



CALIFORNIA ASSOCIATION of SANITATION AGENCIES

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Via Electronic Mail

December 2, 2014

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Central Valley Region
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**Subject: Comments on the October 2014 Preliminary Draft for Discussion
Pyrethroid Basin Plan Amendment Language**

Dear Ms. Fojut;

The California Association of Sanitation Agencies (CASA) appreciates the opportunity to provide comments on the proposed Pyrethroid Basin Plan Amendment (BPA) language (October 2014 Preliminary Draft, updated November 10, 2014). CASA represents more than 100 local public wastewater agencies engaged in collecting, treating, and recycling wastewater and biosolids to ensure the protection of public health and the environment. Collectively, our agencies serve over 90 percent of the sewered population of California.

CASA's member agencies under the jurisdiction of the Central Valley Regional Water Quality Control Board (Regional Water Board) operate wastewater treatment and water recycling facilities that will be impacted by the proposed BPA. Regional wastewater associations of the Bay Area Clean Water Agencies (BACWA), Central Valley Clean Water Association (CVCWA), and Southern California Alliance of Publicly Owned Treatment Works (SCAP), support the comments provided below by CASA. CASA also supports the comments provided by CVCWA on the proposed implementation language in the BPA for Publicly Owned Treatment Works (POTWs) and requests additional time to work with CVCWA and Central Valley Regional Water Quality Control Board (Regional Water Board) staff to further develop an appropriate implementation program for POTWs.

CASA has concerns about the proposed BPA and adverse consequences for wastewater agencies in the Central Valley, and potentially across the state. Pesticide use and water quality impacts are a statewide and national issue and the water quality objective setting process should follow national standards and meet California Water Code (Water Code) requirements to ensure that the wider context of objectives is considered.

CASA's primary concerns pertain to: (1) the methodology and assumptions used to derive the proposed water quality objectives for pyrethroids; (2) the lack of information supporting the proposed use of the additive toxicity formula; (3) the inability to understand compliance impacts of the proposed water quality objectives for pyrethroids due to the lack of adequate approved analytical methodologies; and (4) the need for specific consideration of outstanding technical concerns by the peer review panel.

CASA understands the increasingly complex challenges that we face in protecting public and environmental health while providing reasonable protection of beneficial uses. CASA is committed to collaboratively working with its members and regulatory agencies in achieving these goals with technically- and scientifically-sound standards and policies. As new chemicals emerge, the science behind the effects of these chemicals on the environment is sometimes not fully understood. That said, the need exists to use consistent and reliable methods and robust scientific information in the process of establishing enforceable water quality objectives in accordance with the requirements of the Water Code.

Methodology and Assumptions Used to Derive the Proposed Water Quality Objectives for Pyrethroids

The Regional Water Board proposes to use the water quality threshold values for bifenthrin (UCD, 2010), cyfluthrin (UCD, 2010), lambda-cyhalothrin (UCD, 2010), cypermethrin (UCD 2011), permethrin (UCD, 2011), and esfenvalerate (UCD, draft 2014), developed by the University of California, Davis (UCD), as new water quality objectives for pyrethroids in the BPA. These water quality threshold values (identified as "criteria" by UCD and the Regional Water Board) were derived using a methodology developed by UCD (TenBrook, 2009) that differs from the established United States Environmental Protection Agency (USEPA) national ambient water quality criteria development methodology (USEPA, 1985). Specifically, the UCD methodology requires toxicity data for three fewer taxa than the USEPA methodology and includes the use of a default acute-chronic ratio (ACR) that was developed for organochlorine and organophosphorus pesticides in the Great Lakes (USEPA, 2003).

As discussed in further detail in the following sections, the assumptions of greatest concern that are used to derive the proposed water quality objectives include:

- Applicable toxicity data
- Use of overly conservative protection levels
- Use of default ACRs
- Bioavailability of pyrethroids
- Applicable Toxicity Data

The water quality “criteria” reports produced by UCD acknowledge “major limitation[s]” in the lack of available applicable toxicity data in developing the water quality criteria. The lack of toxicity data is especially pronounced in the development of chronic water quality threshold values for pyrethroids. Few chronic toxicity tests are available for the full taxa cross-section that is needed for developing water quality criteria under either the USEPA or UCD methodologies. Other toxicity data issues include the lack of toxicity tests conducted using flow-through testing, limited toxicity tests exploring the effects of temperature on pyrethroid toxicity, and an incomplete understanding of the effects of mixtures of pyrethroids.

Scientific research is available for field-based toxicity tests (i.e., tests using field collected organisms) that were not included in the data set used to derive the water quality threshold values in the UCD reports. There is national precedence from the development of the tributyltin water quality criteria for using field-based toxicity tests in deriving water quality criteria. Without sufficient data, multiple layers of assumptions and subjective conservative adjustments were used to derive the water quality threshold values, which are the basis for the proposed water quality objectives.

The additional field-based test results should be used as part of the data set to derive the water quality threshold values. Such addition would supplement the available data set and reduce and/or eliminate the reliance on assumptions and subjective conservative adjustments in the derivation of the water quality threshold values. Where data gaps still remain, additional research is needed to fill those data gaps to yield technically- and scientifically-sound water quality objectives for pyrethroids.

Use of Overly Conservative Protection Levels

The 1985 USEPA national ambient water quality criteria development method uses the fifth percentile of the EC50 concentrations of the data set used in the criteria derivation to derive acute national water quality criteria. The final acute water quality criteria are based on one-half of the fifth percentile level. USEPA criteria methods also allow for a check to ensure sensitive species are protected. In developing its acute water quality threshold values for pyrethroids, UCD used one-half of the fifth percentile of the EC50 concentrations to develop acute water quality threshold values for bifenthrin, lambda-cyhalothrin, permethrin, and esfenvalerate. UCD used one-half of the first percentile of the EC50 concentrations to develop the acute water quality threshold values for cyfluthrin and cypermethrin. The use of the first percentile of the EC50 concentrations is overly conservative and fails to consider alternative adjustments that are less conservative, but still protective of sensitive species. Additionally, since the acute water quality threshold values are used to determine the chronic water quality threshold values, the conservative assumptions cascade and result in overly conservative chronic water quality threshold values. These conservative and inconsistent protection level assumptions are again compounded with the use of the additive toxicity equation that is proposed in the BPA (see comments below).

Use of Default ACRs

The UCD methodology for developing chronic water quality threshold values allows for the use of default ACRs when there are insufficient paired acute and chronic toxicity test data for a specific chemical even though it is stated in the Phase I report “that there is no evidence that default ACR values are appropriate for pesticides in general” (TenBrook, 2006; TenBrook, 2009). The basis for the default ACR used in the derivation of the proposed objectives is from ACRs for organochlorine and organophosphorus pesticides (chlordane, chlorpyrifos, diazinon, dieldrin, endosulfan, endrin, lindane, and parathion) developed for the Great Lakes (Host, 1995). The 80th percentile of the organochlorine and organophosphorus pesticide ACRs (12.4) (based on actual values ranging from 2.2 to 25) was selected as the default ACR in the development of the UCD threshold values. Fojut et al. (2014) updated the ACR (11.4) developed by Host et al. by including ACRs for cyfluthrin and lambda-cyhalothrin.

Even though the mode of toxicity between pyrethroids and organochlorine and organophosphorus pesticides is different, the chronic water quality threshold values were developed by UCD using the default ACR where there were no toxicity test-based ACRs (i.e., bifenthrin, cypermethrin) or to fill in for the lack of a complete set of toxicity test-based ACRs (i.e., permethrin, esfenvalerate). For cyfluthrin and cypermethrin, the inflated default ACR is compounded with a protection level based on the first percentile estimate of species mean EC50 concentrations that result in water quality threshold values that are overly stringent for the protection of the environment.

If a default ACR is used, a pyrethroid-only ACR is more appropriate than an ACR based on organochlorine and organophosphorus pesticides and should be developed. Additionally, the USEPA methodology for deriving water quality criteria recommends using the geometric mean of all species mean ACRs available instead of the 80th percentile in developing an ACR. The use of the 80th percentile of the available species mean ACRs is another conservative assumption that further propagates the development of the overly stringent proposed water quality objectives.

Bioavailability of Pyrethroids

The proposed water quality objectives for pyrethroids, based on the water quality threshold values derived by UCD, should be expressed as the bioavailable fraction of the pyrethroid. As discussed in the water quality “criteria” reports developed by UCD, the bioavailable fraction is the only portion of the total pyrethroid concentration available for uptake by an organism that causes toxicity to the organism. Any pyrethroid bound to particulates in water is unlikely to contribute to toxicity. Because the bioavailable portion of a pyrethroid dictates toxicity to an organism, the water quality criteria and proposed water quality objectives should be based on the bioavailable fraction of the pyrethroid.

The laboratory toxicity tests upon which the proposed water quality objectives are based were performed using clean water that avoided particulate effects. As such, those results are based on bioavailable concentrations of the pyrethroids that were tested. The proposed water quality objectives should likewise be clearly expressed to be based on the bioavailable fraction.

Compliance with the proposed water quality objectives for pyrethroids should offer flexibility in the means of determining the bioavailable fraction. Alternative methods should include (1) direct measurement of the dissolved fraction of the pyrethroid in the sample using solid-phase microextraction (SPME), (b) filtration using filters that have minimal interference with pyrethroids, (c) development of site-specific partition coefficients, or (d) an alternative methodology that would be approved by the Executive Officer of the Regional Water Board.

Proposed Use of Additive Toxicity Formula in Implementation of Proposed Water Quality Objectives for Pyrethroids

In the proposed BPA, the Regional Water Board will determine compliance with the proposed water quality objectives for pyrethroids based on equations that assume additive toxicity for all six pyrethroids at proposed acute and chronic water quality objective concentrations. The additive toxicity equations are based on the sum of the measured concentration of each pyrethroid divided by the proposed water quality objective for that pyrethroid. If the sum of the ratios for all six pyrethroids is less than or equal to one, then the water quality sample is deemed to be in compliance.

Multiple factors (e.g., concentrations, type of pyrethroid, antagonism, available binding sites) can affect the additive toxicity of pyrethroids in a mixed sample. There are limited scientific literature and studies that have investigated mixtures of pyrethroids and their combined effects on the aquatic ecosystem. Of the three studies cited in the draft esfenvalerate water quality “criteria” report, it was concluded that there were additive effects of pyrethroids on the test organisms. Two studies (Barata et al. [2006] and Brander et al. [2009]) identified antagonism between pyrethroid mixtures tested in competing for binding sites. The third study (Trimble et al. [2009]) was conducted on sediment samples. A key point is that these studies did not evaluate additive toxicity at the levels of the proposed water quality objectives. In particular, Brander et al. (2009) evaluated mixtures of cyfluthrin and permethrin at concentrations several orders of magnitude higher than the proposed water quality objectives. Therefore, these results do not confirm that the use of the proposed additive toxicity equations is appropriate.

The Regional Water Board has not provided references to other scientific studies that evaluate the effect of the mixture of pyrethroids at the proposed water quality objective levels to validate the assumptions of the proposed additive toxicity equations or determine if the mixture accurately predicts the effect implied by the proposed equations. Prior to adoption of the proposed additive toxicity water quality objectives, additional research needs to be conducted to validate the proposed additive toxicity equations at the concentrations relevant to assessing compliance. In particular, the evaluation should be performed comparing the ratio of available additive field concentration data when ecological impacts are observed to those predicted from the laboratory-derived additive toxicity models. Such an evaluation would help illustrate the environmental relevance of laboratory observations with actual field results.

Lack of Adequate Approved Analytical Methodologies to Determine Compliance

The UCD-developed water quality criteria for the pyrethroids are below reporting and detection limits for most, if not all, analytical laboratories. Furthermore, USEPA has not approved a standard methodology for analyzing pyrethroids under Title 40 of the Code of Federal Regulations Part 136. The use of unapproved analytical methods may result in analytical interferences and/or false positive results.

In setting new water quality objectives, the Regional Water Board is required to follow Water Code requirements. Under Section 13242, the Regional Water Board is required to provide a program of implementation for meeting the proposed objectives. Absent analytical methodologies, which would allow an assessment of current or future compliance with the proposed objectives, it is unclear how the Regional Water Board will fulfill its Water Code obligations to describe how the proposed water quality objectives would be achieved in ambient waters. Relatedly, given the lack of information regarding the impact of the proposed objectives on the regulated community, it is unclear how the Regional Water Board will address other requirements under the Water Code that require a finding that the proposed water quality objectives are reasonably attainable and meet the balancing tests articulated in Section 13000 of the Water Code.

Charge to Independent Peer Reviewers

It is CASA's understanding that the proposed BPA, along with the draft Regional Water Board Staff Report, water quality "criteria" reports, and other associated documents will be sent out for technical peer review in January 2015. During the November 7, 2014 workshop, Regional Water Board staff indicated that stakeholders could submit questions for consideration in the charge to the peer reviewers. CASA requests that the following important technical questions be submitted to the peer reviewers as part of their charge in reviewing the technical basis for the proposed BPA:

Does available scientific research support the construct that the six pyrethroids in question exhibit additive toxicity at the concentrations of the proposed water quality objectives?

What additional data are required to establish an ACR derived from only pyrethroid test results?

Does the inclusion of toxicity results from field-based toxicity tests (i.e., toxicity tests using field-collected organisms) increase the robustness of the data set used in the derivation of water quality threshold values using the UCD methodology?

How does the ratio of available additive field concentration data when ecological impacts are observed compare to those predicted from the laboratory-derived additive toxicity models? Does the comparison support or refute the use of laboratory-based models?

How can bioavailability be considered when determining compliance with pyrethroid water quality criteria that will be used as a regulatory endpoint?

Because of the statewide and national significance of the proposed BPA and associated water quality objectives, CASA is very concerned that the independent review process may not adequately address the substantive technical issues surrounding the proposed BPA. CASA considers it essential that the above questions be considered in the peer review charge and process that the peer review panel includes individuals with expertise in the derivation of water quality criteria for pesticides and evolutionary biology.

One basis for our concern stems from the fact that the water quality “criteria” reports developed by UCD did not undergo adequate independent technical peer review. The peer reviewers for the water quality “criteria” reports for bifenthrin, cyfluthrin, lambda-cyhalothrin, cypermethrin, and permethrin were primarily from State agencies, including UCD, the California Department of Fish and Game (now California Department of Fish and Wildlife), and California Department of Pesticide Regulations. To date, CASA is unclear if the draft water quality “criteria” report for esfenvalerate has undergone peer review. The peer reviewers provided minimal comments and/or questions to substantiate the technical justification of their conclusions in reviewing the derivation of the water quality threshold values. Because of outstanding technical issues, CASA believes that further technical peer review is necessary to verify that the water quality threshold values, and subsequently proposed water quality objectives, are scientifically sound and technically developed.

Summary

CASA does not support the use of the UCD-developed water quality threshold values which are being proposed as water quality objectives for the Central Valley in the BPA. CASA believes that field-based toxicity results should be added to the data set used to derive the water quality threshold values upon which the proposed water quality objectives are based. If there is still insufficient data, additional research is clearly necessary to promulgate appropriate water quality objectives for pyrethroids.

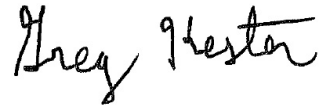
CASA also does not support the proposed use of the additive toxicity equations as proposed water quality objectives. Data to support the proposed use of the equations using pyrethroids at concentrations of the proposed water quality objectives has not been presented and is not known to exist. Unless and until such information is provided, the proposed additive toxicity objectives should not be considered.

CASA is very concerned with the impact of the overly stringent water quality objectives in the proposed BPA on its member agencies. There are no USEPA approved analytical methods for accurately measuring pyrethroid concentrations at the levels proposed in the BPA. The lack of such analytical methods limits our ability to fully understand the compliance implications of the proposed water quality objectives in ambient waters and impacts on beneficial uses. Such information is needed to allow the Regional Water Board to fulfill its Water Code obligations for the adoption of water quality objectives under Sections 13241 and 13242.

Ms. Tessa Fojut
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CASA appreciates this opportunity to provide comments on the proposed Pyrethroid BPA and we look forward to working with you as this process moves forward. If you have any questions or wish to discuss our perspective further, please contact me at the CASA office, (916) 446-0388. Thank you for your consideration of our comments.

Sincerely,

A handwritten signature in black ink that reads "Greg Kester". The signature is written in a cursive style with a large initial "G".

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