the facility is operating in compliance with effluent and receiving water limitations.
2. Each Discharger or Coalition shall attach a cover letter to the Annual Report. The information contained in the cover letter shall clearly identify violations of the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.
3. Annual Reports must be submitted to the Deputy Director or his/her designee, signed and certified as required by the Standard Provisions (Attachment B).

Attachment D - FACT SHEET

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ATTACHMENT D – FACT SHEET

As described in the Findings in Section III of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California.

I. PERMIT INFORMATION

A. Background

1. The Regulatory Background

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act) was amended to provide that the discharge of pollutants to waters of the U.S. from any point source is effectively prohibited unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit.

On September 22, 1989, the United States Environmental Protection Agency (U.S. EPA) granted the State of California, through the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards), the authority to issue general NPDES permits pursuant to 40 Code of Federal Regulations (C.F.R.) parts 122 and 123.

Section 122.28 of 40 C.F.R. provides for issuance of general permits to regulate a category of point sources if the sources involve the same or substantially similar types of operations; discharge the same type of waste; require the same type of effluent limitations or operating conditions; require similar monitoring; and are more appropriately regulated under a general order rather than individual permits.

On March 12, 2001, the Ninth Circuit Court of Appeals held that discharges of pollutants from the use of aquatic pesticides in waters of the U.S. require coverage under an NPDES permit. (*Headwaters, Inc. v. Talent Irrigation District*).[12] The Talent decision was issued just prior to the major season for applying aquatic pesticides.

Because of the serious public health, safety, and economic implications of delaying pesticide applications, in 2001 the State Water Board adopted Water Quality Order (Order) No 2001-0012-DWQ, Statewide General NPDES Permit for Discharges of Aquatic Pesticides to Waters of the U.S.

[12] 243 F.3d 526 (9th Cir 2001).

on an emergency basis to provide immediate NPDES permit coverage for broad categories of aquatic pesticide use in California.

Order 2001-0012-DWQ imposed requirements on any discharge of aquatic pesticides from public entities to waters of the U.S. in accordance with the State Water Board's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP). The SIP establishes procedures for implementing water quality standards for priority pollutants in NPDES permits.

Section 5.3 of the SIP allows for short-term or seasonal exceptions from its requirements for resource or pest management conducted by public entities. In order to qualify for an exception from meeting priority pollutant standards, a public entity must fulfill the requirements listed in section 5.3 and the State Water Board must decide to grant the exception. Among other requirements, entities seeking an exception to complying with water quality standards for priority pollutants must submit documents in compliance with California Environmental Quality Act[13]. Because of the emergency adoption of Order 2001-0012-DWQ, the State Water Board invoked an exemption to the requirements of section 5.3 of the SIP and issued the permit incorporating a categorical exception to water quality standards for priority pollutants.

Order 2001-0012-DWQ required that Dischargers develop a best management practices (BMPs) plan that minimizes adverse impacts to receiving waters and a monitoring and reporting plan that is representative of each type of aquatic pesticide application.

In August 2001, Waterkeepers Northern California (Waterkeepers) filed a lawsuit against the State Water Board challenging several aspects of Order 2001-0012- DWQ. Major aspects of the challenge included the emergency adoption of the Order without compliance with California Environmental Quality Act and other exception requirements of the SIP; failure to address cumulative impacts; and failure to comply with the California Toxics Rule (CTR).[14]

In a settlement of the Waterkeepers' lawsuit, the State Water Board agreed to fund a comprehensive aquatic pesticide monitoring program that would assess receiving water toxicity caused by aquatic pesticide residues. In November 2002, the Ninth Circuit issued another opinion concerning the need for an NPDES permit for pesticide application. (*League of Wilderness Defenders v. Forsgren.[15])* In this case, the court

[13] Cal. Pub. Resources Code §§ 21000 et seq.

[14] Section 131.38.

[15] 309 F.3d 1181 (9th Cir. 2002).

held that the U.S. Forest Service must obtain an NPDES permit before it sprays insecticides from an aircraft directly into or over rivers as part of silviculture activities. The court found that the insecticides are pollutants under the Clean Water Act (CWA). The court also found the exemption for silvicultural pest control from the definition of "point source" in U.S. EPA's regulations to be limited to pest control activities from which there is natural run.

Also in 2002, the Second Circuit issued an unpublished decision regarding the need for an NPDES permit for application of pesticides for vector control in federal wetland areas. (*Altman v. Town of Amherst.*) The lower court had dismissed a citizens' suit, holding that pesticides, when used for their intended purpose, do not constitute a "pollutant" for purposes of the CWA, and are more appropriately regulated under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The appeals court vacated the trial court's decision and remanded the matter. In its unpublished decision, the Second Circuit expressed concern that: [u]ntil the EPA articulates a clear interpretation of current law - among other things, whether properly used pesticides released into or over waters of the U.S. can trigger the requirements for NPDES permits - the question of whether properly used pesticides can become pollutants that violate the [Clean Water Act] will remain open.

Order 2001-0012-DWQ expired on January 31, 2004. In May 2004, it was replaced by two general permits: a vector control permit for larvicides (Order 2004-0008-DWQ) and a weed control permit (Order 2004-0009-DWQ). The vector control permit does not cover spray applications of pesticides to control adult mosquitoes. The State Water Board determined that adoption of these two permits was consistent with the Ninth Circuit decisions.

In 2005, the Ninth Circuit held that a pesticide that is applied consistent with FIFRA is not a "chemical waste" (*Fairhurst v. Hagener*[16]), but also stated that it would not change its decision in *Headwaters*. The court stated that whether an NPDES permit was required depends on whether there was any "residue or unintended effect" from application of the pesticide. In *Fairhurst*, the court found neither residue nor unintended effect was present. Therefore, the pesticide application at issue did not require an NPDES permit.

U.S. EPA's Final Rule: On November 20, 2006, U.S. EPA adopted a final regulation providing that NPDES permits are not required for pesticide applications as long as the discharger follows FIFRA label instructions. According to this new regulation, pesticides applied under the following

16 422 F.3d 1146 (9th Cir. 2005).

two circumstances are not pollutants and, therefore, are not subject to NPDES permitting requirements:

(1) The application of pesticides directly to waters of the U.S. in order to control pests. Examples of such applications include applications to control vector larvae, aquatic weeds, or other pests that are present in waters of the U.S.

(2) The application of pesticides to control pests that are present over waters of the U.S., including near such waters, where a portion of the pesticides will unavoidably be deposited to waters of the U.S. in order to target the pests effectively; for example, when insecticides are aerially applied to a forest canopy where waters of the U.S. may be present below the canopy or when pesticides are applied over or near water for control of adult mosquitoes or other pests.

Lawsuits Against U.S. EPA's Final Rule: After U.S. EPA's new regulation was adopted in 2006, lawsuits were filed by both the pesticide industry and environmental groups in 11 of the 13 Circuits, including the Ninth Circuit Court, challenging U.S. EPA's Final Rule.

The National Cotton Council of America v. U.S. EPA.[17] The petitions for review were consolidated in the Sixth Circuit Court by an order of the Judicial Panel on Multidistrict Litigation.

On January 7, 2009, the Sixth Circuit Court determined that U.S. EPA's Final Rule is not a reasonable interpretation of the CWA and vacated the Final Rule. U.S. EPA did not request reconsideration of the decision, but did file a motion for a two-year stay of the effect of the decision in order to provide agencies time to develop, propose, and issue NPDES general permits for pesticide applications covered by the ruling. On June 8, 2009, the Sixth Circuit granted the motion, such that the U.S. EPA exemption remained in place until April 9, 2011.

2. Related Aquatic Pesticide Regulation Information

Pesticide formulations may include "active ingredients" and "inert ingredients". Adjuvants or surfactants may be added to the ingredients in the application equipment that is used in the delivery of the pesticide.

As part of the registration process of pesticides for use in California, U.S. Environmental Protection Agency (U.S. EPA) and the California Department of Pesticide Regulation (DPR) evaluate data submitted by registrants to ensure that a product used according to label instructions will cause no harm or adverse impact on non-target organisms that cannot be reduced or mitigated with protective measures or use restrictions.

17 553 F.3d 927 (6th Cir. 2009).

Registrants are required to submit data on the effects of pesticides on target pests (efficacy) as well as non-target effects. Data on non-target effects include plant effects (phytotoxicity), fish and wildlife hazards (ecotoxicity), impacts on endangered species, effects on the environment, environmental fate, breakdown products, leachability, and persistence. Requirements that are specific to use in California are included in many pesticide labels that are approved by U.S. EPA. Use must be reported to the county agricultural commissioner where required by law or by agreement with DPR.

Section 301(a) of the CWA broadly prohibits the discharge of any pollutant to waters of the U.S., except in compliance with an NPDES permit. Pesticides discharged into surface waters may constitute pollutants within the meaning of the CWA even if the discharge is in compliance with the registration requirements of FIFRA, thus, requiring coverage under a valid NPDES permit.

DPR and county agricultural commissioners regulate the sale and use of pesticides in California. Pesticide applications subject to this Order must be consistent with applicable Use Permits issued by county agricultural commissioners and the pesticide label instructions approved by U.S. EPA under FIFRA. According to federal law, pesticide label language is under the sole jurisdiction of U.S. EPA. Label language and any changes thereto must be approved by U.S. EPA before the product can be sold in this country. DPR cannot require manufacturers to make changes on labels; however, DPR can refuse to register products unless manufacturers address unmitigated hazards by amending the pesticide label.

State regulations require that county agricultural commissioners determine if a substantial adverse environmental impact will result from the proposed use of a restricted material. If the county agricultural commissioner determines that this is likely, the commissioner may deny the Use Permit or may issue it under the condition that site-specific use practices be followed (beyond the label and applicable regulations) to mitigate potentially adverse effects. DPR conducts scientific evaluations of potential health and environmental impacts and provides commissioners with information in the form of suggested permit conditions. DPR’s suggested permit conditions reflect minimum measures necessary to protect people and the environment. County agricultural commissioners use this information and its evaluation of local conditions to set site-specific limits in permits.

The State’s pesticide regulations provide special procedures for vector control agencies operating under cooperative agreements [For example, see Food and Agricultural Code § 11408(e)]. The application of pesticides by vector control agencies is regulated by a special arrangement among

the California Department of Public Health (CDPH), DPR, county agricultural commissioners, and vector control agencies. Vector control agencies are not directly regulated by DPR. Instead, supervisors or applicators are licensed by CDPH. Pesticide use by vector control agencies is reported to the county agricultural commissioner in accordance with a 1995 Memorandum of Understanding among DPR, CDPH, and county agricultural commissioners for the *Protection of Human Health from the Adverse Effects of Pesticides* and with cooperative agreements entered into between CDPH and vector control agencies, pursuant to Health and Safety Code section 116180.

3. Mosquitoes

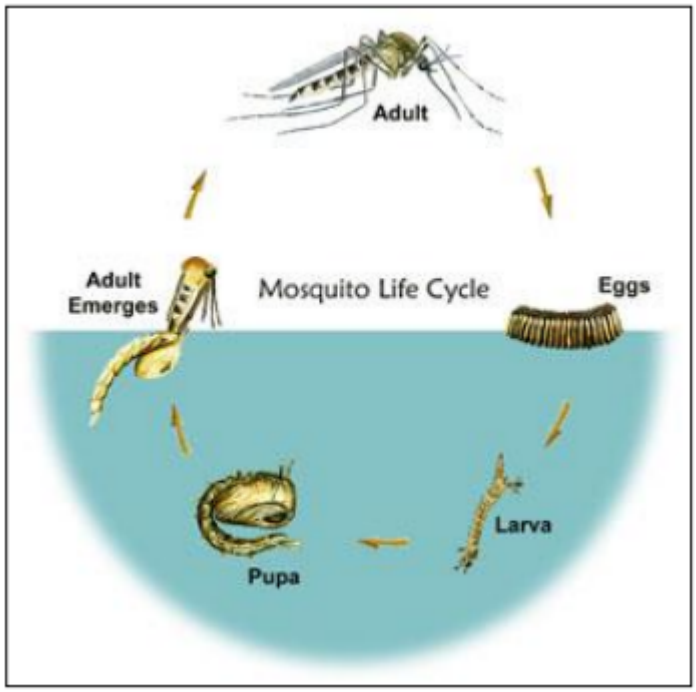
a. Mosquito Life Cycle

There are several species of mosquitoes that readily feed on people, and domestic animals, and some species are capable of transmitting organisms that cause diseases such as malaria and encephalitis in people, domestic animals, and wildlife.

Mosquitoes are classified as Insects in the Order Diptera. They undergo a complete metamorphosis, which involves four stages of development: egg, larva, pupa, and adult. The first three stages occur in water, but the adults are active flying insects and the female feeds upon the blood of humans and/or animals. The female mosquito lays her eggs directly on water or on moist substrates that may later be flooded with water. The eggs later hatch into larvae, the focus of most vector agencies control programs. The larvae go through four growth stages called instars. During these stages, the larvae continue to feed and grow in size. Once the larvae have developed to the fourth instar, they stop feeding and pupate. This is a resting (i.e., nonfeeding) period. At this point, biological control (larvicides) and growth regulators no longer work as control measures because they require ingestion/absorption. Draining or emptying the water, predation by fish and other aquatic predators, surface film larvicides, waves, or currents sufficient to flush pupae to open or moving water will also kill the pupae.

Once larvae transform into pupae, internal changes occur and the adult mosquitoes take form. After a few hours to a few days in the pupae stage, the adult mosquitoes emerge at the water surface and seek shelter in shady, moist areas. Adult mosquitoes must find shelter during the heat to avoid dehydration and are generally most active during the hours around dusk and dawn, although some species are active throughout daylight hours or during the night. After a brief period of rest, adult females seek blood meals and the cycle

continues. The time frame for completion of this cycle is highly variable, anywhere from less than a week to several months, depending primarily on the species and the temperature of the water. Development is quicker when the water is warmer. A very small amount of water in a container in the sun may produce a batch of adult mosquitoes very quickly.



(Leon County Mosquito Control, Tallahassee, Florida)

Mosquito biology can follow two general scenarios. The first involves those species that lay their eggs in masses or rafts on the water's surface. Some of these species, which are found throughout the United States, often lay their eggs in natural or artificial water-holding containers found in the domestic environment, or in naturally occurring pools. In summer, the entire life cycle, from egg to adult, may be completed in a week or less.

The second scenario includes *Aedes* mosquitoes that lay their eggs on moist soil or other substrates in areas that will be flooded with water later. After a few days, these eggs are ready to hatch but, if not flooded, can withstand drying for months and longer. In inland areas of the U.S. where these mosquitoes breed, heavy rains, irrigation, or other simultaneous flooding can produce millions of mosquitoes in a short time. Similar situations occur along coastal areas with mosquitoes adapted to salt marsh habitats, where high tides can initiate simultaneous development of large mosquito populations.

Some salt marsh mosquitoes are strong fliers and can sometimes travel up to 50 miles from the breeding site.

Only female mosquitoes require a blood meal and bite animals or birds, warm or cold blooded. Stimuli that influence biting (blood feeding) include a combination of carbon dioxide, temperature, moisture, smell, color and movement. Male mosquitoes do not bite, but feed on the nectar of flowers or other suitable sugar source. Acquiring a blood meal (protein) is essential for egg production, but mostly both male and female mosquitoes are nectar feeders. Female *Toxorhynchites* actually cannot obtain a bloodmeal and are restricted to a nectar diet. Female mosquitoes, capable of blood feeding, prefer horses, cattle, smaller mammals and/or birds over human blood meals.

Aedes mosquitoes are painful and persistent biters. They search for a blood meal early in the morning, at dusk (crepuscular feeders), and in the evening. Some are diurnal (daytime biters) especially on cloudy days and in shaded areas. They usually do not enter dwellings, and they prefer to bite mammals like humans. Aedes mosquitoes are strong fliers and are known to fly many miles from their breeding sources.

Culex mosquitoes are painful and persistent biters also, but prefer to feed at dusk and after dark. They readily enter dwellings for blood meals. Domestic and wild birds usually are preferred over humans, cows, and horses. Culex mosquitoes are generally weak fliers and do not move far from home, although they have been known to fly up to two miles. Culex mosquitoes usually live only a few weeks during the warm summer months; however, the life of these mosquitoes can be extended in warm weather locales. Those females that emerge in late summer search for sheltered areas where they "hibernate" until spring. Warm weather brings them out again in search of water on which to lay their eggs.

Culiseta mosquitoes are moderately aggressive biters, attacking in the evening hours or in the shade during the day. *Psorophora*, *Coquillettidia*, and *Mansonia* mosquitoes are becoming more pestiferous as an ever-expanding human population invades their natural habitats. Anopheles mosquitoes are persistent biters and are the only mosquitoes which transmit malaria to man.

b. Public Health Impacts

Female mosquitoes of nearly all species require blood from vertebrate animals to develop eggs, and bite people, pets, and livestock for this purpose. Mosquitoes are found throughout the world and many

transmit pathogens, which may cause disease. These diseases include a variety of mosquito-borne viral encephalitides, dengue, yellow fever, malaria, and filariasis. Most of these diseases have been prominent as endemic or epidemic diseases in the U.S. in the past, but today, only the insect-borne (arboviral) encephalitides occur annually and dengue occurs periodically in the U.S. The most important consequence of this is the transmission of microorganisms that cause diseases such as Western equine encephalomyelitis St. Louis encephalitis and West Nile virus. All of these diseases can cause serious, sometimes fatal neurological ailments in people. (Western equine encephalomyelitis virus also causes disease in horses.) Western equine encephalomyelitis infections tend to be more serious in infants while St. Louis encephalitis can be a problem for older people. These viruses are normally infections circulating in birds or small mammals. During outbreaks, however, the level of the virus present may increase facilitating transmission to humans by mosquitoes.

Human cases of encephalitis range from mild to very severe illnesses that, in a few cases, can be fatal. Other pathogens transmitted by mosquitoes include a protozoan that causes malaria, and *Dirofilaria immitis*, a parasitic roundworm and the causative agent of dog heartworm. Disease carrying mosquito species are found throughout the U.S., especially in urban areas and coastal or inland areas where flooding of low lands frequently occurs. Even when no infectious diseases are transmitted by mosquitoes, they can be a health problem to people and livestock. Mosquito bites can result in secondary infections, allergic reactions, pain, irritation, redness, and itching.

i. West Nile Virus

West Nile virus is a mosquito-borne disease that has been found in parts of Asia, Eastern Europe, Africa, and the Middle East. West Nile virus, which can also cause encephalitis, was found in the northeastern United States for the. first time in 1999 and is a good example of infected animals facilitating transmission to humans by mosquitoes. Since then, more than 28,000 cases of infection with West Nile virus have been detected in 47 states, including California. California led the nation in human West Nile virus cases for four years consecutively. Most people and horses that are infected with West Nile virus do not become ill or have only mild to moderate symptoms. In some cases, the virus can cause a more serious condition called encephalitis, an inflammation of the brain, which is potentially fatal.

While West Nile virus is initially spread between mosquitoes and birds, infected mosquitoes will occasionally bite other hosts such as horses and people, and transmit the virus to them. People typically develop symptoms between three and 14 days after they are bitten by an infected mosquito.

Numerous local agencies throughout California routinely conduct surveillance and control of mosquitoes and the diseases they transmit. In 2000, the statewide surveillance program added West Nile virus to the list of diseases monitored. Extensive information on West Nile virus in California, including current and historic activities throughout the state, can be found at http://westnile.ca.gov.

ii. Other Diseases

Recently, various invasive species of Aedes mosquitoes have been discovered in California. Aedes albopictus, the Asian tiger mosquito, was found in Los Angeles in 2011. Aedes aegypti, the yellow fever mosquito, was found in Fresno, Madera, and San Mateo Counties in 2013. These day-biting mosquitoes transmit viruses that cause dengue, chikungunya, and yellow fever. Transmission of dengue has occurred in the U.S. in areas where the two species are established, including Florida, Hawaii, and Texas. As of October 2015, Aedes aegypti has been found in 12 counties while Aedes albopictus has been discovered in four counties in the U.S. If these mosquito populations get established in California, the potential for local transmission of dengue, chikungunya, and yellow fever will increase. Currently, infected travelers and visitors to areas where the viruses are active return to California and can serve as the source of outbreaks. Since 2010, an average of 80 imported cases of dengue has been reported annually in California. Imported cases of chikungunya were detected in April 2014 in California.

4. Black Flies

Unlike mosquitoes and midges, black flies breed in flowing water from rivers and streams to irrigation ditches. After mating, the female black fly deposits her fertilized eggs on rocks or other substrate in swift flowing water. Larvae emerge from eggs and develop aquatically, feeding on algae and organic matter in the moving water. It will take seven to ten days for them to develop into pupae. Adults emerge from the pupal case through a slit and float to the surface on a bubble of air. Emerging adults live between two to three weeks. They are usually found from spring through fall, with the greatest numbers appearing in the late spring and

summer. They are active during the day, with peak activity in the morning and early evening. The adults are small, menacing, biting flies that are a nuisance to people and animals living, working, or playing near rivers and streams. These small flies are commonly called "buffalo gnats" because of their humped- back appearance. They are typically dark in color and appear in a variety of neutral shades from light gray to black.

The painfully itchy bite of the black fly is created when the female cuts a hole in the skin to suck blood from animals and people. Females will attack incessantly around the eyes, ears, scalp and, occasionally, on the arms and exposed legs. Pain and swelling from the bites can occur due to allergic reactions to foreign proteins and toxins that the female injects when feeding. In the tropics, black flies transmit diseases, such as River Blindness. Fortunately, they do not transmit any diseases to humans in California, but can cause extreme discomfort and irritation due to their biting habits and great numbers. Thus, they are considered a ‘nuisance vector’ under the provisions of the California Health and Safety code.

Black fly control programs will include monitoring for black fly larval occurrence and abundance, the application of larvicides when larval numbers exceed predetermined thresholds, as well as monitoring for treatment effectiveness.

5. Midges

Midges comprise many kinds of very small two-winged flies, found mostly in Northern England, Scotland, Ireland, Norway, Russia and in parts of North America. The term does not encapsulate a well-defined taxonomic group, but includes animals in several families of Nematoceran Diptera. The habits of midges vary greatly among the component families, which include Blephariceridae (net-winged midges), Ceridomviidae (gall midges), Ceratopogonidae (biting midges, also known as no-see-ums or punkies in North America), Chaoboridae (phantom midges), Chironomidae (non-biting midges, also known as muffleheads in the Great Lakes region of North America), Deuterophlebiidae (mountain midges), Dixidae (meniscus midges), Scatopsidae (dung midges), and Thaumaleidae (solitary midges).

The Ceratopogonidae (biting midges) are serious biting pests, and can spread the livestock diseases Blue Tongue and African Horse Sickness – but the other midge families are not. Most midges, apart from the gall midges (Cecidomyiidae), are aquatic during the larval stage.

Midges are usually a problem from April to September and will typically emerge in swarms around sunset. They survive the winter as larvae in mud and at the bottom of water sources. The larvae develop and breed in aquatic habitats similar to those of mosquitoes. The adults are flying insects which emerge in masses and become especially bothersome for

residents near sources such as flood control channels, lakes, ponds, reservoirs, or spreading basins. When midges emerge as adults in enormous numbers, they invade nearby residences, disrupt outdoor and indoor activities, and create stressful living conditions in affected areas. Flying adult midges can stick on newly painted surfaces or deface walls, ceilings, curtains, and other property. Swarms can cause discomfort or irritation by entering the eyes, ears, nose, and mouth. While they tend to lessen real estate value in residential areas, midge swarms can also interfere with processing of food, paper products, plastic, and automotive refinishing operations in industrial situations, causing significant economic impact. Although these insects do not transmit diseases, except for the biting midges, they have been documented as the cause of allergic reactions and are considered a ‘nuisance vector’ under the provisions of the California Health and Safety Code.

Vector control agencies have been involved in collaborative research programs concerning the biology, ecology, and control of midges since the early 1960's. Research concluded that physical control, the ability to manage the movement of water to and from midge habitats, is the most effective method for preventing midge occurrence. This method properly disrupts the midge life cycle and prevents adult emergence. Midge control program methodologies are based upon the maximization of physical control and restriction of the use of larvicides or adulticides to situations where water rotation or drainage to prevent midge mass emergences is not an option.

6. Other Public Health Impacts

In addition to transmitting pathogenic disease, vectors also can cause significant impacts to the public in general, to farm workers and other outdoor workers in particular, to outdoor recreation and tourism, and to real estate values, etc., and therefore are recognized as public nuisances under the law. (California Health and Safety Code section 2002(j).) Specifically, the California Legislature also has recently found that, "the protection of Californians and their communities against the discomforts and economic effects of vector-borne diseases is an essential public service that is vital to public health, safety, and welfare." (Health and Safety Code section 2001(b)(3); Senate Bill No. 1588 (2002)).

B. General Criteria

1. This Order serves as a general NPDES permit for the discharge of biological and residual pesticides to surface waters as a result of direct or spray applications for vector control.
2. Dischargers who submit a complete application under this Order are not required to submit an individual permit application. The State Water Board

may request additional information and determine that a Discharger is not eligible for coverage under this Order and would be better regulated under an individual or other general NPDES permits to be issued by the appropriate Regional Water Board. If the discharge becomes covered by an individual or another general NPDES permit, the applicability of this Order to the specified discharge is immediately terminated on the effective date of the individual NPDES permit or coverage under the other general NPDES permit.

II. NOTIFICATION REQUIREMENTS

A. Application

To obtain authorization under this Order, Dischargers must submit a complete application to the State Water Board as described below:

1. A Notice of Intent (NOI shown as Attachment E) signed in accordance with the signatory requirements of the Standard Provisions in Attachment B;
2. An application fee; and
3. A Pesticide Application Plan (PAP).

State and Regional Water Board staff will review the application package for completeness and applicability to this Order. Additionally, the State Water Board's Deputy Director of the Division of Water Quality (Deputy Director) or his/her designee may issue a Notice of Exclusion[18], which either terminates permit coverage or requires submittal of an application for an individual permit or alternative general permit.

Permit coverage will be effective when all of the following have occurred:

1. The Discharger has submitted a complete permit application;
2. The PAP has been posted on the State Water Board's website for a 30-day comment period19 and approved by the Deputy Director or his/her designee; and
3. The Deputy Director or his/her designee has issued a Notice of Applicability (NOA). The NOA will specify the pesticide products or type(s) of pesticides that may be used and any Regional Water Board specific conditions and requirements not stated in this Order. Any such region-

[18] A Notice of Exclusion is a one-page notice that indicates and justifies why the Discharger or proposed Discharger is not eligible for coverage under this Order. This justification can include, but is not limited to, the necessity to comply with a total maximum daily load or to protect sensitive water bodies. The Notice of Exclusion can also indicate that the coverage is denied if feasible alternatives to the selected pesticide application project are not analyzed.

specific conditions and requirements shall be enforceable. The Discharger is authorized to discharge starting on the date of the NOA.

B. Fees

California Water Code section 13260(d) requires each person for whom waste discharge requirements are issued to pay an annual fee to the State Water Board. California Water Code section 13260(f) requires: (1) the State Water Board to adopt a schedule of fees by emergency regulation; and (2) fees to be adjusted annually to conform to the revenue levels set forth in the State Budget Act for the activities that have been issued waste discharge requirements.

Currently, the fee for enrollment under this Order shall be based on section 2200(b)(6) of title 23, California Code of Regulations, which can be found at the State Water Board Fees webpage (http://www.waterboards.ca.gov/resources/fees/water_quality/) and is payable to the State Water Board.

C. Public Notification

The State Water Board has notified interested agencies and persons of its intent to prescribe waste discharge requirements in this Order and provided them with an opportunity to submit their written comments and recommendations.

III. DISCHARGE DESCRIPTION

A. Discharge Description

1. Vector control agencies in California follow an integrated pest management approach that strives to minimize the use of pesticides and their impact on the environment while protecting public health. These agencies generally determine what is appropriate in their districts, and many follow response plans that use surveillance tools to determine the extent of the problem and guide treatment decisions, with an emphasis on source reduction and control of vectors in their immature stages. Control of adult vectors may become necessary under some circumstances, such as in the event of a disease outbreak (documented presence of infectious virus in active host-seeking adult mosquitoes) or lack of access to larval sources leading to the emergence of large numbers of biting adult mosquitoes. In their control programs, vector control agencies in California use larvicides and adulticides.
2. The presence of biological and residual pesticides in surface waters from direct or spray applications of pesticides for vector control at various areas throughout the State of California may pose a threat to existing and potential beneficial uses of waters of the U.S. if not properly controlled and regulated. This Order covers the discharge to waters of the U.S. of

biological and residual pesticides related to the direct or spray application, either ground application or aerial application, of: (1) larvicides containing monomolecular films, methoprene, *Bacillus thuringiensis* subspecies *israelensis* (or *Bti*), *Bacillus sphaericus* (or *B. sphaericus*), petroleum distillates, temephos, pyriproxyfen and spinosad; (2) adulticides containing organophosphates malathion and naled; pyrethrin; pyrethroids deltamethrin, etofenprox, lambdacyhalothrin, permethrin, prallethrin, resmethrin, and sumithrin; and synergists piperonyl butoxide (PBO) and N-octyl bicycloheptene dicarboximide (or MGK 264); and (3) minimum risk pesticides which are pesticides that U.S. EPA has exempted from FIFRA requirements when used only in the manner specified in 40 C.F.R. section 152.25(f) because they pose minimum risks to human health and the environment.

Products containing active ingredients listed in 40 C.F.R. section 152.25(f) are exempt from the requirements of FIFRA, alone or in combination with other substances, provided that all of the criteria of 40 C.F.R. section 152.25 are met. A pesticide product exempt under 40 C.F.R. section 152.25(f) may only include inert ingredients listed in the most current list at U.S. EPA's website of inert ingredients approved for use in minimum risk pesticide products: http://www2.epa.gov/minimum-risk-pesticides/inert-ingredients-approved-useminimum-risk-pesticide-products.

3. The discharge is necessary only when no feasible alternative to the discharge (alternative application techniques, etc.) is available and the discharge is limited to that increment of waste that remains after implementation of all reasonable alternatives for avoidance is employed.

4. A study by Weston, et al. (*Aquatic Effects of Aerial Spraying for Mosquito Control over an Urban Area*, Environ. Sci. Technol. 2006, 40, 5817-5822) has shown the accumulation of pyrethroids, which are chemically similar to pyrethrin, in sediments in amounts that can be toxic to invertebrates. The study indicated that PBO concentrations from spray applications were high enough to enhance toxicity of pyrethroids already existing in creek sediments from general urban pesticide use. The study also states that risk assessments for vector control agents have focused on the active ingredients but have failed to recognize the potential for interactions with pesticides previously existing in the environment, which in this case appeared to represent a risk to aquatic life greater than that of the active ingredients themselves.

   Another study by Lawler, et. al [Does Synergized Pyrethrin Applied Over Wetlands for Mosquito Control Affect Daphnia Magna Zooplankton or Callibaetis Californicus Mayflies? Pest Manag Sci 64:843-847, (2008)] tested whether repeated applications of synergized pyrethrin over wetlands caused mortality of two aquatic invertebrates: the zooplankton

Daphnia magna Straus and a mayfly, Callibaetis californicus Banks. The results showed that there were no detectable effects of synergized pyrethrin on 36-hour survival of Daphnia or mayflies, but some exposed sediments yielded pyrethrin and most showed PBO.

Due to the potential for toxicity resulting from the synergistic effect of PBO on pyrethroids and the additive effects of larvicide and adulticide products on pesticides that are already in creek sediments or in the water column, this Order requires the State Water Board to conduct a toxicity study to determine if residues, including active ingredients, inert ingredients, and degradation byproducts, in any combination, from pesticide applications including those using PBO cause toxicity to the receiving water or add toxicity to it if there is preexisting toxicity prior to pesticide applications.

5. The discharge is necessary only when no feasible alternative to the discharge (alternative treatment methods, alternative application techniques, etc.) is available and the discharge is limited to that increment of waste that remains after implementation of all reasonable alternatives for avoidance is employed.

B. Pesticide Applications

1. Larviciding

Larviciding involves applying pesticides to breeding habitats to kill vector larvae. Larviciding can reduce overall pesticide usage in a control program. Killing vector larvae before they emerge as adults can reduce or eliminate the need for spray application of pesticides to kill adult vectors.

As stated in Mosquito Vector Control Association of California's *Conceptual Monitoring Plan for Mosquito Larvicides and Adulticides*, vector larvicides may be applied in a variety of locations, including irrigation ditches, roadside ditches, flood water, standing pools, woodland pools, snowmelt pools, pastures, stock ponds, duck ponds, catch basins, storm water retention areas, tidal water, creeks, marshes, and rice fields. Locations may be urban, suburban, agricultural, recreational, or wildlife refuge areas. Application areas may vary in size from a fraction of an acre to several thousand acres. In some cases, treatment may be limited to the edge of water bodies or tidal marshes; in other cases, treatment would occur over entire water bodies. Treatment frequency for larvicides can be weekly (for hot weather and liquid formulations that have little or no residual) to once every three months (for moderately small sites that are hard to reach like a heavily vegetated marsh treated with pellets or granules). Types of locations, frequency, and size of application areas vary by region. The following are main techniques and equipment used to apply larvicides:

a. Ground Application Equipment

Larvicides can be applied with pickup trucks or all-terrain vehicles. A chemical-container tank, high-pressure, low-volume electric or gas pump, and spray nozzle are mounted in the back of the truck bed, with a switch and extension hose allowing the driver to operate the equipment and apply the larvicide from the truck's cab. The all-terrain vehicles have a chemical container mounted on the vehicle, a 12-volt electric pump supplying high- pressure, low-volume flow, and booms and/or hoses and spray tips allowing for application while steering the vehicle. All-terrain vehicles are ideal for treating areas such as agricultural fields, pastures, and other off-road sites. Additional training in all-terrain vehicle safety and handling is provided to employees before operating these machines.

Additional equipment used in ground applications includes hand-held sprayers and backpack blowers. Hand-held sprayers (hand cans) are standard one- or two-gallon garden-style pump-up sprayers used to treat small, isolated areas. Backpack sprayers are gas-powered blowers with a chemical tank and calibrated proportioning slot. Generally, a pellet or small granular material is applied with a backpack sprayer or "belly grinder" machine designed to distribute pellets or granules.

There are several advantages of using ground application equipment, both when on foot and when conveyed by vehicles. Ground larvicide application allows applications while in proximity to the actual treatment area, and consequently treatments to only those microhabitats where larvae are actually present. This also reduces both the unnecessary pesticide load on the environment and the financial cost of the amount of material used, as well as its application. Both the initial and maintenance costs of ground equipment are generally less than those for aerial equipment. Ground larvicide applications are less affected by weather conditions than are aerial applications.

Ground larvicide application is impractical for large or densely wooded areas. There is also a greater risk of chemical exposure to applicators than there is during aerial larvicide operations. Damage may occur from the use of a ground vehicle in some areas. Ruts and vegetation damage may occur, although both conditions are reversible and generally short-lived. Technicians are trained to recognize sensitive areas and to use good judgment to avoid significant impacts.

b. Aerial Application Equipment

When several large areas are simultaneously producing vector larvae at densities exceeding treatment thresholds, then helicopters or other

aircraft may be used to apply the larvicides. As stated in Mosquito Vector Control Association of California's *Conceptual Monitoring Plan for Mosquito Larvicides and Adulticides*, many agencies contract with independent flying services to perform aerial applications, with guidance to the target area provided by the vector control agency staff. A few agencies make applications with their own aircraft. The number and extent of aerial application of larvicides differ among agencies, from only a few times each year, covering a few hundred acres, to more frequent or extensive operations in the Central Valley districts.

There are three advantages to using fixed- or rotary-wing (helicopter) aerial larvicide application equipment compared to ground application. First, it can be more economical for large target areas with extensive vector production. Second, by covering large areas quickly, it can free staff to conduct other needed surveillance or control. Third, it can be more practical for remote or inaccessible areas, such as islands and large marshes, than ground larvicide application. However, maintaining aircraft or contracting for aerial applications is expensive; and, in addition to the timing constraints inherent in most larvicide use, the potential application window can be very narrow for aerial activities due to weather conditions.

2. Adulticiding

Adulticiding is the process of controlling vectors when they are mature and flying. Adult female vectors are the ones that bite, so ultimately they provide the largest threat to the public health and welfare. Adulticiding is necessary because larviciding is not 100 percent effective and some larval sources may be unknown or inaccessible.

Chemical control of adult vectors is implemented when vector populations reach a level that is thought by health officials to represent an unacceptable increase in the risk of disease transmission to humans or domestic animals, or when biting vectors become intolerable to the local population. The action level or threshold is determined by each vector control program and varies according to local conditions. The threshold for adult vector control is variable and depends on several local factors, including:

- The presence and intensity of vector-borne disease in the region;
- The abundance of vector species populations; and
- The tolerance of local citizens to nuisance vector populations.

There are two basic techniques for applying adulticides:

a. Barrier Application

Adulticides are sprayed onto vegetation or other surfaces to leave a residual adulticide intended to kill vector that land on that surface. Barrier application is typically done with backpack sprayers that produce large droplets that immediately fall out of the air onto the intended surface. Barrier type adulticides can kill "non-target" insects.

b. Ultra Low Volume Application

Adulticides are sprayed into the air with the intent of killing vectors that are flying in the sprayed area. Ultra Low Volume (ULV) application is typically done with truck-mounted sprayers, but can be done with aircraft. ULV produces very small droplets that hang in the air for a few hours. Droplet sizes range from 8 to 30 microns. According to CDPH, spray drift may occur for a distance of up to a half mile via truck-mounted applications and more than a mile for aerial applications from the path or point of application. Most spray applications occur in the evening or early morning when female vectors are seeking a blood meal and many other arthropods, particularly pollinators, are inactive. By definition, ULV uses that smallest possible amount of adulticide that will kill adult vectors. ULV applied adulticides can also kill "non-target" insects.

C. Annual Report Review

Staff's review of annual reports from 2011 through 2014 found that all constituent concentrations from post-event application samples were below receiving monitoring limitation and triggers except for the following:

1. In May 2012, the San Joaquin County Mosquito and Vector Control District exceeded the receiving water limitation of 0.1 µg/L by 0.01 µg/L in one "event" sample in East Central Delta. In response to the exceedance, the district ceased application of malathion to East Central Delta for the season.
2. The Coachella Valley Mosquito and Vector Control District exceeded the Instantaneous Maximum Monitoring Trigger of 0.014 µg/L for piperonyl butoxide (PBO) in PBO/pyrethrin mixtures in three "event" samples collected in June 2012. However, two of the "background" samples collected prior to the application already exceeded the trigger.
3. The Greater Los Angeles County Vector Control District exceeded the Instantaneous Maximum Monitoring Trigger of 0.0019 µg/L for etofenprox in one "event" sample after an application of Zenivex in September 2012.
4. The Merced County Mosquito Abatement District exceeded the Instantaneous Maximum Monitoring Trigger of 0.014 µg/L for PBO in PBO/pyrethrin mixtures in three "event" samples in October 2012. One

"background" sample collected prior to the application already exceeded the trigger.

5. The Butte County Mosquito and Vector Control District exceeded the Instantaneous Maximum Monitoring Trigger of 0.014 µg/L for PBO in PBO/pyrethrin mixtures in one "event" sample in November 2012.

The mosquito and vector control districts reported these exceedances to the State Water Board and appropriate Regional Water Boards. The districts also conducted investigations of these exceedances and found no adverse effects.

IV. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in Section III of this Order. This section provides supplemental information, where appropriate, for the plans, policies, and regulations relevant to the discharge.

A. Legal Authorities

This Order is issued pursuant to section 402 of the CWA and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the California Water Code; commencing with section 13370. Section 122.28(a)(1) of title 40 of the Code of Federal Regulations [40 C.F.R. §122.28(a)(1)] allows NPDES permits to be written to cover a category of discharges within the State political boundaries as a general NPDES permit. U.S. EPA Region 9 has granted the State Water Board the authority to issue general NPDES permits.

This Order shall serve as a general NPDES permit for point source discharges of biological and residual pesticides to waters of the U.S. from larvicide and adulticide applications for vector control. This Order also serves as general Waste Discharge Requirements pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with § 13260).

B. California Environmental Quality Act

Pursuant to California Water Code section 13389, State and Regional Water Boards are exempt from the requirement to comply with chapter 3, division 13 of the Public Resources Code when adopting NPDES permits.

C. State and Federal Regulations, Policies, and Plans

1. Water Quality Control Plans

The Regional Water Boards have adopted Water Quality Control Plans (Basin Plans) that designate beneficial uses, establish water quality objectives, and contain implementation programs and policies to achieve those objectives for all waters addressed through the plans. In addition, the Basin Plans implement State Water Board Resolution 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. The Basin Plans identify typical beneficial uses as follows: municipal and domestic supply, agricultural irrigation* , stock watering, process supply, service supply, hydropower supply, water contact recreation, canoeing and rafting recreation, other non-contact water recreation, warm freshwater aquatic habitat, cold freshwater habitat, warm fish migration habitat* , cold fish migration habitat* , warm and cold spawning habitat* , wildlife habitat, navigation, rare, threatened, or endangered species habitat, groundwater recharge, and freshwater replenishment.

Requirements of this Order implement provisions contained in the applicable Basin Plans.

2. National Toxics Rule and California Toxics Rule

U.S. EPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May4, 1995 and November 9, 1999. About 40 criteria in the NTR applied in California. On May 18, 2000, U.S. EPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

3. State Implementation Policy

On March 2, 2000, the State Water Board adopted the SIP. The SIP became effective on April 28, 2000 with respect to the priority pollutant criteria promulgated for California by U.S. EPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plans. The SIP became effective on May 18, 2000 with respect to the priority pollutant criteria promulgated by U.S. EPA through the CTR. The State Water Board adopted amendments to the SIP on February 24,

2005 that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

4. Antidegradation Policy

Section 131.12 of 40 C.F.R. requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Basin Plans implement, and incorporate by reference, both the state and federal antidegradation policies.

This Order requires that discharges must be consistent with the provisions of 40 C.F.R. section 131.12 and Resolution 68-16. The conditions of this Order require residual pesticide discharges to meet applicable water quality objectives. Specifically, the Order sets receiving water limitations for malathion and receiving water monitoring triggers for the other active ingredients of chemical pesticides. This Order also requires the State Water Board to conduct a toxicity study to determine if residues, including active ingredients, inert ingredients, and degradation byproducts, in any combination, from pesticide applications cause toxicity to the receiving water or add toxicity to it if there is pre-existing toxicity prior to pesticide applications.

The requirements of this Order are protective of the broad range of beneficial uses set forth in basin plans throughout the state, constituting best control available consistent with the purposes of the pesticide application in order to ensure that pollution or nuisance will not occur. The conditions also ensure maintenance of the highest water quality consistent with maximum benefit to the people of state. The nature of pesticides is to be toxic in order to protect beneficial uses such as human health or long-term viability of native aquatic life. Lake Davis and Silver King Creek are examples of water bodies where the California Department of Fish and Wildlife (CDFW) has used chemical pesticides to eradicate the Northern Pike and non-native trout, respectively. Waters of exceptional quality may be degraded due to the application of pesticides; however, it would only be temporary and in the best interest of the people of the state. While surface waters may be temporarily degraded, water quality standards and objectives will not be exceeded after project completion.

Another example of the benefits of pesticide application and any temporary degradation of water quality occurring as a result is the Asian clam infestation in Lake Tahoe which may require the use of pesticides to eradicate the pest. The Asian clam is undesirable because it: (1) displaces native clams, snails, and other organisms living on the lake bottom, which are important members of the lake's native food web; (2) fosters the growth of bright green algae, which change the look of the water, and smell when they decompose; and (3) could help foster an invasion of quagga mussels, another aggressive non-native species, by creating desirable habitat for them. Eradication of these species is important to protect beneficial uses, including habitat for native species, and water conveyance. Discharges in compliance with this permit will maintain existing levels of water quality over the long term.

Given the nature of a general permit and the broad range of beneficial uses to be protected across the state, data analysis of specific water bodies is infeasible. While surface waters may be temporarily degraded, water quality standards and objectives will not be exceeded. The nature of pesticides is to be toxic in order to protect human health. However, compliance with receiving water limitations and other permit requirements is required. Therefore, this Order is consistent with State and federal antidegradation policies.

5. Endangered Species Act

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) or the Federal Endangered Species Act (16 U.S.C.§§ 1531 et seq.). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

D. Impaired Water Bodies on Clean Water Act 303(d) List

Under section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On June 26, 2015, U.S. EPA approved California's 2012 Water Quality Integrated Report and supporting documentation pursuant to CWA sections 303(d) and 305(b). The Basin Plans reference this list of Water Quality Limited Segments (WQLSs), which are defined as "…*those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet*

(or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 C.F.R. section130.2(j))." The Basin Plans also state, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*" Impaired waters do not support beneficial uses.

This Order does not authorize the discharge of biological and residual pesticides and their degradation by-products to waters of the U.S. that are impaired by same pesticide active ingredients. Impaired waters are those waters not meeting quality standards pursuant to section 303(d) of the CWA. California impaired waters, as approved by the State Water Board, are listed on the GIS Public State Water Board webpage (http://gispublic.waterboards.ca.gov/webmap/303d_2012/files/2012_USEPA_approv_3 03d_List_Final_20150807.xlsx).

E. Delegation to Executive Director

This Order covers the application of pesticides which are based on active ingredients that are currently registered by DPR for vector control. When DPR registers a new active ingredient for vector control, this Order must be reopened to add the new active ingredient and its receiving water limitations to the Order before the Discharger may begin using the active ingredient. In addition, when DPR registers a new active ingredient that is also a priority pollutant and the State Water Board has added the new active ingredient to this Order, this Order may also be reopened to allow the Discharger to obtain an exception from meeting receiving water limitations for the priority pollutant in accordance with SIP section 5.3. Furthermore, this Order may be reopened to allow dischargers to obtain an exception from meeting receiving water limitations for pollutants discharged into the Pacific Ocean in accordance with the California Ocean Plan. Amending this Order on a case-by-case basis is resource intensive for the State Water Board. Thus, this Order contains a delegation from the State Water Board to the Executive Director or his/her designee to amend this Order to add: (1) new active ingredients that have been registered by DPR along with their receiving water limitations; and (2) Dischargers to the SIP and California Ocean Plan exception list.

V. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the CWA and amendments thereto are applicable to the discharge.

The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations: (1) 40 C.F.R. section122.44(a) requires that permits include applicable technology-based limitations and standards; and (2) 40 C.F.R. section122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established.

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 C.F.R. 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to numeric criteria specifying maximum amounts of particular pollutants. Pursuant to 40 C.F.R. section 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that "*are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality*." Section 122.44(d)(1)(vi) of 40 C.F.R. further provides that "*[w]here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits*."

The CWA requires point source dischargers to control the amount of conventional, nonconventional, and toxic pollutants that are discharged into the waters of the U.S.. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in 40 C.F.R.: section 122.44(a) requires that permits include applicable technology-based limitations and standards; and section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established.

With respect to narrative objectives, the State Water Board must establish effluent limitations using one or more of three specified sources: (1) U.S. EPA's published water quality criteria; (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria; or (3) an indicator parameter (i.e., 40 C.F.R. 122.44(d)(1)(vi)(A), (B) or (C)). Basin Plans contain a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*." Basin Plans require the application of the most stringent objective necessary to ensure that surface water

and groundwater do not contain chemical constituents, discoloration, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. Basin Plans state that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. Basin Plans also limit chemical constituents in concentrations that adversely affect surface water beneficial uses. Basin Plans further state that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than maximum contaminant levels.

A. Discharge Prohibitions

1. The discharge of biological and residual pesticides at a location or in a manner different from that described in the Findings is prohibited.
2. The discharge of biological and residual pesticides shall not create a nuisance as defined in section 13050 of the California Water Code.
3. The discharge of biological and residual pesticides shall not cause, have a reasonable potential to cause, or contribute to an in-stream excursion above any applicable criterion promulgated by U.S. EPA pursuant to section 303 of the CWA, or any water quality objective adopted by the State or Regional Water Boards. For larvicide applications, this prohibition shall apply outside the treatment area during treatment, and in the treatment area after treatment has been completed.

B. Effluent Limitations

NPDES permits for discharges to surface waters must meet all applicable provisions of sections 301 and 402 of the CWA. These provisions require controls that use Best Available Technology Economically Achievable, Best Conventional Pollutant Control Technology, and any more stringent controls necessary to reduce pollutant discharge and meet water quality standards.

Title 40, C.F.R. section 122.44 states that if a discharge causes, has the reasonable potential to cause, or contributes to an excursion above a numeric or narrative water quality criterion, the permitting authority must develop effluent limits as necessary to meet water quality standards. Section 122.44(k)(3) of 40 C.F.R. allows the use of other requirements such as BMPs in lieu of numeric effluent limits if the latter are infeasible. It is infeasible for the State Water Board to establish numeric effluent limitations in this Order because:

1. The application of pesticides is not necessarily considered a discharge of pollutants according to the *National Cotton Council of America v. U.S.* EPA 553 F.3d 927 (6th Cir. 2009) and other applicable case law. However, the Sixth Circuit Court of Appeals ruled that residual pesticides associated with the application of pesticides at, over, or near water constitute

pollutants within the meaning of the CWA and that the discharge of such pollutants must be regulated under an NPDES permit;

2. This Order regulates biological and residual pesticides which are degradation byproducts or other pesticide ingredients that are present after the use of the pesticide for vector control. In larvicide applications, pesticides are applied directly to the water body and/or to vector larvae in the water or on the water surface and are not considered pollutants until sometime after actual discharge. In adulticide applications, any pesticide product or its degradation by-product that is deposited in waters of the U.S. is a pollutant. However, at what point the pesticide becomes a residue is not precisely known and varies depending on the type of spray system, wind speed and direction, temperature, droplet size distribution, droplet drift, water chemistry, etc. Therefore, in the application of pesticides, the exact effluent is unknown;

3. It would be impractical to provide effective treatment of biological and residual pesticides from vector control applications, given that typically, pesticide applications consist of numerous short duration intermittent pesticide residue releases to surface waters from many different locations; and

4. Treatment may render the pesticide useless for pest control. Therefore, the effluent limitations contained in this Order are narrative and include requirements to develop and implement a PAP that describes appropriate BMPs such as compliance with all pesticide label instructions. In addition, this Order requires compliance with: (a) narrative receiving water limitations; (b) a numeric receiving water limitation for malathion; and (c) required actions if receiving water monitoring triggers are exceeded.

   The BMPs required herein constitute Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology and are intended to: (1) minimize the area and duration of impacts caused by the discharge of biological and residual pesticides in the target area* and (2) allow for restoration of water quality and protection of beneficial uses of the receiving waters to pre-application quality following completion of an application event.

C. Best Management Practices

The development of BMPs provides the flexibility necessary to establish controls to minimize the area extent and duration of impacts caused by the discharge of biological and residual pesticides. This flexibility allows dischargers to implement appropriate BMPs for different types of applications and different types of waters.

Much of the BMP development has been incorporated into the pesticide regulation process by the U.S. EPA, DPR, CDPH, and county agricultural

commissioners. The Dischargers must be licensed by DPR or CDPH if such licensing is required for the pesticide application project. The pesticide use must be consistent with the pesticide label instructions and any Use Permits issued by county agricultural commissioners.

U.S. EPA and DPR scientists review pesticide labels to ensure that a product used according to label instructions will cause no harm (or "adverse impact") on non-target organisms that cannot be reduced (or "mitigated") with protective measures or use restrictions. Many of the label directions constitute BMPs to protect water quality and beneficial uses. Label directions may include: precautionary statements regarding toxicity and environmental hazards; directions for proper handling, dosage, application, and disposal practices; prohibited activities; spill prevention and response measures; and restrictions on type of water body and flow conditions.

A Use Permit issued by the county agricultural commissioner incorporates applicable suggested permit conditions from DPR and local site-specific conditions necessary to protect the environment. State regulations require that specific types of information be provided in an application to the county agricultural commissioners for a pesticide use permit. The county agricultural commissioners review the application to ensure that appropriate alternatives were considered and that any potential adverse effects are mitigated. The county agricultural commissioners also conduct pre-project inspections on at least five percent of projects.

This Order requires that Dischargers use BMPs when implementing vector control programs in order to mitigate effects to water quality due to biological and residual pesticide discharges from pesticide applications. Dischargers are required to determine and implement feasible non-toxic and least toxic alternatives to the selected pesticide application project that could reduce potential water quality impacts. The selection of non-toxic and least toxic alternatives is an example of an effective BMP.

D. Water Quality-Based Effluent Limitations

1. Scope and Authority

Section 122.44(d)(1)(i) of 40 C.F.R. mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using:

(1) U.S. EPA criteria under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the

pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 C.F.R. section 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plans, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

2. Receiving Water Beneficial Uses

Direct and spray applications for vector control may potentially deposit biological and residual pesticides to surface waters. Beneficial uses of receiving waters may include the following: municipal and domestic supply, agricultural irrigation, agricultural stock watering, process water supply, service water supply, and hydropower supply, water contact recreation, canoeing and rafting recreation, other non-contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm and cold spawning habitat, wildlife habitat, navigation, groundwater recharge, and freshwater replenishment.

3. Determining the Need for Water Quality-Based Effluent Limitations

- Water quality standards include Regional Water Board Basin Plan beneficial uses and narrative and numeric water quality objectives, State Water Board adopted standards, and federal standards, including the CTR and NTR, as well as antidegradation policies. The Basin Plans include numeric site specific water quality objectives and narrative objectives for toxicity, chemical constituents, and tastes and odors. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*." With regard to the narrative chemical constituents objective, the Basin Plans state that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, *"…water designated for use as domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels*" in Title 22 of the California Code of Regulations. The narrative tastes and odors objective states: "*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses*."

- Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard.

4. Antidegradation Policy

The permitted discharge is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. Due to the low volume of discharge expected from discharges regulated under this Order, the impact on existing water quality will be insignificant. Dischargers seeking authorization to discharge under this Order are required to demonstrate compliance with receiving water limitations during the application. If, however, the appropriate Regional Water Board, subsequent to review of any application, finds that the impact of a discharge will be significant, then authorization for coverage under this Order will be denied and coverage under an individual permit will be required (including preparation of an antidegradation analysis).

VI. RATIONALE FOR RECEIVING WATER LIMITATIONS AND MONITORING TRIGGERS

A. Groundwater

[Not Applicable]

B. Surface Water

CWA section 303(a-c), requires states to adopt water quality standards, including criteria necessary to protect beneficial uses. Regional Water Boards adopted water quality criteria as water quality objectives in the Basin Plans. The Basin Plans state that "*[t]he numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses."* The Basin Plans include numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains receiving surface water limitations based on the Basin Plans' numerical and narrative water quality objectives for biostimulatory substances, chemical constituents, color, temperature, floating material, settleable substances, suspended material, tastes and odors, and toxicity. This Order also requires compliance with any amendment or revision to the water quality objectives contained in the Basin Plans adopted by Regional Water Boards subsequent to adoption of this Order.

Once a pesticide has been applied to an application area, the pesticide product can actively control vector within the application area. Discharge of biological and residual pesticides produced by the application to surface water must meet

applicable water quality criteria and objectives. The receiving water limitations ensure that an application event does not result in an exceedance of a water quality standard in the receiving water. Receiving water is defined as any surface water or drainage courses where the pesticide may be deposited as a result of larvicide and adulticide applications.

To protect all designated beneficial uses of the receiving water, the most protective (lowest) and appropriate (to implement the CTR criteria and water quality objectives in the *Water Quality Control Plans*) limit should be selected as the water quality limit for a particular water body and constituent. In many cases, water quality standards include narrative, rather than numerical, water quality objectives. In such cases, numeric water quality limits from the literature or publicly available information may be used to ascertain compliance with these standards.

Pesticide formulations contain disclosed “active” ingredients that yield toxic effects on target organisms and may also have toxic effects on non-target organisms. Residual active ingredients that do not contain pollutants for which there are applicable numeric CTR criteria may still have toxic effects on receiving water bodies. In addition, the inactive or “inert” ingredients of pesticides, some of which are trade secrets and have not been publicly disclosed, may also contain toxic pollutants or pollutants that could affect water quality.

DPR is responsible for reviewing toxic effects of product formulations and determining whether a pesticide is suitable for use in California’s waters. In this Order, inert ingredients are also considered on a constituent-by-constituent basis. U.S. EPA regulates pesticide use through strict labeling requirements in order to mitigate negative impacts to human health and the environment. DPR environmental and medical toxicologists review toxicity data on formulations and can deny registration or work with registrants or county agricultural commissioners to impose additional requirements in order to protect human health or the environment.

U.S. EPA and DPR require that pesticides undergo toxicity testing and meet specific toxicity requirements before registering the pesticide for application to surface waters. U.S. EPA has found that the application of properly registered pesticides pose a minimum threat to people and the environment. In addition, the effects of these biological and residual pesticides on water quality will be mitigated through application of BMPs and compliance with FIFRA label requirements, monitoring requirements, and receiving water limitations.

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that surface water and groundwater be

maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the maximum contaminant levels set forth in title 22, California Code of Regulations. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plans require the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply*, or any other beneficial use.

Establishing Receiving Water Limitations and Receiving Water Monitoring Triggers

In pesticide applications for vector control, it is reasonable to conclude that some residual pesticides will be deposited in surface waters. These residual pesticides may cause toxicity to aquatic life. This Order contains a Receiving Water Limitation for malathion and Receiving Water Monitoring Triggers for the other active ingredients. The Receiving Water Limitation and Receiving Water Monitoring Triggers will be used to assess whether the discharge of residual pesticides has the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard. This Order includes an Instantaneous Maximum Receiving Water Monitoring Trigger for residual pesticides of concern.

The Instantaneous Maximum Receiving Water Limitations are based on promulgated water quality criteria such as those provided in the CTR, water quality objectives adopted by the State and Regional Water Boards in their water quality control plans, water quality criteria adopted by CDFW, or water quality standards such as drinking water standards adopted by the California Department of Public Health. In the absence of these adopted criteria, objectives, or standards, the State Water Board used U.S. EPA's *Ambient Criteria for the Protection of Freshwater Aquatic Life* (Ambient Water Quality Criteria) which are directly applicable as a regulatory level to implement narrative toxicity limitations included in all Regional Water Board Basin Plans. Where Ambient Water Quality Criteria are unavailable in addition to adopted criteria, objectives, or standards, the State Water Board used data from the *Ecotoxicity Database* to develop the Receiving Water Monitoring Triggers for individual pesticides and combinations of pesticides to protect all beneficial uses of the receiving water. In most, if not all cases, protection of the most sensitive aquatic life in receiving water provides protection of all beneficial uses of that receiving water.

For constituents that do not have Ambient Water Quality Criteria, the Instantaneous Maximum Receiving Water Monitoring Trigger is based on one-tenth of the lowest 50 Percent Lethal Concentration (LC50) from the *Ecotoxicity Database*. Using one-tenth of the lowest LC50 as the receiving water monitoring trigger is consistent with the Central Valley Regional Water Board's Basin Plan approach when developing the Daily Maximum limitation for pesticides that do not have water quality criteria.

The following is a detailed discussion of toxicity data, applicable water quality criteria, if available, and Receiving Water Monitoring Triggers, if required, for: 1) larvicides, including microbial larvicides (*Bti* and *B. sphaericus*), petroleum distillates, methoprene, temephos, pyriproxyfen, monomolecular films, and spinosad; and 2) adulticides, including organophosphate insecticides (malathion and naled), pyrethrin, pyrethroids (deltamethrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, resmethrin, sumithrin), piperonyl butoxide (PBO), and N-octyl bicycloheptene dicarboximide (or MGK-264). Among these pesticides, only malathion has Ambient Water Quality criteria. Thus, the Instantaneous Maximum Receiving Water Monitoring Trigger for temephos, naled, pyrethrin, deltamethrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, resmethrin, sumithrin, PBO, pyriproxyfen, and MGK-264 is based on one-tenth of the lowest LC50.

This Order may be reopened to add receiving water limitations if the monitoring result for temephos, naled, pyrethrin, deltamethrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, resmethrin, sumithrin, PBO, pyriproxyfen, and MGK-264 exceed the associated monitoring trigger.

1. Larvicides

a. Microbial Larvicides

Microbial larvicides are bacteria that are registered as pesticides for control of vector larvae in outdoor areas such as irrigation ditches, flood water, standing ponds, woodland pools, pastures, tidal water, fresh or saltwater marshes, and storm water retention areas. Duration of effectiveness depends primarily on the vector species, the environmental conditions, the formulation of the product, and water quality. Microbial larvicides may be used along with other vector control measures in an Integrated Pest Management program. The microbial larvicides used for vector control are *Bti* and *B. sphaericus*.

- *Bti* is a naturally occurring soil bacterium registered for control of mosquito and midge larvae as well as blackflies. *Bti* was first registered by U.S. EPA as an insecticide in 1983. *Bti* is typically in liquid, granular or pellet form and is distributed on the surface of standing waters. When the mosquito larvae ingest the bacteria, crystallized toxins are produced which destroy the

larvae's digestive tract. Larvae become sluggish and die within 24 hours. The toxin disrupts the gut in the mosquito by binding to receptor cells present in insects, but not in mammals. Persistence of *Bti* is low in the environment. It usually lasts 1 to 4 days due to sensitivity to ultraviolet light.

- B. sphaericus is a naturally occurring bacterium that is found throughout the world. *B. sphaericus* was initially registered by U.S. EPA in 1991 for use against various kinds of mosquito larvae. *B. sphaericus* works in a manner very similar to *Bti*. Mosquito larvae of susceptible species ingest a lethal dose of *B. sphaericus* crystals and spores. Toxins are released in the larval midgut, paralyzing and damaging the digestive system. The larvae undergo tremors, become sluggish, and die with 48 hours.

The microbial pesticides have undergone extensive testing prior to registration. U.S. EPA has determined that microbial pesticides are essentially non-toxic to humans and do not pose risks to wildlife, non-target species, or the environment when they are used according to label directions.

Therefore, this Order does not include a Receiving Water Monitoring Trigger for *Bti* and *B. sphaericus*.

b. Monomolecular Films

Monomolecular films are low-toxicity pesticides that spread a thin film on the surface of the water that makes it difficult for mosquito larvae, pupae, and emerging adults to attach to the water's surface, causing them to drown. Reported half-lives of monomolecular films in water range from 5 to 22 days. They have been used in the U.S. in floodwaters, brackish waters, and ponds. They may be used along with other vector control measures in an Integrated Pest Management program. They are also known under the trade name Agnique monomolecular film with the active ingredient as Poly (oxy-1,2-ethanediyl), α-(C_{16-20} branched and linear alkyl)-ω-hydroxy. Agnique has an average persistence in the environment of 5 to 21 days at label application rates.

U.S. EPA has concluded that monomolecular films, when used according to label directions for larva and pupa control, pose minimal risks to the environment. They do not last very long in the environment, and are usually applied only to standing water, such as roadside ditches, woodland pools, or containers which contain few non-target organisms. Therefore, this Order does not include a Receiving Water Monitoring Trigger for monomolecular films.

c. Petroleum Distillates

Petroleum distillates, like monomolecular films, are pesticides used to form a coating on top of water to drown larvae, pupae, and emerging adult mosquitoes. Special-derived petroleum distillates are mineral oils. Petroleum distillates have been used for many years in the U.S. to kill aphids on crops and orchard trees, and to control mosquitoes. They may be used along with other vector control measures in an Integrated Pest Management program.

Petroleum distillates are effective in many situations in which monomolecular films do not give effective control. Petroleum distillates generally have a shorter environmental persistence (approximately two to three days) than most chemical larvicide alternatives. They are also effective in areas known to produce mosquitoes for only a very short time duration, areas which are expected to be dry for some time periods, or where the use of longer duration products would not be warranted, such as swales along rivers and lakes, and certain types of floodwater habitats.

U.S. EPA has determined that petroleum distillates, when used according to label directions for mosquito larva and pupa control, do not pose a risk to human health. In addition to low toxicity, there is little opportunity for human exposure, since the material is applied directly to ditches, ponds, marshes, or flooded areas that are not drinking water sources.

According to the July 12, 2006 *Reregistration Eligibility Decision for Aliphatic Solvents*, there was no lethality observed in any of the tests conducted with fish species, estuarine/marine invertebrates (mysid shrimp), mammals, or birds. Due to the characteristics of the products, it is likely that petroleum distillates would not mix within the water column and the exposures would be restricted to a much higher concentration at the film layer on the surface of the water. Thus, there would be a higher concentration exposure at the surface, but in a smaller proportion of the entire water body, and a lower concentration throughout the vertical extent of the water body. Therefore, any possible adverse effects on the critical components of the aquatic ecosystem would be much lower within the water column than on the surface layer.

Petroleum distillates, if misapplied, may be toxic to fish and other aquatic organisms. For that reason, U.S. EPA has established specific precautions on the label to reduce such risks.

Based on the above considerations, this Order does not contain a Receiving Water Monitoring Trigger for petroleum distillates.

d. Methoprene

Methoprene was first registered by U.S. EPA as a conventional chemical pesticide in 1975. U.S. EPA issued a Registration Standard for methoprene in February 1982. Subsequently, U.S. EPA reclassified methoprene as a biochemical pesticide. U.S. EPA issued the Reregistration Eligibility Document (RED) in 1991 and reregistration of the active ingredient and all end-use products was completed in 1997.

Methoprene is the common name for isopropyl-(2E,4E,7R,S)-11-methoxy3,7,11-trimethyldodeca-2,4-dienoate. It is a racemic mixture of two enantiomers (R and S in a ratio of 1:1). The activity of the compound as a juvenile hormone is restricted to the S enantiomer. Methoprene is an insect growth regulator with activity against a variety of insect species including mosquitoes. Methoprene is considered a biochemical pesticide because rather than controlling target pests through direct toxicity, methoprene interferes with an insect's life cycle and prevents it from reaching maturity or reproducing by mimicking the activity of natural juvenile insect hormone. It is applied to water to kill mosquito larvae, and it may be used along with other vector control measures in an Integrated Pest Management program. Methoprene can be applied as briquets (similar in form to charcoal briquets), pellets, sand granules, and liquids. The liquid and pelletized formulations can be applied by helicopter and fixed-wing aircraft.

According to U.S. EPA's June 2001 Update of the March 1991 Methoprene RED Fact Sheet (2001 RED), methoprene is of low toxicity and poses very little hazard to people and other non-target species. Exposure to methoprene residues is not expected from drinking water. It is also indicated that methoprene will not result in unreasonable adverse effects on the environment since methoprene degrades rapidly in sunlight, both in water and on inert surfaces. Methoprene is also metabolized rapidly in soil and does not leach. Thus, methoprene is not expected to persist in soil or contaminate ground water. The 2001 RED also concluded that ecological concerns contained in the 1991 RED related to toxicity to estuarine invertebrates have been alleviated as a result of submission of the estuarine invertebrate life cycle toxicity study in 1996, which indicated minimal chronic risk to mysid shrimp.

Based on the above considerations, this Order does not contain a Receiving Water Monitoring Trigger for methoprene.

e. Temephos

Temephos is an organophosphate (OP) pesticide registered by U.S. EPA in 1965 to control mosquito larvae. It is the only OP pesticide with larvicidal use. It is an important resistance management tool for vector control programs. Its use helps prevent vector from developing resistance to the bacterial larvicides. Temephos is used in areas of standing water, shallow ponds, swamps, marshes, and intertidal zones. It may be used along with other vector control measures in an IPM program. Temephos is applied to water most commonly by helicopter but can be applied by backpack sprayers, fixedwing aircraft, and right-of-way sprayers in either liquid or granular form.

U.S. EPA has determined that when temephos is applied according to the label for vector control, it does not pose unreasonable risks to human health. It is applied to water and the amount of temephos is very small in relation to the area covered (less than 1 ounce of active ingredient per acre for the liquid and 8 ounces per acre for the granular formulations.) Temephos breaks down within a few days in water, and post-application exposure is minimal. However, at high dosages, temephos, like other OP pesticides, can overstimulate the nervous system causing nausea, dizziness, and confusion.

Because temephos is applied directly to water, it is not expected to have a direct impact on terrestrial animals or birds. Current mosquito larviciding techniques pose some risk to non-target aquatic species and the aquatic ecosystem. Although temephos presents relatively low risk to birds and terrestrial species, available information suggests that it is more toxic to aquatic invertebrates than alternative larvicides. For this reason, U.S. EPA is limiting temephos use to areas where less-hazardous alternatives would not be effective, specifying intervals between applications, and limiting the use of high application rates.

Toxicity data for temephos were obtained from the *Ecotoxicity Database* to assess toxicity of temephos to freshwater aquatic life. Table D-1 summarizes toxicity data for temephos.

Table D-1. Summary of Toxicity Data for Temephos

Test Species	Study Length	LC50 (µg/L)
Scud	96 hrs	80
Scud	96 hrs	640
Bluegill sunfish	96 hrs	21,800
Bluegill sunfish	96 hrs	1,140

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	43,000
Bluegill sunfish	96 hrs	9,900
Fathead minnow	96 hrs	34,100
Rainbow trout	96 hrs	160
Rainbow trout	96 hrs	9,580
Rainbow trout	96 hrs	3,490
Rainbow trout	96 hrs	13,800
Rainbow trout	96 hrs	4,750
Rainbow trout	96 hrs	158
Rainbow trout	96 hrs	18,800
Brook trout	96 hrs	12,800
Brook trout	96 hrs	5,000
Channel catfish	96 hrs	3,230
Lake trout	96 hrs	3,650
Largemouth trout	96 hrs	1,440
	Lowest LC50 = 80 µg/L	
	Lowest LC50/10 = 8 µg/L	

Ambient Water Quality Criteria are unavailable for temephos. Table D-1 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for temephos is 8 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 8 µg/L for temephos. This monitoring trigger is based on implementing the Basin Plans' narrative toxicity objective of no toxics in toxic amounts and is only applicable to applications using temephos-based larvicide products.

f. Spinosad

Spinosad is a biologically derived insecticide produced via fermentation culture of the actinomycete *Saccharopolyspora spinosa*, a bacterial organism isolated from soil. It is composed of a mixture of two members of the chemical class of 12-membered macrocyclic lactones in a unique tetracyclic ring. Each component, designated spinosyn A and spinosyn D, is an unsaturated tetracyclic ester with two sugar derivatives (forosamine and rhamnose sugars) attached through ether linkages. Spinosyn A and D are identical in structure except for an additional methyl group on the core macrolide of spinosyn D. Technical grade spinosad is a light gray to white crystalline solid with an odor of slightly stale water.

Spinosad is a naturally occurring insecticide with stomach poison and contact activity. It activates the central nervous system of insects through interaction with the nicotinic acetylcholine receptors. Immediately after application, insect pests exhibit irreversible tremors, prostrate trembling, paralysis, and death.

It is stable to metal and metal ions for 28 days, degrades under ultra-violet light, and is non-phytotoxic when used as directed. It is non-explosive, nonreactive toward monoammonium phosphate, zinc, and water, and reactive toward potassium permanganate. Spinosad is soluble in water, and soluble in common organic solvents such as acetone, acetonitrile, methanol, and toluene. Spinosad is relatively short-lived in the field and photodegrades rapidly. Its half-life* is less than one day.

U.S. EPA determined that spinosad does not leach, bioaccumulate, volatilize, or persist in the environment, Spinosad will degrade photochemically when exposed to light after application, Because spinosad strongly adsorbs to most soils, it does not leach through soil to groundwater. Spinosad demonstrates low mammalian and avian toxicity. It does not pose long-term health problems in mammals. In addition, a low potential for acute toxicity exists due to low oral, dermal, and inhalation toxicity from the use of spinosad.

Spinosad is the winner of both 1999 and 2010 *Designing Greener Chemicals Award*. This Award promotes pollution prevention through partnerships with the chemistry community. Through high level recognition and support, the Award promotes innovative developments in and uses of green chemistry for pollution prevention. U.S. EPA's Office of Pollution Prevention and Toxics is leading this voluntary partnership program with other U.S. EPA offices, other

federal agencies, members of the chemical industry, trade associations, scientific organizations, and academia.

Based on the above considerations, this Order does not contain a Receiving Water Monitoring Trigger for spinosad.

g. Pyriproxyfen

Pyriproxyfen is the common name for 2- [1-methyl-2-(4-phenoxyphenoxy) ethoxy] pyridine. Pyriproxyfen is a juvenile hormone analogue that acts as an insect growth regulator. Pyriproxyfen interferes with the normal hormonal activity of juvenile mosquitos by preventing the metamorphosis of pupae to adult mosquitos that are capable of transmitting vector dengue and other pathogens.

In 1999, the California Department of Pesticide Regulation registered pyriproxyfen as an approved, active ingredient. Pesticide products containing pyriproxyfen have primarily been used to control red imported fire ants, fleas, and ticks. In 2019, the California Department of Pesticide Regulation approved the pyriproxyfen use for mosquito control within water bodies. The pyriproxyfen use in conjunction with other vector control measures leads to a robust Integrated Pest Management program that reduces the risk of pesticide resistance.

Due to its low solubility, pyriproxyfen's persistence in water declines substantially in the absence of organic matter and increased temperature and sunlight exposure. Since pyriproxyfen is highly susceptible to photodegradation in water, its half-life is less than 10 days in aqueous buffer and up to 20 days in river water.

Based on available information from the United States Environmental Protection Agency, within aerobic soils, pyriproxyfen degrades rapidly through biological catalysis, thus acting as a carbon source for soil microorganisms. However, within anaerobic conditions such as brackish waters or sediments, pyriproxyfen is much more stable, persistent, and toxic to aquatic invertebrates. For this reason, best management practices should be applied when applying pyriproxyfen to or near water bodies.

Toxicity data for pyriproxyfen were obtained from the *Ecotoxicity Database* to assess toxicity of pyriproxyfen to freshwater aquatic life. Table D-2 summarizes toxicity data for pyriproxyfen.

Table D-2. Summary of Toxicity Data for Pyriproxyfen

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hr	5900

Bluegill sunfish	96 hr	270
Mysid	96 hr	67
Mysid	96 hr	65
Rainbow trout	96 hr	4500
Rainbow trout	96 hr	325
Sheepshead minnow	96 hr	320
	Lowest LC50 = 65 µg/L	
	Lowest LC50/10 = 6.5 µg/L	

Ambient Water Quality Criteria are not available for pyriproxyfen. Table D-2 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for pyriproxyfen is 6.5 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 6.5 µg/L for pyriproxyfen. This monitoring trigger is based on implementing the Basin Plans' narrative toxicity objective of no toxics in toxic amounts, and is only applicable to pyriproxyfen-based larvicide product applications.

2. Adulticides

The receiving water monitoring trigger for each constituent below is based on the Basin Plans' narrative toxicity objective of no toxics in toxic amounts. This trigger is only applicable to spray applications using each of the adulticide products.

a. Organophosphate Insecticides

i. Malathion

Malathion is an OP insecticide that has been registered for use in the U.S. since 1956. It is used in agriculture, residential gardens, public recreation areas, and in public health pest control programs.

Malathion is an adulticide, which is used to kill adult mosquitoes. In vector control programs conducted by state or local authorities, malathion is applied by truck-mounted or aircraft-mounted sprayers. Malathion is applied as a ULV spray. ULV sprayers

dispense very fine aerosol droplets that stay aloft and kill mosquitoes on contact.

Malathion is highly toxic to insects, including beneficial insects such as honeybees. For that reason, U.S. EPA has established specific precautions on the label to reduce such risks. Malathion is classified as an Acute Toxicity Category III compound. Although it is less acutely toxic than other OP insecticides, adverse health effects have been reported by exposed persons.

U.S. EPA has also refined its characterization of the potential risk from malaoxon, a more toxic compound that is formed from malathion under certain conditions. For example, malathion runoff and spray drift may reach drinking water sources downstream from where the malathion was used. Malathion present in untreated water will form malaoxon during the chlorination process in water treatment facilities. Malaoxon can also form more slowly when malathion is deposited on hard, dry surfaces and exposed to air over time. U.S. EPA's assessment shows that even when considering the presence of malaoxon on surfaces following applications of malathion for vector control, the relatively low application rates and small droplet sizes used in these types of applications result in minimal exposure to people in the treated area.

U.S. EPA has established an ambient water quality criterion of 0.1 µg/L both as a continuous concentration (four-day average) and instantaneous maximum concentration for the protection of freshwater aquatic life for malathion. The U.S. EPA Integrated Risk Information System Reference Dose as a drinking water level for malathion is 140 µg/L. The U.S. EPA Suggested-No-Adverse-Response-Level for toxicity other than cancer risk for malathion is 100 µg/L.

Under section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality limited segments. The waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires for waters on the list that priority rankings be established for the development of action plans, called Total Maximum Daily Loads, to improve the water quality. California impaired waters due to malathion, as approved by the State Water Board, are listed on http://gispublic.waterboards.ca.gov/webmap/303d_2012/files/2012_USE PA_approv_303d_List_Final_20150807.xlsx.

Due to impairment by malathion, this Order does not authorize the discharge of residual malathion to the water bodies identified on the California 303(d) listing as impaired by malathion.

DPR collected water and sediment samples during the summer of 2003 for OP and pyrethroid pesticides in the San Joaquin River Watershed (Stanislaus County) and Salinas River Watershed (Monterey County). The purpose of this study was to determine the presence of pyrethroid insecticides in water and bed sediments and the presence of OP pesticides in water during the summer growing season. The Salinas and San Joaquin valleys were selected because they are important agricultural regions in California. Sampling sites were chosen on waterways whose flows are dominated by summer agricultural run-off. For Monterey County, malathion was detected in 17 of 64 samples with a maximum concentration of 0.544 µg/L, while 9 of 17 detected samples were reported as “trace,” which means the concentration was detected above the method detection limit (MDL) but below reporting limit (RL). The MDL and RL for malathion were reported at 0.0117 µg/L and 0.04 µg/L, respectively. For Stanislaus County, malathion was detected in 1 of 68 samples at a concentration of 0.0741 µg/L.

Based on the information set forth above, this Order contains a Receiving Water Limitation of 0.1 µg/L for malathion.

ii. Naled

Naled is an OP insecticide that has been registered since 1959 for use in the U.S. It is used primarily for controlling adult mosquitoes, but naled is also used on food and feed crops and in greenhouses.

In vector control programs conducted by state or local authorities, naled is applied by truck-mounted or aircraft-mounted sprayers. Naled is applied as an ULV spray. ULV sprayers dispense very fine aerosol droplets that stay aloft and kill mosquitoes on contact.

At high doses, naled like other OP pesticides, can overstimulate the nervous system causing nausea, dizziness, or confusion. Severe highdose poisoning with any OP pesticide can cause convulsions, respiratory paralysis, and death. There is potential for risks to invertebrates from the repeated use of naled. Naled is highly toxic to insects, including beneficial insects such as honeybees. For that reason, U.S. EPA has established specific

precautions on the label to reduce such risk. Naled is an acute toxicity level I OP pesticide.

Toxicity data for naled were obtained from the *Ecotoxicity Database* to assess toxicity of naled to freshwater aquatic life. Table D-3 summarizes toxicity data for naled.

Table D-3. Summary of Toxicity Data for Naled

Test Species	Study Length	LC50 (µg/L)
Scud	96 hrs	18
Scud	96 hrs	14
Scud	48 hrs	0.14
Fathead minnow	96 hrs	3,300
Bluegill sunfish	96 hrs	2,200
Rainbow trout	96 hrs	195
Rainbow trout	96 hrs	345
Rainbow trout	96 hrs	160
Mysid	96 hrs	8.8
Channel catfish	96 hrs	710
Cutthroat trout	96 hrs	127
Lake trout	96 hrs	87
Largemouth bass	96 hrs	1,900
Striped bass	96 hrs	500
	Lowest LC50 = 0.14 µg/L	
	Lowest LC50/10 = 0.014 µg/L	

Ambient Water Quality Criteria are unavailable for naled. Table D-3 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for naled is 0.014 µg/L.

Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.014 µg/L for naled.

b. Pyrethrin

Pyrethrin is an insecticide that is derived from the extract of chrysanthemum flowers. Pyrethrins have a soil half-life of 12 days. The plant extract called pyrethrum contains pyrethrin I and pyrethrin II; collectively, these are called pyrethrins.

A study from the UC Berkeley (*Aquatic Effects of Aerial Spraying for Mosquito Control over an Urban Area*, Weston, et al., Environ. Sci. Technol. 2006, 40, 5817-5822) on aquatic effects of aerial spraying for adult mosquito control found that a few hours after spraying, 35 percent of the water samples contained measurable pyrethrin residues (up to 3.8 µg/L), but pyrethrin was not detected in any water sample collected before or 10 to 34 hours after spraying. Water sampling results were similar to that conducted by the local mosquito control district in which none of 14 water samples was detected with pyrethrin prior to spraying. Pyrethrin was not detected in any sediment sample in two creeks before spraying for which pre-spray data were available; however, sediments in these two creeks were found to contain pyrethrin at a maximum concentration of 372 µg/kg immediately following the aerial application (eight days later). This study was conducted to evaluate effects of mosquito control agents on aquatic life within an urban setting due to aerial applications of insecticide containing pyrethrin and the synergist PBO over Sacramento in an effort to combat West Nile virus in 2005.

Toxicity data for pyrethrin were obtained from the *Ecotoxicity Database* to assess toxicity of pyrethrin to freshwater aquatic life. Table D-4 summarizes toxicity data for pyrethrin.

Table D-4. Summary of Toxicity Data for Pyrethrin

Test Species	Study Length	LC50 (µg/L)
Scud	96 hrs	1.4
Bluegill sunfish	96 hrs	104
Bluegill sunfish	96 hrs	41
Bluegill sunfish	96 hrs	10
Fathead minnow	96 hrs	74

Test Species	Study Length	LC50 (µg/L)
Rainbow trout	96 hrs	20
Rainbow trout	96 hrs	3.2
Rainbow trout	96 hrs	5.1
Mysid	96 hrs	1.4
Brown trout	96 hrs	19.4
Channel catfish	96 hrs	8.96
Chinook salmon	96 hrs	44.5
Lake trout	96 hrs	19.7
Largemouth trout	96 hrs	33
Smallmouth bass	96 hrs	22
Yellow perch	96 hrs	44.5
	Lowest LC50 = 1.4 µg/L	
	Lowest LC50/10 = 0.14 µg/L	

Ambient Water Quality Criteria are unavailable for pyrethrin. Table D-4 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for pyrethrin is 0.14 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.14 µg/L for pyrethrin.

c. Pyrethroids

Pyrethroids are synthetic (human-made) chemical insecticides that act in a similar manner to pyrethrins. They work by quickly paralyzing the nervous systems of insects, producing a quick "knockdown" effect on insect pest populations. Pyrethroids are widely used for controlling various insects. Permethrin, resmethrin, and sumithrin are synthetic pyrethroids commonly used in vector control programs to kill adult vectors.

Vector control professionals apply pyrethroids as an ULV spray. ULV sprayers dispense very fine aerosol droplets that stay aloft and kill

adult mosquitoes on contact. Pyrethroids used in vector control are typically mixed with a synergist compound, such as PBO, which enhances the effectiveness of the active ingredient.

Pyrethroids are considered to pose slight risks of acute toxicity to humans, but at high doses, pyrethroids can affect the nervous system. Vector control formulations of permethrin break down in the environment, and high temperatures and sunlight accelerate this process. However, pyrethroids are toxic to fish and to bees.

Pyrethroids are designed to breakdown more slowly than the naturally occurring pyrethrin. While pyrethrins, extremely sensitive to light, heat and moisture, break down in a few hours, the synthetic pyrethroids are stable and persist in the environment much longer. With a few exceptions, pyrethroids break down most quickly in direct sunlight, usually just a few days after application. However, in areas with limited sunlight, pyrethroids can persist for months.

According to the Scientific Investigations Report (Hladik M.L., Orlando J.L., and K.M. Kuivila. 2009. Collection of Pyrethroids in Water and Sediment Matrices: Development and Validation of a Standard Operating Procedure: U.S. Geological Survey Scientific Investigations Report 2009-5012, 22p.) from U.S. Geological Survey prepared in cooperation with the U.S. EPA, pyrethroids are challenging to measure accurately in environmental samples. Sample-collection devices, sample-collection and laboratory-container material, container size, holding conditions, and sample-handling procedures have been found to have significant influences on the losses of pesticides onto container walls. The Report identifies the following techniques to minimize pyrethroid sorption to sample containers:

- Container composition affects the extent of pyrethroid loss:
    - Pyrethroids associate less to glass containers than plastic (highdensity polyethylene or low-density polyethylene);
    - Teflon has the greatest pyrethroid association;
- Containers should be agitated vigorously for at least one minute before transfer to another container;
- Use larger sample containers;
- When pumping through larger filtration apparatuses (plate filter, autosampler), pump speeds should be greater than 500 mL/min;

- Composition of the water affects the extent of association of pyrethroids to container surfaces: when adding higher amounts of dissolved organic carbon or suspended sediments to a water matrix, a lower amount of pyrethroids associated to the container surfaces;
- Appreciable losses of pyrethroids were not found for sediment samples collected in glass containers; and
- When possible, water samples should be analyzed within three days of collection. Sediment samples can be frozen for up to six months.

The Report is available at the United States Geological Survey Publications webpage (http://pubs.usgs.gov/sir/2009/5012/).

Under section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality limited segments. The waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires for waters on the list that priority rankings be established for the development of action plans, called Total Maximum Daily Loads, to improve the water quality. California impaired waters due to pyrethroids, as approved by the State Water Board, are listed on the GIS Public State Water Board webpage (http://gispublic.waterboards.ca.gov/webmap/303d_2012/files/2012_USEPA_ approv_303d_List_Final_20150807.xlsx). The pyrethroids of concern for this listing are bifenthrin, lambda cyhalothrin, efenvalerate/fedvalerate, and permethrin. This Order does not authorize the discharge of residual pyrethroids to the water bodies identified on the California 303(d) listing as impaired for pyrethroids.

i. Deltamethrin

Deltamethrin is a synthetic pyrethroid insecticide. Deltamethrin controls numerous insect pests on field crops. Deltamethrin has very good residual activity for outdoor uses and for indoor uses. Deltamethrin formulations include concentrates, wettable powders, ULV, and flowable formulations and granules. Deltamethrin works by disrupting the insect's nervous system and will be used primarily for barrier applications.

Toxicity data for deltamethrin were obtained from U.S. EPA's Ecotoxicity Database to assess the toxicity of deltamethrin to freshwater aquatic life. Table D-5 below summarizes the toxicity data for deltamethrin.

Table D-5. Summary of Toxicity Data for Deltamethrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	1.4
Mysid	96 hrs	0.0037
Mysid	96 hrs	0.0017
Rainbow trout	96 hrs	0.91
Sheepshead minnow	96 hrs	0.58
	Lowest LC50 = 0.0017 µg/L	
	Lowest LC50/10 = 0.00017 µg/L	

Ambient Water Quality Criteria are unavailable for deltamethrin. Table D-5 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for deltamethrin is 0.00017 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.00017 µg/L for deltamethrin.

ii. Etofenprox

Etofenprox is a synthetic pyrethroid-like substance. It differs in structure from pyrethroids in that it lacks a carbonyl group. Etofenprox contains an ether moiety whereas pyrethroids contain ester moieties. Its mode of action against insects is very similar to that of pyrethroids, and its main action site is the neuronal axon.

Toxicity data for etofenprox were obtained from the *Ecotoxicity Database* to assess toxicity of etofenprox to freshwater aquatic life. Table D-6 summarizes toxicity data for etofenprox.

Table D-6. Summary of Toxicity Data for Etofenprox

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	13
Bluegill sunfish	96 hrs	2.4

Test Species	Study Length	LC50 (µg/L)
Rainbow trout	96 hrs	2.7
Rainbow trout	96 hrs	3.3
Mysid	96 hrs	0.019
	Lowest LC50 = 0.019 µg/L	
	Lowest LC50/10 = 0.0019 µg/L	

Ambient Water Quality Criteria are unavailable for etofenprox. Table D-6 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for etofenprox is 0.0019 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.0019 µg/L for etofenprox.

iii. Lambda-Cyhalothrin

Lambda-cyhalothrin belongs to the pyrethroid chemical group. It may be used for pest management or in public health applications to control insects such as cockroaches, mosquitos, ticks, and flies which may act as disease vectors.

Lambda-cyhalothrin works by disrupting the normal functioning of the nervous system in an organism. This disruption of the nervous system can cause paralysis or death in an organism. Lambda-cyhalothrin will be used primarily for barrier applications.

Toxicity data for lambda-cyhalothrin were obtained from the Ecotoxicity Database to assess toxicity of lambda-cyhalothrin to freshwater aquatic life. Table D-7 summarizes toxicity data for lambda-cyhalothrin.

Table D-7. Summary of Toxicity Data for Lambda – Cyhalothrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	0.21
Mysid	96 hrs	0.0041
Rainbow trout	96 hrs	0.24

Test Species	Study Length	LC50 (µg/L)
Rainbow trout	96 hrs	0.19
	Lowest LC50 = 0.0041 µg/L	
	Lowest LC50/10 = 0.00041 µg/L	

Ambient Water Quality Criteria are unavailable for lambda-cyhalothrin. Table D-7 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for lambda-cyhalothrin is 0.00041 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.00041 µg/L for lambda-cyhalothrin.

iv. Permethrin

Permethrin is an odorless, colorless crystalline solid or a viscous liquid that is white to pale yellow. Permethrin has been registered by U.S. EPA since 1977. It is currently registered and sold in a number of products such as household insect foggers and sprays, tick and flea sprays for yards, flea dips and sprays for cats and dogs, termite treatments, agricultural and livestock products, and vector abatement products. The results of one study indicate that permethrin has a halflife of less than 2.5 days. When exposed to sunlight, the half-life was 4.6 days. Compared to other pyrethroids, permethrin is very stable, even when exposed to ultraviolet light. Permethrin is strongly absorbed to soil and other organic particles, with half-lives in soil of up to 43 days.

CDFW developed the maximum concentration criterion of 0.03 µg/L as a one-hour average to protect the freshwater aquatic life for permethrin. The U.S. EPA Integrated Risk Information Reference Dose as a drinking water level for permethrin is 350 µg/L.

DPR conducted samplings from November 2002 through March 2003, in tributaries to the Sacramento and San Joaquin Rivers for the Surface Water Protection Program to determine if insecticides esfenvalerate and permethrin were moving off site into surface waters during winter storm events. All of four sites selected are dominated by agricultural inputs. During this monitoring period, permethrin was detected in 1 of 39 samples, at a concentration of 0.094 µg/L

DPR also collected water and sediment samples during the summer of 2003 for organophosphate and pyrethroid pesticides in the San Joaquin River Watershed (Stanislaus County) and Salinas River Watershed (Monterey County). The purpose of this study was to determine the presence of pyrethroid insecticides in water and bed sediments and the presence of OP pesticides in water during the summer growing season. The Salinas and San Joaquin valleys were selected because they are important agricultural regions in California. Sampling sites were chosen on waterways whose flows are dominated by summer agricultural runoff. For Monterey County, permethrin was detected in 13 of 64 samples with a maximum concentration of 162 µg/L. Four of 13 detected samples were reported as “trace,” which means the concentration was detected above the MDL but below RL. The MDL and RL for permethrin were reported at 0.0169 µg/L and 0.05 µg/L, respectively. For the Stanislaus County, permethrin was detected in 1 of 68 samples and was reported as “trace.”

U.S. EPA’s freshwater Ambient Water Quality Criteria are unavailable for permethrin. CDFW has developed an interim maximum concentration criterion of 0.03 µg/L as a one-hour average to protect freshwater aquatic life for permethrin

Toxicity data for permethrin were obtained from the *Ecotoxicity Database* to assess toxicity of permethrin to freshwater aquatic life are shown in Table D-8.

Table D-8. Summary of Toxicity Data for Permethrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	5.0
Rainbow trout	96 hrs	2.9
Fathead minnow	96 hrs	5.7
Scud	96 hrs	0.17
Sheepshead minnow	96 hrs	7.8
Pink shrimp	96 hrs	0.22
Mysidt	96 hrs	0.019

Test Species	Study Length	LC50 (µg/L)
	Lowest LC50 = 0.019 µg/L	
	Lowest LC50/10 = 0.0019 µg/L	

Table D-8 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for permethrin is 0.0019 µg/L. This value is lower than CDFW's interim maximum concentration criterion of 0.03 µg/L as a one-hour average to protect freshwater aquatic life. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.0019 µg/L for permethrin.

v. Prallethrin

Prallethrin is a synthetic pyrethroid with fast knock-down activity against household insect pests. It is used in household insecticide products against mosquitoes, houseflies, and cockroaches. Prallethrin also has veterinary uses in the treatment of domestic pets. Prallethrin is very toxic to bees and fish but of low toxicity to birds.

Toxicity data for prallethrin were obtained from the *Ecotoxicity Database* to assess toxicity of prallethrin to freshwater aquatic life. Table D-9 summarizes toxicity data for prallethrin.

Table D-9. Summary of Toxicity Data for Prallethrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	22
Rainbow trout	96 hrs	12
Mysid	96 hrs	3.9
	Lowest LC50 = 3.9 µg/L	
	Lowest LC50/10 = 0.39 µg/L	

Ambient Water Quality Criteria are unavailable for prallethrin. Table D-9 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for prallethrin is 0.39 µg/L.

Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.39 µg/L for prallethrin.

vi. Resmethrin

Resmethrin is a waxy, off-white to tan solid with an odor characteristic of chrysanthemums. It is stable under normal temperatures and pressures, but decomposes in the presence of alkalis and light. Resmethrin breaks down in the presence of light and humidity. Its half-life in the environment is 15 minutes. Degradation end-products reported for resmethrin are chrysanthemic acid, benzaldehyde, benzyl alcohol, benzoic acid, phenylacetic acid, and various esters. Resmethrin is considered slightly toxic to humans and is rated U.S. EPA toxicity class III (I = most toxic, IV = least toxic), bearing the word CAUTION on its label.

Resmethrin has been registered by U.S. EPA since 1971 and is used to control flying and crawling insects in the home, lawn, garden, and industrial sites. It can also be used to control insects on ornamental plants (outdoor and greenhouse use), on pets and horses, and as a mosquitocide. Because of its toxicity to fish, resmethrin is a restricted use pesticide that is available for use only by certified pesticide applicators in public health and vector control districts or persons under their direct supervision.

According to a report from the Center for Disease Control and Prevention that summarizes investigations of illnesses associated with exposures to insecticides uses during 1999-2002 to control mosquito populations in nine states (including California), of 133 reported cases of pesticide-related illness associated with vector control, resmethrin was associated with 10 cases. When combined with PBO, resmethrin is a highly effective insecticide that is of low-order toxicity to mammals, including humans.

Toxicity data for resmethrin were obtained from the *Ecotoxicity Database* to assess toxicity of resmethrin to freshwater aquatic life. Table D-10 summarizes toxicity data for resmethrin.

Table D-10. Summary of Toxicity Data for Resmethrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	0.75
Bluegill sunfish	96 hrs	8

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	1.7
Bluegill sunfish	96 hrs	2.6
Bluegill sunfish	96 hrs	13.4
Rainbow trout	96 hrs	0.82
Rainbow trout	96 hrs	3.1
Rainbow trout	96 hrs	2.4
Rainbow trout	96 hrs	5.6
Rainbow trout	96 hrs	0.28
Rainbow trout	96 hrs	0.45
Rainbow trout	96 hrs	1.8
Fathead minnow	96 hrs	2.96
Fathead minnow	96 hrs	6.6
Fathead minnow	96 hrs	2.7
Brown trout	96 hrs	0.75
Channel catfish	96 hrs	3.2
Channel catfish	96 hrs	16.6
Common carp	96 hrs	3.95
Green sunfish	96 hrs	4.6
Lake trout	96 hrs	0.74
Lake trout	96 hrs	1.7
Largemouth bass	96 hrs	0.66
Northern pike	96 hrs	1.1

Test Species	Study Length	LC50 (µg/L)
White sucker	96 hrs	2.3
White sucker	96 hrs	3.3
Yellow perch	96 hrs	2.4
Yellow perch	96 hrs	0.51
	Lowest LC50 = 0.28 µg/L	
	Lowest LC50/10 = 0.028 µg/L	

Ambient Water Quality Criteria are unavailable for resmethrin. Table D-10 shows that one-tenth of the lowest LC50 to protect the most sensitive aquatic life for resmethrin is 0.028 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.028 µg/L for resmethrin.

vii. Sumithrin

Sumithrin has been registered by U.S. EPA since 1975 and is used to control adult mosquitoes and as an insecticide in transport vehicles such as aircraft, ships, railroad cars, and truck trailers. It is also used as an insecticide and miticide in commercial, industrial, and institutional nonfood areas, in homes and gardens, in greenhouses, and in pet quarters and on pets. Sumithrin is a combination of two cis and two trans isomers.

Sumithrin is slightly toxic and is rated U.S. EPA toxicity class IV (I = most toxic, IV = least toxic) bearing the word CAUTION on its label. Sumithrin degrades rapidly, with a half-life of one to two days under dry, sunny conditions. Under flooded conditions, the half-life increases to two to four weeks for the trans isomer and one to two months for the cis isomer.

With no sunlight and little air circulation, most of the product still remains after one year (World Health Organization, 1990). Symptoms of acute sumithrin poisoning include hyperexcitability, prostration, slow respiration, salivation, tremor, ataxia and paralysis.

According to a report from the Center for Disease Control and Prevention that summarizes investigations of illnesses associated with exposures to insecticides uses during 1999-2002 to control mosquito populations in nine states (including California), of 133

reported cases of mosquito-control insecticide-related illness, sumithrin was associated with 24 cases. When combined with PBO, sumithrin is a highly effective insecticide that is of low-order toxicity to mammals, including humans.

Toxicity data for sumithrin were obtained from the *Ecotoxicity Database* to assess toxicity of sumithrin to freshwater aquatic life. Table D-11 summarizes toxicity data for sumithrin.

Table D-11. Summary of Toxicity Data for Sumithrin

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	18
Bluegill sunfish	96 hrs	15.8
Rainbow trout	96 hrs	16.7
Rainbow trout	96 hrs	1.4
Mysid	96 hrs	0.025
Inland silverside	96 hrs	94.2
	Lowest LC50 = 0.025 µg/L	
	Lowest LC50/10 = 0.0025 µg/L	

Ambient Water Quality Criteria are unavailable for sumithrin. Table D-11 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for sumithrin is 0.0025 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.0025 µg/L for sumithrin.

d. Piperonyl Butoxide

Piperonyl Butoxide (PBO) is a synergist used to increase the potency of insecticides like pyrethrins and pyrethroids. According to U.S. EPA, PBO is one of the most commonly used ingredients in household pesticide products.

PBO acts as a synergist by inhibiting the activity of a family of enzymes called P450s in the target organism that would otherwise detoxify the pyrethrin or pyrethroid. These enzymes have many

functions, including breakdown of toxic chemicals and transformation of hormones. Symptoms of PBO poisoning include anorexia, vomiting, diarrhea, intestinal inflammation, pulmonary hemorrhage and perhaps mild central nervous system depression. Repeated contact may cause slight skin irritation. U.S. EPA's classification of PBO is "Group C," a possible human carcinogen based on a study result on mice. The study found that PBO caused liver tumors and cancer.

In field tests of agricultural soils conducted in California by a manufacturers' task force, PBO persisted (measured as the time required for all applied PBO to dissipate) up to 30 days. The manufacturers' task force also measured PBO's half-life (the time required for half of applied PBO to break down or move away from the application site) and persistence in water and aquatic sediments. In water tested in California, PBO's half-life is about a day. In sediment, the half-life is up to 24 days and PBO persisted up to 120 days.

A study from the UC Berkeley (Weston, et al.) on aquatic effects of aerial spraying for adult mosquitoes over Sacramento in 2005 found that PBO was detected in every creek sample at concentrations ranging from 0.44 µg/L to 3.92 µg/L after a completion of an aerial application. These results are similar to the local Vector Control District's post-application sampling that reported PBO was detected at about 4 µg/L in four of ten creeks and 20 µg/L in one creek. The study also found PBO detections after spraying in sediment samples at 16 to 61 µg/kg in 4 of 6 samples (these 4 samples also contains pyrethrin), where PBO was not detected in sediment samples collected just before aerial spraying. As indicated in this study, the greatest risk of aerial application to aquatic lives is the synergy between the PBO and insecticides already presented in the environment, or in this case, preexisting pyrethroids. These insecticides may not be related to spray application to control adult mosquitoes. The synergistic effect is proportional to the logarithm of the PBO concentration.

Toxicity data for PBO, for the mixture of PBO and resmethrin, and for the mixture of PBO and pyrethrin were obtained from U.S. EPA's *Ecotoxicity Database* to assess the toxicity of PBO and its mixtures to freshwater aquatic life. Tables D-12, D-13, and D-14 below summarize the toxicity data for PBO and its mixtures.

Table D-12. Summary of Toxicity Data for PBO

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	5,370

Test Species	Study Length	LC50 (µg/L)
Fathead minnow	96 hrs	6,200
Rainbow trout	96 hrs	1,800
Rainbow trout	96 hrs	3,400
Rainbow trout	96 hrs	2,800
Rainbow trout	96 hrs	6,100
Mysid	96 hrs	490
Black bullhead	96 hrs	5,650
Channel catfish	96 hrs	6,400
Common carp	96 hrs	4,220
Green sunfish	96 hrs	12,200
White sucker	96 hrs	6,950
Yellow perch	96 hrs	6,900
	Lowest LC50 = 490 µg/L	
	Lowest LC50/10 = 49 µg/L	

Ambient Water Quality Criteria are unavailable for PBO. Table D-12 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for PBO is 49 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 49 µg/L for PBO.

Table D-13. Summary of Toxicity Data for PBO (PBO/Resmethrin Mixture)

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	13.4
Rainbow trout	96 hrs	2.4
Pink Shrimp	96 hrs	1.3

Test Species	Study Length	LC50 (µg/L)
	Lowest LC50 = 1.3 µg/L	
	Lowest LC50/10 = 0.13 µg/L	

Ambient Water Quality Criteria are unavailable for PBO (in the PBO/Resmethrin Mixture). Table D-13 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for PBO (in the PBO/Resmethrin Mixture) is 0.13 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.13 µg/L for PBO (in the PBO/Resmethrin Mixture).

Table D-14. Summary of Toxicity Data for PBO (PBO/Pyrethrin Mixture)

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	3.4
Mysid	96 hrs	0.14
	Lowest LC50 = 0.14 µg/L	
	Lowest LC50/10 = 0.014 µg/L	

Ambient Water Quality Criteria are unavailable for PBO (in the PBO/Pyrethrin Mixture). Table D-14 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for PBO (in the PBO/Pyrethrin Mixture) is 0.014 µg/L. Therefore, this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 0.014 µg/L for PBO (in the PBO/Pyrethrin Mixture).

e. N-Octyl Bicycloheptene Dicarboximide (or MGK-264)

MGK-264 is an ingredient in some common pesticides. It is a synergist used to enhance the potency of pyrethroids. It is used in a variety of household and veterinary products.

Toxicity data for MGK-264 were obtained from the *Ecotoxicity Database* to assess toxicity of MGK-264 to freshwater aquatic life. Table D-15 summarizes toxicity data for MGK-264.

Table D-15. Summary of Toxicity Data for MGK-264

Test Species	Study Length	LC50 (µg/L)
Bluegill sunfish	96 hrs	2,400
Rainbow trout	96 hrs	1,400
Rainbow trout	96 hrs	169
	Lowest LC50 = 169 µg/L	
	Lowest LC50/10 = 16.9 µg/L	

Ambient Water Quality Criteria are unavailable for MGK-264. Table D-15 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for MGK-264 is 16.9 µg/L. Therefore,

this Order contains an Instantaneous Maximum Receiving Water Monitoring Trigger of 16.9 µg/L for MGK-264.

Summary of Receiving Water Monitoring Triggers

Table D-16 below summarizes the Receiving Water Limitation and controlling water quality criteria for malathion.

Table D-16. Summary of Receiving Water Limitations

Ingredient	Unit	Instantaneous Maximum	Basis
Malathion	µg/L	0.1	U.S. EPA's Ambient Water Quality criteria

Summary of Receiving Water Monitoring Triggers

Table D-17 below summarizes the Receiving Water Monitoring Triggers and controlling water quality criteria and standards for larvicides and adulticides active ingredients.

Table D-17. Summary of Receiving Water Monitoring Triggers

Ingredient	Unit	Instantaneous Maximum Monitoring Triggers	Basis
Naled	µg/L	0.014	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Pyrethrin	µg/L	0.14	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Deltamethrin	µg/L	0.00017	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Etofenprox	µg/L	0.0019	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Lambda-Cyhalothrin	µg/L	0.00041	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Permethrin	µg/L	0.0019	U.S. EPA's Office of Pesticides' Ecotoxicity Database

Ingredient	Unit	Instantaneous Maximum Monitoring Triggers	Basis
Prallethrin	µg/L	0.39	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Resmethrin	µg/L	0.028	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Sumithrin	µg/L	0.0025	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Piperonyl Butoxide (PBO)	µg/L	49	U.S. EPA's Office of Pesticides' Ecotoxicity Database
PBO (in PBO/Resmethrin Mixture)	µg/L	0.13	U.S. EPA's Office of Pesticides' Ecotoxicity Database
PBO (in PBO/Pyrethrin Mixture)	µg/L	0.014	U.S. EPA's Office of Pesticides' Ecotoxicity Database
MGK-264	µg/L	16.9	U.S. EPA's Office of Pesticides' Ecotoxicity Database
Pyriproxyfen	µg/L	6.5	U.S. EPA's Office of Pesticides' Ecotoxicity Database

Persistence of Vector Adulticides and Larvicides Active Ingredients

Tables D-18 and D-19 below summarize information on persistence of the active ingredients for vector larvicides and adulticides, respectively, as included in the Mosquito Vector Control Association of California's Conceptual Monitoring Plan for Mosquito Larvicides and Adulticides:

Table D-18.Persistence of Vector Larvicides Active Ingredients

Class	Active Ingredient	Half-Life	Degradation Method (and Matrix)	Reference
Microbial[1]	*Bacillus Thuringiensis*	1-4 days	UV light (foliage)	EPA 1998
Microbial[1]	*Bacillus Thuringiensis*	Several months	Not reported (soil)	EPA 1998
Microbial[1]	*Bacillus Sphaericus*	0.5-2 weeks	Not reported (formulated product)	EPA 1999
Surface Agents	Monomolecular Films[2]	5-7 days	Not reported (water)	EPA 2007a
Surface Agents	Monomolecular Films[2]	5-22 days	Not reported (water)	Cognis Corporation 2004
Surface Agents	Petroleum Distillates[3]	2-3 days	Not reported (water)	EPA 2007b
Insect Growth Regulator	Methoprene[4]	Rapid	Photolysis (water and soil)	EPA 2001
Insect Growth Regulator	Methoprene[4]	<1 day	Photolysis (water)	ASTDR 2005
Insect Growth Regulator	Methoprene[4]	<13 days	Photolysis (water)	Csondes 2004
Insect Growth Regulator	Methoprene[4]	10-14 days		EPA 1991

[1] Formal environmental fate data is not generally required for microbial pesticides because it is not usually needed and it is difficult to evaluate due to the potential for microbial growth under suitable environmental conditions (EPA 1998).

[2] Alpha-isooctadecyl-Omega-Hydroxypoly (Oxyethylene)

[3] Reported as either Petroleum Distillates or Refined Petroleum Distillates

[4] S-Methoprene is the active ingredient of Methoprene

Class	Active Ingredient	Half-Life	Degradation Method (and Matrix)	Reference
Insect Growth Regulator	Methoprene[4]	>150 days	Not reported (briquettes in water)	Csondes 2004
Organophosphate	Temephos	Rapid	Not reported (natural water)	EPA 2000
Organophosphate	Temephos	>7 days	Not reported (field data)	ASTDR 2005
Insect neuro-disruptor	Spinosad	0.84-0.96 days	Photolysis (water)	Kollman 2002
Insect neuro-disruptor	Spinosad	8.68-9.44 days	Photolysis (soil)	Kollman 2002
Insect neuro-disruptor	Spinosad	>30 days	Hydrolysis, pH=7-9 (water)	Kollman 2002
Insect neuro-disruptor	Spinosad	14.5-17.3 days	Aerobic metabolism (soil)	Kollman 2002
Insect neuro-disruptor	Spinosad	161-250 days	Anaerobic metabolism (soil)	Kollman 2000

Table D-19. Persistence of Vector Adulticides Active Ingredients

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Organophosphates	Malathion	0.1–11	Days	Aerobic metabolism (soil)	U.S. EPA 2009b (RED), Newhart 2006

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Organophosphates	Malathion	0.67-42	Days	Photodegradation (water)	U.S. EPA 2009b (RED)
Organophosphates	Malathion	1-14	Days	Aerobic metabolism (water)	U.S. EPA 2009b (RED)
Organophosphates	Malathion	Persistence		Anaerobic degradation (water)	U.S. EPA 2009b (RED)
Organophosphates	Malathion	1.4-147	Days	Anaerobic degradation (water)	Newhart 2006
Organophosphates	Naled	<2	Days	Hydrolysis & biodegradation (water & soil)	U.S. EPA 2006d (RED)
Organophosphates	Naled	“high”		Volatilization (soil)	U.S. EPA 2006d (RED)
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	<1	Day	Photolysis (water and soil)	U.S. EPA 2006a (RED), Gunasekara 2005
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	14-17	Hrs	Hydrolysis, pH=9 (water)	U.S. EPA 2006a (RED)

[1] 1 Pyrethrins are a mix of Pyrethrin I, Pyrethrin II, Cinerin I, Cinerin II, Jasmolin I, and Jasmolin II

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	86.1	Days	Anaerobic metabolism (soil)	U.S. EPA 2006a (RED)
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	10.5	Days	Aerobic metabolism (soil)	U.S. EPA 2006a (RED)
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	1.8-97	Days[2]	Volatilization (soil)	Gunasekara 2005
Pyrethrins (naturally occurring chemicals in pyrethrum)	Pyrethrins[1]	“slow”		Hydrolysis, neutral or acidic	U.S. EPA 2006a (RED)
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Deltamethrin	Stable		Hydolysis, pH=5-7	Melendez, J. and Sappington K. 2013
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Deltamethrin	2.5	Days	Hydolysis, pH=9	Melendez, J. and Sappington K. 2013

[2] Estimated value

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Deltamethrin	64-84	Days	Photolysis (water)	Melendez, J. and Sappington K. 2013
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Etofenprox	4.4	Days	Photolysis (soil)	Central Life Sciences 2009
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Etofenprox	1.7	Days	Photolysis (water)	Central Life Sciences 2009
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	Stable		Hydolysis, pH=5-7	L.M. He Environmental Fate of Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	8.66	Days	Hydolysis, pH=9	L.M. He Environmental Fate of Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	24.5	Days	Photolysis, pH= 5 (water)	L.M. He Environmental Fate of

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic)					Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	53.7	Days	Photolysis (soil)	L.M. He Environmental Fate of Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	21.9	Days	Aerobic (water)	L.M. He Environmental Fate of Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Lambda-Cyhalothrin	42.6	Days	Aerobic (soil)	L.M. He Environmental Fate of Lambda-Cyhalothrin
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	Stable		Hydolysis, pH=5-7	U.S. EPA 2009a (RED), Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	242	Days	Hydolysis, pH=9	Imgrund 2003

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	125-350	Days	Aquatic degradation, pH= 9	U.S. EPA 2009a (RED),
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	113-175	Days	Anaerobic degradation (water)	U.S. EPA 2009a (RED),
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	51-100	Days	Photolysis, pH= 5 (water)	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	<3-197	Days	Anaerobic degradation (soil)	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	3.5-113	Days	Aerobic degradation (soil)	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	104-324	Days	Photolysis (soil)	Imgrund 2003

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic)					
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	<2.5	Days	Sediment/ seawater degradation	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	1.8-20.4	Days	Stream, pH= 7 - 7.5, 13 -15°C	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Permethrin	19.6-27.1	Days	Photolysis, ponds (water)	Imgrund 2003
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Prallethrin	25	Days	Photolysis (soil)	Sumitomo Chemical 2009
Pyrethroids (synthetic) Pyrethroids (synthetic) Pyrethroids (synthetic)	Prallethrin	13.6	Hrs	Photolysis (waterl)	Sumitomo Chemical 2009

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic)	Resmethrin	22	Minutes	Photolysis (sea water)	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	Resmethrin	47	Minutes	Photolysis (distilled water)	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	Resmethrin	198	Days	Aerobic metabolism (soil)	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	Resmethrin	37	Days	Aerobic metabolism (water)	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	Resmethrin	Stable		Aerobic metabolism (soil)	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	Resmethrin	>89	Days	Hydrolysis, pH= 5-9	U.S. EPA 2006b (RED)
Pyrethroids (synthetic)	d-phenothrin (Sumithrin)	6.5	Days	Photolysis (water)	U.S. EPA 2008 (RED)
Pyrethroids (synthetic)	d-phenothrin (Sumithrin)	18.6-25.8	Days	Aerobic metabolism (soil)	U.S. EPA 2008 (RED)
Pyrethroids (synthetic)	d-phenothrin (Sumithrin)	36.1	Days	Aerobic metabolism (water)	U.S. EPA 2008 (RED)
Pyrethroids (synthetic)	d-phenothrin (Sumithrin)	173.3	Days	Anaerobic metabolism (water)	U.S. EPA 2008 (RED)

Class	Active Ingredient	Half-Life	Half-Life	Degradation Method (and Matrix)	Reference
Pyrethroids (synthetic)	d-phenothrin (Sumithrin)	Stable		Hydrolysis, all pH levels	U.S. EPA 2008 (RED)
Synergist for pyrethrin and pyrethroids	Piperonyl Butoxide (PBO)	8.4	Hours	Photolysis (water)	U.S. EPA 2006c (RED)
Synergist for pyrethrin and pyrethroids	Piperonyl Butoxide (PBO)	"very slow"		Hydrolysis & aerobic/ anaerobic metabolism	U.S. EPA 2006c (RED)

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U.S. EPA. 2006c. Reregistration Eligibility Decision for Piperonyl Butoxide (PBO). List B Case No. 2525. EPA 738-R-06-005. Office of Prevention, Pesticides, and Toxic Substances (7508C). June.

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U.S. EPA. 2009a. Reregistration Eligibility Decision (RED) for Permethrin. Case No. 2510. EPA 738-R09-306. Office of Prevention, Pesticides, and Toxic Substances (7508P). Revised May.

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Melendez, J. and Sappington K. 2013. Risks of Deltamethrin Use to Federally Threatened Bay Checkerspot Butterfly. Environemetal Fate and Effects Division. Office of Pesticide Program. Washington, D.C. March 28, 2013

L.M. He, J. Troiana, K.S. Goh, and A. Wang. Environmetal Chemistry, Ecotoxicity, and Fate of LambdaCyhalothrin. Surface Water Protection Program, Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA.

Sumitomo Chemical. 2009. Material Safety Data Sheet. Prallethrin Technical Grade. March.

Toxicity

The narrative toxicity objective contained in the Regional Water Boards' Basin Plans states that "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." For compliance with that objective, this Order contains a receiving water limitation for toxicity and requires the Coalition or Discharger to implement BMPs to identify corrective actions to reduce or eliminate any toxicity caused by residual pesticides from larvicide and adulticide applications for vector control.

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Section 122.48 of title 40 C.F.R. requires that all NPDES permits specify requirements for recording and reporting monitoring results. California Water Code sections 13267 and 13383 authorize the State and Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program

(Attachment C) for this Order establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the requirements contained in the Monitoring and Reporting Program for discharges of biological and residual pesticides from larvicide and adulticide applications for vector control.

A. Effluent Monitoring

Pursuant to the requirements of 40 C.F.R. section 122.44(i) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the treatment process, and to assess the impacts of the discharge on the receiving water and groundwater.

The application of pesticides for vector control is not necessarily considered a discharge of pollutants according to the *National Cotton Council of America v. U.S. EPA* decision and other applicable case law. The regulated discharge is the discharge of biological and residual pesticides. At what point the pesticide becomes a residue is not precisely known. Therefore, in the application of pesticides, the exact effluent is unknown. Thus, effluent monitoring requirement is not applicable for applications of pesticides for vector control.

B. Toxicity Testing Requirements

Pursuant to the Porter-Cologne Act and the federal Clean Water Act, the State Water Board customarily requires the discharger to conduct toxicity monitoring. In fact, both acts anticipate discharger self-monitoring. Order 2011-0002-DWQ required the State Water Board to conduct a toxicity study to determine if residues, including active ingredients, inert ingredients, and degradation byproducts, in any combination, from pesticide applications cause toxicity to the receiving water or add toxicity to it if there is preexisting toxicity prior to pesticide applications. Order 2011-0002-DWQ also required that the order be reopened and modified to incorporate toxicity monitoring requirements if the State Water Board-funded toxicity study demonstrated probable toxicity for particular pesticide ingredients. The toxicity study was completed in December 2012. Based on that study, the State Water Board determined that there were no significant impacts to waters of the U.S. from pesticide applications for vector control. Thus, the State Water Board did not add toxicity testing requirements to Order 2011-0002-DWQ.

C. Receiving Water Monitoring

Receiving water monitoring is necessary to determine the impacts of the discharge on the receiving stream.

All testing for both toxicity and individual chemicals have some degree of uncertainty associated with them. The more limited the amount of test data available, the larger the uncertainty. The intent of this Order's sampling

program is to select a number that will detect most events of noncompliance without requiring needless or burdensome monitoring. Table 3-1 of the EPA Region 9 and 10 Toxicity Training Tool provides guidance on the selection of the appropriate sample number. It shows that six is the minimum number of samples where there is about a 50 percent chance of detecting at least one toxic event for the three probabilities of occurrence shown on the table.

Staff also used EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD) to determine the appropriate number of samples that would be needed to characterize the impacts of the residual pesticide discharge from pesticide applications. Page 53 of the TSD recommends using a coefficient of variation (CV) 0.6 when the data set contains less than 10 samples. Table 3-1 of the TSD shows that with a CV of 0.6, the multiplying factors used to determine whether a discharge causes, has the reasonable potential to cause, or contributes to an excursion above a State water quality standard begin to stabilize when the sample number is six.

Thus, this Order requires six samples to characterize the effects of residual pesticide discharge from pesticide applications.

VIII. RATIONALE FOR PROVISIONS

A. Standard and Special Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 C.F.R. section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 C.F.R. section 122.42, are provided in Attachment B. The Discharger must comply with applicable standard provisions and with those additional conditions that are applicable under 40 C.F.R. section 122.42. In addition, the Discharger must comply with all the Special Provisions which are provided in Section IX.C of this Order.

Sections 122.41(a)(1) and (b) through (n) of 40 C.F.R. establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in this Order.

Section 123.25(a)(12) of 40 C.F.R. allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 C.F.R. section 123.25, this Order omits federal conditions that address enforcement authority specified in 40 C.F.R. section 122.41(j)(5) and (k)(2) because the enforcement authority under the California Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference California Water Code section 13387(e).

B. Reopener Provisions

1. The reopener provisions allow the State Water Board to reopen the permit in accordance with 40 C.F.R. section 122.62.
2. Conditions that necessitate a major modification of a permit are described in 40 C.F.R. section 122.62, including:
   a. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this Order may be reopened and modified in accordance with the new or amended standards.
   b. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.
   c. **Acute and Chronic Toxicity.** This Order may be reopened if a numeric acute and chronic toxicity water quality objective is adopted by the State Water Board. This Order may be reopened to include a numeric acute and chronic toxicity limitation based on that objective.
   d. **Receiving Water Limitations.** This Order may be reopened to add receiving water limitations to Table 3 (Receiving Water Limitations) if the monitoring result for residual pesticides specified in the Table 4 (Receiving Water Monitoring Triggers) exceed the associated monitoring trigger.
   e. **Endangered Species Act.** If U.S. EPA develops biological opinions regarding pesticides included in this Order, this Order may be reopened to add or modify Receiving Water Monitoring Triggers for residual pesticides of concern, if necessary.
   f. **Pesticide Active Ingredients.** This Order covers the application of pesticides for vector control that are based on active ingredients that are currently registered by DPR and minimum risk pesticides as defined 40 C.F.R. section 152.25(f). The Executive Director may reopen this Order to add new pesticide active ingredients registered by DPR for vector control. The Executive Director may also reopen this Order to allow Dischargers to obtain an exception from meeting receiving water limitations in accordance with the SIP and the California Ocean Plan.

IX. PUBLIC PARTICIPATION

The State Water Board considered the issuance of waste discharge requirements (WDRs) that will serve as a general NPDES permit for direct and spray applications of pesticides for vector control. As a step in the WDR adoption process, State

Water Board staff developed tentative WDRs. The State Water Board encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties

The State Water Board notified interested agencies, parties, and persons of its intent to prescribe general WDRs for direct and spray applications of pesticides for vector control and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided to interested parties through specific mailings, distribution through the State Water Board Lyris Email System, and through publication in major newspapers communities throughout California. The State Water Board, in a public meeting, heard and considered all comments pertaining to discharges to be regulated by this Order.

The public had access to the agenda and any changes in dates and locations through the State Water Board's website at: http://www.waterboards.ca.gov/board_info/calendar

B. Written Comments

Interested persons were invited to submit written comments concerning the tentative WDRs. Comments were due at the State Water Board offices by 12:00 noon on **January 29, 2016**.

C. Public Hearing and Meeting

The State Water Board held a public hearing and meeting on the tentative WDRs on the following date, time, and location:

Date:	**March 1, 2016**
Time:	9:00 a.m.
Location:	State Water Resources Control Board 1001 I Street Sacramento, CA 95814

Our State Water Board web address is http://www.waterboards.ca.gov/ where you can access the current agenda for changes in dates and locations.

D. Information and Copying

The tentative effluent limitations, receiving water limitations, and special provisions, comments received, and other information were on file and available for inspection at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents was available through arrangement with the State Water Board by calling (916) 319-9152.

E. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding this Order should contact the State Water B

F. Additional Information

Requests for additional information or questions regarding this Order should be directed to NPDES_wastewater@waterboards.ca.gov.

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#_____

II. DISCHARGE INFORMATION

A. Name _____

B. Mailing Address_____

C. City_____

D. County_____

E. State_____

F. Zip Code _____

G. Contact Person_____

H. Email address_____

I. Title_____

J. Phone _____

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: _____

   Name of the conveyance system: _____

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

   Name of water body: _____

   *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 _____

(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. Pesticide Used: List name, active ingredients and, if known, degradation by-products

_____

_____

_____

C. Period of Application:

Start Date _____ End Date _____

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

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:_____

B. Signature:_____ Date:_____

C. Title:_____

X. FOR STATE WATER BOARD USE ONLY

WDID:_____ Date NOI Received:_____ Date NOI Processed: _____

GENERAL NPDES PERMIT FOR BIOLOGICAL AND RESIDUAL
PESTICIDE DISCHARGES FROM VECTOR CONTROL APPLICATIONS
ORDER 2016-0039-DWQ NPDES NO. CAG990004

Case Handler's Initial:_____Fee Amount Received: $ _____Check#:_____

INSTRUCTIONS FOR COMPLETING THE 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

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 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 email address of the person responsible for billing.

H. Enter the title of the person responsible for billing.

I. Enter the daytime telephone number of the person responsible for billing.

Section IV – Receiving Water Information

A. Check all boxes that apply. At least one box must be checked

1. Check this box if the application area is a canal, ditch, or other constructed conveyance system owned and controlled by the Discharger. Print the name of the conveyance system.

2. Check this box if the application area is a canal, ditch, or other constructed conveyance system owned and controlled by an entity other than the Discharger. Print the name of the owner and the name of the conveyance system..

3. Check this box if the application area is to the river, lake, creek, stream, bay, ocean, etc. Print the name of the water body.

B. List all Regional Water Board numbers where pesticide application is proposed. Regional Water Board boundaries are defined in section 13200 of the California Water Code. The boundaries can also be found on our State Water Board website at http://www.waterboards.ca.gov/waterboards_map.shtml. The numbers with corresponding Regional Water Board names are given below:

Regional Water Board Numbers	Regional Water Board Names
1	North Coast
2	San Francisco Bay
3	Central Coast
4	Los Angeles

5	Central Valley (Includes Sacramento, Fresno, Redding Offices)
6	Lahontan (South Lake Tahoe, Victorville offices)
7	Colorado River Basin
8	Santa Ana
9	San Diego

Section V – Pesticide Application Information

A. Check the appropriate target organism.
B. List the name and active ingredients of each pesticide to be used.
C. List the start and end date of proposed pesticide application event.
D. List the name(s) and type(s) of adjuvants added by the Discharger.

Section VI – Pesticides Application Plan

The Discharger must prepare and complete a Pesticides Application Plan (PAP). The minimum contents of PAP are specified in the permit under item VIII.C of the Order. The Discharger must ensure that its applicator is familiar with the PAP contents before pesticide application.

If a PAP is not complete at the time of application, enter the date by which it will be completed.

Section VII – Notification

Have you notified potentially affected governmental agencies, as required under item VIII.B of the Order?

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

Section VIII – Fee

The amount of fee shall be based on section 2200(b)(6) of title 23, California Code of Regulations. Fee information can be found at the State Water Board Fee webpage (http://www.waterboards.ca.gov/resources/fees/water_quality/). Check the YES box if you have included payment of the fee. Check the NO box if you have not included this payment.

Section IX– Certification

A. Print the name of the appropriate official. For a municipality, State, federal, or other public agency, this would be a principal executive officer, ranking elected official, or duly authorized representative. The principal executive officer of a federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of U.S. EPA).

B. The person whose name is printed above must sign and date the NOI.

C. Enter the title of the person signing the NOI.

Endangered Species Act

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 et seq.) or the Federal Endangered Species Act (16 U.S.C. sections 1531 et seq.). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

Additional information on federally-listed threatened or endangered species and federally designated critical habitat is available from the **Error! Hyperlink reference not valid.** (www.nmfs.noaa.gov) for anadromous or marine species or the U.S. Fish and Wildlife Service website (www.fws.gov) for terrestrial or freshwater species.

Section 303(d) List

This Order does not authorize the discharge of biological and residual pesticides or their breakdown by-products to waters of the U.S. that are impaired by the same pesticide active ingredient. Impaired waters are those waters not meeting quality standards pursuant to section 303(d) of the CWA. California impaired waters, as approved by the State Water Board, are listed on the GIS Public State Water Board webpage http://gispublic.waterboards.ca.gov/webmap/303d_2012/files/2012_USEPA_approv_303d_List _Final_20150807.xlsx

Attachment F - NOTICE OF TERMINATION

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. WASTE DISCHARGE IDENTIFICATION

WDID# _____

II. DISCHARGER INFORMATION

A. Name _____

B. Mailing Address _____

C. City _____

D. County _____

E. State _____

F. Zip Code _____

G. Contact Person _____

H. Email address _____

I. Title _____

J. Phone _____

III. BASIS FOR TERMINATION

_____

_____

_____

_____

_____

_____

IV. CERTIFICATION

"I certify under penalty of law that 1) I am not required to be permitted under the Vector Control General Permit CAG990004; and 2) 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 understand that the submittal of this Notice of Termination does not release a pesticide applicator from liability for any violations of the Clean Water Act."

A. Printed Name:_____

B. Signature:_____ Date:_____

C. Title:_____

V. CERTIFICATION

Approved for Termination Denied and Returned to the Discharger

A. Printed Name:_____

B. Signature:_____

C. Date:_____

Notice of Termination Effective Date: ____/ ____/ ____