UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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Danny McClure, P.E.
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Dear Mr. McClure:

Thank you for the opportunity to review and comment on the draft amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (the "Basin Plan") for the Control of Pyrethroid Pesticide Discharges report dated January 2017. We support the Central Valley Regional Water Quality Control Board's (Regional Board's) efforts to try to control and minimize pyrethroid pesticides contamination of aquatic ecosystems. The TMDL numeric targets for pyrethroids in the Basin Plan are a good first step to the phased approach in reducing pyrethroids in water systems.

We support the approach of addressing the additive toxicity of the pyrethroids. This is consistent with the Regional Board's previous organophosphate TMDLs. However, on the issue of bioavailability, we believe there is uncertainty in how to appropriately consider the bioavailable fraction of the various pyrethroid pesticides. This TMDL will be the first case for the application of a bioavailability adjustment for pesticides. In previous pyrethroid TMDLs, (Central Coast Regional Board's Pesticides TMDLs in the Santa Maria Watershed, August 2015, and EPA's Oxnard Drain TMDL, October 2011) no such adjustments were made in setting TMDL numeric targets for pyrethroids. EPA recommends that the Regional Board not apply the bioavailability fraction in future water quality standards, such as objectives, to be implemented in NPDES permits because it may not adequately protect aquatic life use. However, if additional studies are conducted and new data confirm that incorporation of a bioavailability factor has merit, then there will be more confidence and certainty in its application to be protective. Please see our detailed comments on this issue in the Enclosure.

We agree that the Regional Board has the mechanism in place to address agricultural pyrethroid runoff through the Regional Board's Irrigated Lands Regulatory Program. We strongly recommend this program include toxicity testing with appropriate test species and include sub-lethal endpoints. The adopted waste discharge requirements for irrigated agriculture (Order Number R5-2014-0032) currently, do not require chronic water column toxicity testing for invertebrate or fish species. We recommend that these orders include water column toxicity testing with both *Ceriodaphnia dubia* (for chronic tests) and *Hyalella azteca* (for acute tests), and sediment toxicity testing with *Hyalella azteca.* We recommend additional EPA acute test species in EPA-821-R-02-012 for water column and EPA-600-R-99-064 for sediment.

In the section on MS4 monitoring requirements, we suggest the Regional Board review the specific language in the San Francisco Bay Region, Municipal Regional Storm Water NPDES Permit, Order R2-2015--0049, dated November 2015, in particular section C.8 on Water Quality Monitoring and section C.9. on Pesticides Toxicity Control and consider similar language for the Central Valley Regional Board stormwater permits. We recommend that wastewater and stormwater permits include the same water column and sediment toxicity tests as recommended above for the irrigated lands orders. As permits are renewed, we also recommend requiring permittees to follow methods in the Hladik et al., (2009) report, which includes more specificity for collection and sampling of water and sediment for pyrethroids.

EPA requests the proposed amendments be modified to include additional information related to existing NPDES permits and implementation. It is important to identify all NPDES permitted discharges within the area covered by the TMDL, even if some of them may not discharge pyrethroids or are insignificant sources. If possible, EPA recommends specifying wasteload allocations or wasteload reductions necessary for each individual facility or permitted source, for ease of implementation. Also, additional clarity on the point(s) of compliance is needed. For more details on our recommendations for NPDES permit implementation, please see the Enclosure and *Helpful Practices for Addressing Point Sources and Implementing TMDLs in NPDES Permits* (2015).

Given the proposed amendments include the statement that "pyrethroid triggers will not be used as WQBELS or for reasonable potential analysis," and yet these provisions appear to apply to waterbodies throughout the Sacramento and San Joaquin Basins, EPA is requesting more clarification regarding how NPDES sources of pyrethroids would be evaluated in future permit procedures. Please explain if there are unique circumstances that apply and describe what permit requirements will be included to provide assurance that discharges from permitted sources will adequately protect the applicable beneficial uses. If whole effluent toxicity tests will be included as part of this approach, then please explain clearly the intention and mechanisms to assess and/or provide protection.

We recognize that this amendment has been under development for several years. We appreciate your hard work and efforts on this amendment to control pyrethroid sources and its toxic effects to aquatic resources. We hope our comments are helpful in improving the Regional Board's TMDL and implementation plan in the amendment. If you have any questions, please contact me at (415) 972-3452 or Hashimoto.janet@epa.gov.

Sincerely,

Janet Y. Hashimoto

Janet Y. Hashimoto
Manager, Water Quality Assessment Section

Enclosure

Enclosure

1. Pyrethroid numeric targets and additivity

   We support the science used to develop and support the development of the six pyrethroids numeric acute and chronic concentration goals (used as TMDL numeric targets). This approach has been rigorously peer-reviewed through the State Water Board's peer review process. We support the approach of addressing the additive toxicity of the pyrethroids. There is extensive scientific evidence showing that chemicals within the same class exhibit the same mode of toxic action, and will have a combined, additive effect, which is always greater than that of each compound alone (Lydy et al. 2004). Compounds present at concentrations even below their "no toxic-effect" level contribute to the joint toxicity of the mixture. Addressing additive toxicity is consistent with your Board's previous adoption of several organophosphate TMDLs.

2. Bioavailability

   On the issue of bioavailability, we appreciate the technical staff's efforts to consider the application in this TMDL process. However, we believe that there are many areas of uncertainty, mostly the lack of knowledge on the kinetics piece and underestimation of the potential effect of aquatic organisms ingesting pyrethroid-bound particles. More importantly, unlike metals, these persistent pesticides can be a sediment sink for up to 640 days, especially for the most toxic pyrethroid, bifenthrin. This would be the first application of a bioavailability adjustment for a highly persistent pesticide. The staff report states, "Equilibrium-partitioning calculations indicate that attainment of the UC Davis criteria in the water column would also likely resolve most of the toxicity to *Hyalella* observed in sediment toxicity testing." However, a careful examination of Table 5-13 illustrates that in fact, for bifenthrin, cypermethrin, esfenvalerate and lambda-cyhalothrin, setting the goal at the 5th percentile may not be protective of *Hyalella* in sediment. A recent critical review paper which examined 50 studies published over the last 30 years reviewed the influence of particles on bioavailability and toxicity of pesticides in surface water (Knauer et al. in press). Important conclusions from this paper include: "This literature review demonstrates that the bioavailability in toxicity of pesticides to aquatic organisms in the presence of particles cannot simply be predicted by the partitioning of pesticides between water and particles using the Koc. The origin, concentration and properties of particles such as size and OC content have a strong impact on pesticide behavior and bioavailability in aquatic environments. In addition, water quality parameters such as pH may change ionization and thus adsorption of pesticides to particles modifying pesticide bioavailability. Furthermore, the physiology of aquatic organisms, e.g., feeding behavior and digestion, influence both bioaccumulation and toxicity of pesticides. This is also the case for highly lipophilic pesticides, which are generally assumed to be tightly bound particles and therefore not bioavailable." Finally, the route of exposure via ingestion of particle-associated pesticides is not taken into account (Parry et al. 2015).

   In addition to reviewing and evaluating toxicity tests and ambient monitoring data generated by dischargers and others, implementation of a scientific study on the bioavailability fraction of pyrethroids would be helpful. A study is needed to determine whether the single default values (one for ambient waters and one for wastewater) as proposed are accurate to fully measure the bioavailable fraction and predict toxicity. Such a study should evaluate a range of ambient water and sediment, as well as effluent samples, using Tenax or SPME extraction methods to quantify the bioavailable fraction of pyrethroids.

3. Name all NPDES permitted discharges covered by TMDL

   Each TMDL should name all NPDES permitted discharges within the watershed. Include the NPDES permit number and facility name as they appear in the permit itself. This includes all major and minor NPDES discharges, including discharges covered by individual and general NPDES permits; e.g.,

wastewater, stormwater Phase I and Phase II, construction, industrial, pesticide, Caltrans and vector control. We recommend a table of NPDES permits and related information within each TMDL.

4. Source analysis to account for all point source dischargers
The TMDL source analysis should account for all known point source dischargers, noting that some may not discharge the pollutant of concern or discharge insignificant amounts that would not need to be limited with a specific wasteload allocation in order to achieve applicable standards. Care should be taken in evaluating insignificant or "de minimus" discharges to ensure that they are really unimportant at all geographic scales and need not be limited. In cases where individual permitted facilities do not discharge or discharge insignificant amounts of the pollutants of concern, it greatly assists permit development if the TMDL specifies how the NPDES permits should account for these discharges. Potential options for addressing this situation include:

    a. The TMDL can specify that a particular point source need not be addressed by a wasteload allocation or permit limitation (likely including monitoring requirements to help ensure the facility does not discharge the pollutant at significant levels in the future). In this case, the TMDL would explain why no allocation is necessary for this facility.
    b. The TMDL can specify that the permit for a facility should incorporate performance-based limitations to ensure its loading of the pollutant of concern does not increase in the future.
    c. The TMDL can incorporate an explicit margin of safety (MOS) to account for all insignificant sources along with discussion of how this MOS may be available for use in calculating future permit limits (e.g. performance-based limits).
    d. The TMDL can incorporate a WLA of zero for facilities that do not discharge the pollutant of concern, in which case the associated permit would generally prohibit discharge of the pollutant.

5. Wasteload allocation for each facility and disaggregation if feasible
If pollutant load reductions are needed, then define the wasteload allocation for each permitted source and facility. In the case of facilities permitted by a general NPDES permit, express the wasteload allocations such that they can be effectively implemented on a facility-by-facility basis; that is, disaggregate wasteload allocations if feasible. Concentration-based wasteload allocations are probably easiest to implement in situations where multiple facilities are covered by the same wasteload allocation and it is difficult to disaggregate wasteload allocations by discharger.

6. Clarify point(s) of compliance
Clarify where wasteload allocations apply. While the location for the point of compliance is obvious for some traditional facility discharges, in more complex discharge situations, such as large industrial facilities with multiple stormwater outfalls, it can be difficult to define the correct point of compliance when applying a wasteload allocation during permit preparation. Wasteload allocations associated with MS4 stormwater permits may be notably challenging since there can be many outfalls and often several jurisdictions whose discharges are authorized by the same MS4 permit that are assigned one numeric wasteload allocation value.

7. Stratification of wasteload allocations for MS4 co-permittees
For MS4 permit situations in which there are multiple co-permittees, it may be possible to stratify the wasteload allocations based on jurisdiction to distinguish the requirements applicable to individual co-permittees. If wasteload allocation stratification methods are used, it may be appropriate to identify representative outfalls for each stratified land use.

References

EPA Region IX. 2015. Helpful Practices for Addressing Point Sources and Implementing TMDLs in NPDES Permits.

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Lydy MJ, Belden JB, Wheelock CE, Hammock BD, Denton, DL. 2004. Challenges in regulating pesticide mixtures. Ecology and Society. 9(6):1.

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