

## Central Valley Regional Water Quality Control Board

13 July 2020

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Steve Carrigan  
City of Merced  
678 W 18th Street  
Merced, CA 95341

### ORDER TO SUBMIT TECHNICAL AND MONITORING REPORTS PURSUANT TO CALIFORNIA WATER CODE SECTIONS 13267 AND 13383

**You are legally obligated to respond to this Order. Please read this Order carefully.**

The Central Valley Regional Water Quality Control Board ("Central Valley Water Board") finds the following:

- 1. Geographic Scope.** Central Valley Water Board Resolution R5-2017-0057 established a Pyrethroid Pesticides Control Program ("Basin Plan Amendment") to control the discharges of pyrethroid pesticide discharges throughout the Sacramento and San Joaquin River Basins to protect aquatic life beneficial uses.
- 2. Responsible Parties.** The discharges to Waters of the United States from Municipal Separate Storm Sewer Systems (MS4s) have been found by the Central Valley Water Board to be a source of pyrethroid pesticides to surface waters within the Sacramento and San Joaquin River Basins. Resolution R5-2017-0057 established a conditional prohibition for the discharges of pyrethroid pesticides to waters with aquatic life beneficial uses in the Sacramento and San Joaquin River Basins, established monitoring requirements for MS4s to conduct baseline monitoring, and specified that the Executive Officer may issue 13267 and/or 13383 orders to meet these monitoring requirements. The City of Merced is a permitted MS4 discharger within the geographic scope of the Pyrethroids Control Program.

The Basin Plan Amendment Staff Report supporting the adoption of Resolution R5-2017-0057 summarized existing pyrethroid concentration data for the Sacramento and San Joaquin River Basins. These data showed pyrethroids concentrations in urban streams frequently exceeded water quality standards. These data also showed that pyrethroid concentrations in urban storm drain discharges frequently exceeded the pyrethroid prohibition triggers established in the Basin Plan. As described in that Basin

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Plan Amendment Staff Report, over 50% of samples collected from urban streams contained pyrethroid pesticide concentrations exceeding the evaluation guidelines used to interpret water quality objectives. Data also showed that municipal stormwater was toxic to the test organism *Hyalella azteca* in over 50% of the samples collected from urban storm drain discharges following storm events. In those samples that showed toxicity, nearly all had pyrethroid pesticide concentrations that could account for the toxicity observed (Fojut et al., 2017, Sections 2.3, 5.6, and Appendix B).

3. **Beneficial Uses.** The Central Valley Water Board has found that freshwater habitat beneficial uses are the most sensitive to impacts from pyrethroid pesticide discharges. The Central Valley Water Board's operative Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) designates warm/cold freshwater habitat for surface waters throughout the Sacramento and San Joaquin River basins, including those surface water to which the City of Merced discharges.

4. **Regulatory Authority.** This Order is issued pursuant to Water Code section 13267, subdivision (a), which broadly authorizes the Central Valley Water Board to investigate the quality of any waters of the State within this region. Pursuant to Water Code section 13267, subdivision (b)(1), the Central Valley Water Board may require a person who discharged, discharges, is suspected of having discharged or discharging, or proposes to discharge waste to submit technical or monitoring reports. Waste is broadly defined under Water Code section 13050(d) and includes "sewage and any and all other water substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin." In requiring these reports, the Central Valley Water Board must provide the responsible party a written explanation with regard to the need for the report and shall identify the evidence that supports requiring the responsible party to provide the report. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained therefrom. Additionally, Water Code section 13225, subdivision (c) authorizes the Central Valley Water Board to "require as necessary any state or local agency to investigate and report on any technical factors involved in water quality control or to obtain and submit analyses of water, provided that the burden, including costs, of such reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained therefrom."

Applicable findings of this Order and Resolution R5-2017-0057 establish that the City of Merced is appropriately named as a Responsible Party and required to comply with the provisions of this Order. Based on available information, it is reasonable to suspect that discharges of waste, including pyrethroid pesticides, originate from MS4 systems owned and/or controlled by the City of Merced.

5. **Burden of Reports.** The burdens, including costs, of complying with this Order are reasonable in relation to the important needs for information to determine if pyrethroid pesticides are impacting beneficial uses, to assess attainment of the pyrethroids conditional prohibition, and to inform assessments of progress in reducing pyrethroid concentrations and toxicity. In adopting Resolution R5-2017-0057, the Central Valley Water Board found that the costs of implementing the Pyrethroid



Pesticides Control Program, which included the costs of required monitoring, are reasonable relative to the water quality benefits to be derived from implementing the Pyrethroid Pesticides Control Program. The estimated costs for MS4 monitoring and reporting is approximately \$43,000 (Fojut et al., 2017, Table 9-1) for the scope of monitoring and reporting required by this Order. The baseline monitoring and Pyrethroid Management Plans required by this Order will reduce pyrethroid pesticide concentrations and their impact to beneficial uses and inform future actions to reduce pyrethroid pesticide concentrations.

As specified in Resolution R5-2017-0057, the required information may come from the dischargers' monitoring efforts; monitoring programs conducted by state or federal agencies or collaborative watershed efforts; or from special studies that evaluate the effectiveness of management practices. Also as specified in Resolution R5-2017-0057 and Provision 2.D of this Order, with Executive Officer approval, representative monitoring programs, including coordinated regional or statewide monitoring programs, may be used to meet the monitoring requirements.

6. **Liability for Noncompliance.** Pursuant to Water Code section 13267, any person failing or refusing to submit a technical or monitoring report required under section 13267, subdivision (b), or falsifying any information therein, is guilty of a misdemeanor and may be subject to an administrative civil liability of up to \$1,000 per day for each day in which the violation occurs.

7. **California Environmental Quality Act.** The issuance of this Order, which involves collection of information and protection of the environment, is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) (Public Res. Code, § 21000 et seq.), in accordance with the CEQA Guidelines. (Cal. Code Regs., tit. 14, §§ 15306, 15308.) This Order is further exempt because it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment. (Cal. Code Regs., tit. 14, § 15061, subd. (b)(3).)

8. **Delegated Authority.** This Order is issued under authority delegated to the Executive Officer pursuant to Resolution R5-2018-0057 and Water Code section 13223.

**IT IS HEREBY ORDERED** that, pursuant to Water Code Sections 13267 and 13383 and the above findings, City of Merced (hereafter "Discharger") shall submit the following technical and monitoring reports, and do so in accordance with the following provisions:

**1. Monitoring Plan or Commitment to Develop a Pyrethroid Management Plan**

As described in Finding 2, municipal stormwater is known to contain pyrethroids at levels exceeding the prohibition triggers established in the Basin Plan. Therefore, if **Discharger acknowledges that the existing data are assumed to be representative of their discharge and develops and submits a pyrethroids management plan to the Board by 19 August 2021, they may forego the baseline monitoring requirements of this Order.**

A. **No later than 31 August 2020** Discharger shall submit, in a letter signed by an authorized representative of the discharger, either:

- 1) A statement of intent to conduct baseline monitoring in compliance with the specifications of this Order.

OR

- 2) An acknowledgement that the existing data, such as the data used to characterize MS4 concentrations in the Pyrethroids Basin Plan Amendment Staff Report (Fojut et al., 2017, Sections 2.3, 5.6, and Appendix B), and described in Finding 2, are assumed to be representative of its discharge **and** a statement of intent to submit a Pyrethroids Management Plan to the Central Valley Water Board per the requirements in Item 3 by the deadline required in item 3(A).

## 2. Baseline Monitoring Plan Requirements

- A. If Discharger selects the option to conduct baseline monitoring, by **28 February 2021**, Discharger shall submit a complete draft baseline monitoring plan. All baseline monitoring shall be **completed by 21 June 2022<sup>1</sup>**.
- B. Baseline monitoring shall be designed to collect information necessary to:
- 1) Determine through representative receiving water monitoring whether discharges from Discharger are exceeding Acute and/or Chronic Pyrethroid Triggers by providing pyrethroid and dissolved and particulate organic carbon concentration data; and
  - 2) Determine whether pyrethroid pesticide discharges from Discharger are causing or contributing to exceedances of the narrative water quality objective for toxicity in surface waters or bed sediments by providing *Hyalella azteca* toxicity test data.
- C. The baseline monitoring plan shall include a Quality Assurance Project Plan (QAPP), in accordance with the quality assurance/quality control (QA/QC) and other protocols established by the Surface Water Ambient Monitoring Program (SWAMP). Unless otherwise specified by this Order, field testing, sample collection, preservation, laboratory testing, including quality control procedures and all record keeping shall comply with the most current version of the SWAMP Quality Assurance Program Plan (SWRCB, 2017) which is available at:

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<sup>1</sup> If an extension is necessary due to lack of qualifying storm events, as specified in Table 1, the due date for monitoring completion shall be extended as specified in Table 1.



[https://www.waterboards.ca.gov/water\\_issues/programs/swamp/quality\\_assurance.html](https://www.waterboards.ca.gov/water_issues/programs/swamp/quality_assurance.html)

Discharger shall use Environmental Laboratory Accreditation Program (ELAP)-accredited laboratories and methods for chemistry and toxicity testing. ELAP-accredited methods are acceptable for pyrethroid chemical analysis provided that the method meets the analytical capability described in Table 1. A current list of ELAP approved laboratories and points of contact can be found on the Central Valley Water Board's website,

[https://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/central\\_valley\\_pesticides/pyrethroid\\_tmdl\\_bpa/index.html](https://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/central_valley_pesticides/pyrethroid_tmdl_bpa/index.html)

- D. With Executive Officer approval, the baseline monitoring requirements may be met by submittal of a report, including a compilation and interpretation of representative monitoring data (which can include data from representative monitoring programs, including coordinated regional or statewide monitoring programs), demonstrating that the required information has been collected and is sufficient to make the required determinations. Such a demonstration may be made by the provision of data and information similar to that which would be generated by following the specified receiving water monitoring requirements below, or otherwise demonstrating that the determinations in 2B above, assessment of attainment of the pyrethroid trigger limits and assessment of potential toxicity to *Hyaella azteca* in receiving waters, can be made with the data and information provided.
- E. Discharger may, in a Baseline Monitoring Plan, propose a sampling frequency that differs from that described herein if it can be demonstrated to meet the goals of the baseline monitoring described above and if it is approved by the Executive Officer. The Baseline Monitoring Plan shall be approved by the Executive Officer before the data can be used to meet the monitoring requirements.
- F. Monitoring Locations
  - 1) The Discharger shall establish a monitoring location to collect water samples from either a receiving water site downstream of the MS4 discharge; or from the MS4 discharge itself. The monitoring location shall be proposed in the Baseline Monitoring Plan for approval by the Executive Officer.
- G. Pyrethroid Chemistry and Organic Carbon Monitoring Requirements
  - 1) The Discharger shall monitor receiving water or MS4 discharge as shown in Table 1.

**Table 1. Receiving Water or MS4 Discharge Monitoring**

<b>Chemical<sup>a</sup></b>	<b>Units</b>	<b>Sample Type</b>	<b>Minimum Sampling Frequency<sup>e</sup></b>	<b>Minimum QA/QC Sampling Frequency<sup>d</sup></b>	<b>Minimum Reporting Level<sup>b,c</sup> (ng/L)</b>
Bifenthrin	ng/L	Grab	4/year	1/year	1.3
Cyfluthrin	ng/L	Grab	4/year	1/year	1.3
Cypermethrin	ng/L	Grab	4/year	1/year	1.7
Esfenvalerate	ng/L	Grab	4/year	1/year	3.3
Lambda-cyhalothrin	ng/L	Grab	4/year	1/year	1.2
Permethrin (total)	ng/L	Grab	4/year	1/year	10
Total Organic Carbon (TOC)	mg/L	Grab	4/year	1/year	--
Dissolved Organic Carbon (DOC)	mg/L	Grab	4/year	1/year	--

<sup>a</sup> Concentrations are total analyte concentrations, including all isomers.

<sup>b</sup> Numbers reported to two significant figures.

<sup>c</sup> Analytical Methods shall not exceed the minimum reporting levels specified in Table 1. Minimum reporting levels calculated from prohibition trigger limits established by Central Valley Water Board Resolution R5-2017-0057.

<sup>d</sup> Minimum number of QA/QC samples collected shall be 20% of total water samples collected.

<sup>e</sup> Samples shall be collected for three qualifying wet weather events<sup>2</sup> (i.e., post first flush<sup>3</sup>, post mid-winter<sup>4</sup> wet weather event, post spring runoff<sup>5</sup> event) and one dry weather<sup>6</sup> event. If, during the time period for a wet weather event, a qualifying wet weather event does not occur, additional storms shall be sampled during the time period for the next wet weather event. If there are not three qualifying wet weather by the end of the time period for wet weather sampling during the first year of sampling, the monitoring shall be extended until three qualifying wet weather events occur. If the monitoring is extended, the due date for the Baseline Monitoring Report shall be extended until 90 days following the final qualifying wet weather event.

#### H. Water Column and Sediment Toxicity Monitoring Requirements

<sup>2</sup> Qualifying wet weather event is any rain event 0.25-inch in 24-hours.

<sup>3</sup> Post first flush timeframe is within 1 day of the qualifying wet weather event between 1 October and 31 December.

<sup>4</sup> Post mid-winter wet weather event is within 1 day of a qualifying wet weather event between 1 January and 19 March.

<sup>5</sup> Post spring runoff event is within 1 day of a qualifying wet weather event between 20 March and 20 June/.

<sup>6</sup> A dry weather event is any day between 21 June and 30 September that is preceded by 7-days of no measurable (i.e., <0.1 inches) of rain.



**1. Water Column Toxicity Testing.** Discharger shall meet the following acute toxicity testing requirements:

- a) *Monitoring Frequency* – Discharger shall perform water column toxicity testing four times per year to coincide with Table 1 sampling.
- b) *Sampling Types* – Discharger shall use static renewal testing. The samples shall be grab samples and be taken at the established monitoring location in 2.C.1) above and within 24 hours of the water sampling event.
- c) *Test Species and Duration* – The test species shall consist of *Hyaella azteca* and the duration of the test shall be 96 hours.
- d) *Methods* – The water column toxicity testing samples shall be analyzed using EPA method EPA-821-R-02-012 (Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, USEPA, October 2002, or most recent edition) Except as specified in this order, water column toxicity testing shall follow the measurement quality objectives provided in the Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Program Plan (SWRCB, 2020). When feasible, Discharger shall use the Southern California Coastal Water Research Project (SCCWRP) guidance (Schiff and Greenstein, 2016) on test organism age and size for *Hyaella azteca*.

For consistency with EPA Method EPA-821-R-02-012 and ELAP accreditation, *Hyaella azteca* water column toxicity testing for baseline monitoring must be performed at either 20 or 25 degrees Celsius. The test temperature should be the temperature that is closest to the daily average temperature of the water body at the monitoring location on the day the sample is collected. Due to temperature conditions expected during most monitoring events, daily average water temperatures can be assumed to be closer to 20 degrees Celsius. Therefore, this test shall be performed at 20 degrees Celsius, with the following exception: If the Discharger can document that, on the sampling date, the daily average water temperature of the water body at the monitoring location was 22.5 degrees Celsius or higher, the test shall be performed at 25 degrees Celsius.

- e) *Test Failure* – If a toxicity test does not meet all test acceptability criteria as specified in the test method, Discharger must-resample and initiate re-testing as soon as possible, not to exceed 14 days following notification of test failure by the laboratory.

**2. Sediment Toxicity Testing.** Discharger shall meet the following sediment toxicity testing requirements:

- a) *Monitoring Frequency* – Discharger shall perform sediment toxicity testing four times per year to coincide with Table 1 sampling.
- b) *Sampling Types* – Discharger shall identify and collect sediment samples in a depositional area in receiving waters downstream of the MS4 discharge.
- c) *Test Species and duration* – The test species shall consist of *Hyaella azteca* and the duration shall be a 10-day test.
- d) *Methods* – The sediment toxicity testing samples shall be analyzed using EPA method EPA-600-R-99-064 (Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, USEPA, 2000, or most recent edition).
- e) *Test Failure* – If a toxicity test does not meet all test acceptability criteria, as specified in the test method, Discharger must-resample and initiate re-testing as soon as possible, not to exceed 14 days following notification of test failure by the laboratory.

#### I. Baseline Monitoring Report

- 1) If Discharger selects the option to conduct baseline monitoring, Discharger shall submit a Baseline Monitoring Report that:
  - a) Summarizes the pyrethroid and toxicity monitoring results;
  - b) Assesses the compliance of the discharge with the conditional prohibition triggers in the Basin Plan established by Resolution R5-2017-0057;
  - c) Summarizes toxicity of water and sediment samples to the test organism *Hyaella Azteca*; and
  - d) Summarizes any other pyrethroid monitoring data collected by Discharger during the above period.
- 2) The Baseline Monitoring Report shall include all the required pyrethroid chemistry, dissolved and particulate organic carbon data and toxicity test results and documentation of laboratory analysis (including QA/QC data) and chain of custody documents.
- 3) Discharger shall submit the Baseline Monitoring Report by **19 September 2022<sup>7</sup>** to the Central Valley Water Board.

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<sup>7</sup> If an extension is necessary due to lack of qualifying storm events, as specified in Table 1, the due date for submittal of the report shall be extended as specified in Table 1.



### 3. Pyrethroid Management Plan

- A. If Discharger selected the option to submit an acknowledgement that the existing data are representative of their discharge and a statement of intent to submit a Pyrethroids Management Plan to the Central Valley Water Board, per the requirements established in the Basin Plan by Resolution R5-2017-0057, Discharger shall submit a Pyrethroid Management Plan by **19 August 2021**.
- B. If Discharger selected the option to conduct baseline monitoring and the baseline Pyrethroid Chemistry and Organic Carbon Monitoring results reveal an exceedance of any prohibition trigger, Discharger shall develop and submit a Pyrethroid Management Plan per the requirements described in Resolution R5-2017-0057 to the Central Valley Water Board within **one year from the date that an exceedance is identified** by either the Discharger or Central Valley Water Board staff.
- C. The pyrethroid management plan may be submitted to the Board in an update of Discharger's existing storm water management plan (SWMP).
- D. The pyrethroid management plan must identify a set of management practices that, taken as a whole, may be reasonably expected to effectively reduce pyrethroid levels in their discharges, to the maximum extent practicable, and to consider whether there are potential water quality concerns with replacement insecticide products.
- E. The management practices listed in this Provision shall be considered for inclusion in Discharger's pyrethroid management plan. The pyrethroid management plan may include any of the practices listed this Provision or may identify others that are not included here, but must provide justification to the Board regarding their decision whether to select or not select each practice listed in this Provision.

Some of the practices in the pyrethroid management plan may be accomplished by participation in organizations such as California Stormwater Quality Association (CASQA), which coordinates with the California Department of Pesticide Regulation (CDPR) and other organizations taking actions to protect water quality from the use of pesticides in the urban environment. Other practices may also be proposed. If the State Water Resources Control Board (SWRCB) establishes a statewide water quality control plan that requires management practices for the control of urban pesticide discharges, compliance with those requirements shall be deemed compliance with this Provision.

**1) Management Practices to be Considered by Dischargers for Inclusion in a Pyrethroids Management Plan:**

**i. Education and outreach activities**

1. Undertake targeted outreach programs to encourage communities within a discharger's jurisdiction to reduce their reliance on pesticides that threaten water quality, focusing efforts on those most likely to use pesticides that threaten water quality, potentially by working with CDPR, County Agricultural Commissioners, and the University of California Statewide Integrated Pest Management Program, or other entities as appropriate.
2. Make available point-of-purchase outreach materials to pesticide retailer(s) in or near the Discharger's jurisdiction. These materials shall provide targeted information on proper pesticide use and disposal, potential adverse impacts on water quality, and less toxic methods of pest prevention and control.
3. Conduct outreach to Discharger's residents and businesses who may hire structural pest control and landscape professionals that contains messages that (a) explain the links between pesticide usage and water quality; and (b) provides information about structural pest control IPM certification programs and IPM for landscape professionals.
4. Encourage public and private management practices (e.g., landscape design, irrigation management, etc.) that minimize pesticide runoff.

**ii. Pesticide pollution prevention activities**

1. Reduce reliance on pyrethroids and other pesticides that threaten water quality by adopting and implementing policies or procedures that minimize the use of pesticides that threaten water quality in the discharger's operations and on the Discharger's property.
2. Develop and implement an Integrated Pest Management policy that:
  - a) Is consistent with IPM as defined by the University of California Statewide IPM Program (UC-IPM) or the California Structural Pest Control Board definition.
  - b) Applies to all Discharger staff who conduct or contract for pest management and to pest management vendors under contract to the Discharger.



- c) Assigns responsibilities to a designated staff position and/or department to coordinate Discharger activities and ensure that the IPM policy is implemented.

iii. **Support of Pollution Prevention through the Pesticide Regulatory Process**

1. Track USEPA and CDPR pesticide evaluation and registration activities as they relate to surface water quality and encourage these agencies to accommodate urban water quality concerns within their pesticide registration processes. This may include assembling and submitting available information (such as monitoring data) to USEPA and CDPR during public comment periods to assist in their pesticide evaluation and registration activities. This management practice would be implemented most effectively through a cooperative regional or statewide approach.

**4. Certification of Reports**

All technical reports submitted under this Order shall be accompanied by a cover letter, signed by an authorized representative of Discharger with the following **certification**:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

**5. Submittal Process**

All documents submitted to comply with this Order shall be submitted into the Storm Water Multiple Application Tracking System (SMARTS) database. The monitoring data must be in an electronic format where the data can be manipulated.

**6. Requesting Time Extensions**

An extension of time to submit the required technical and monitoring reports may be requested. The request must be in writing, supported by good cause, and submitted before expiration of the above deadline. Any extension of the above deadline must be confirmed in writing by the Central Valley Water Board or designated delegee.

**7. Duty to Comply**

Failure to furnish any of the required reports, or the submittal of substantially incomplete reports or false information, is a misdemeanor, and may result in additional enforcement actions being taken against you, including issuance of an Administrative Civil Liability (ACL) Complaint for liability in an amount not to exceed one thousand dollars (\$1,000) for each day in which the violation occurs pursuant to Water Code section 13268. You are hereby notified that the Assistant Executive Officer reserves the right to assess administrative civil liability starting from the date the Assistant Executive Officer finds the violation first occurred. The Central Valley Water Board reserves its right to take any enforcement action authorized by law for violations of this Order.

**8. Filing Petitions**

Persons aggrieved by this Central Valley Water Board action may petition the State Water Resources Control Board (State Water Board) for review in accordance with Water Code section 13320, and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5pm on the 30th day after the date of this Order, except that if the 30th day falls on a Saturday, Sunday or State holiday, in which case the petition must be received by the State Water Board by 5pm on the next business day. Laws and regulations applicable to filing petitions are available on the internet (at the address below), and copies will also be provided upon request.

[http://www.waterboards.ca.gov/public\\_notices/petitions/water\\_quality](http://www.waterboards.ca.gov/public_notices/petitions/water_quality)

**9. Effective Date**

This Order is effective as of the date set forth below.



If you have any questions regarding this matter, please contact Daniel McClure at (916) 464-4751 or [Daniel.Mcclure@waterboards.ca.gov](mailto:Daniel.Mcclure@waterboards.ca.gov) or Sammantha Mello at (916) 464-4603 or [Sammantha.Mello@waterboards.ca.gov](mailto:Sammantha.Mello@waterboards.ca.gov).

Ordered By:



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PATRICK PULUPA  
Executive Officer,  
Central Valley Water Board

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13 July 2020

## REFERENCES

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USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth edition. Office of Water. Washington, DC. EPA-821-R-02-012. October 2002.