March 24, 1017

Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

Submitted via email

RE: Proposed Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of pyrethroid Discharge

Thank you for the chance to comment on the Proposed Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Pyrethroid Discharges and for your hard work on this process. These comments are from The Institute for Fisheries Resources (IFR), Pacific Coast Federation of Fishermen, the San Francisco Baykeeper, the Environmental Coalition for Water, California Sportsfishing Protection Alliance, and the Pesticide Action Network. We are all highly concerned about the impacts of pyrethroids to surface water and sediments in the Sacramento and San Joaquin Rivers. Of particular concern is the impacts of pyrethroids to anadromous fisheries, endangered species, water quality, and the food web of the Delta ecosystem.

Pyrethroids are known to have high toxicity and significant impacts to aquatic food chains. We are concerned that nearly all samples taken so far that tested positive for pyrethroids showed major exceedances, which most likely means that fisheries are already being impacted by these highly toxic chemicals. The Basin Plan states that no individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses, and that discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses. It is apparent to us that pyrethroid discharges are resulting in both, in violation of the Plan.

IFR represents commercial fishermen who have faced extremely restrictive salmon seasons many years within the last twenty years, therefore the state the San Joaquin and Sacramento River are of economic importance to our industry and all the other industries and communities we support. The Sacramento River Fall Chinook ocean abundance projection declined from 652,000 in 2015 to around 300,000 in 2016. The number of salmon-permitted vessels has declined from approximately 5000 in 1980 to approximately 1100 today. In 2015, only 585 vessels actually landed salmon in California. Fisheries and fishery-dependent coastal communities are suffering through back-to- back resource crises, with a poor salmon season in 2015, and 2016, loss of half of the crab season, and the prospect of another poor salmon season this year. Sacramento Fall chinook are not overfished. Their abundance declines are due to declines in river productivity, which in turn are caused by reduced flows, habitat degradation, the presence of toxic chemical species at mutagenic and lethal concentrations, and many other factors.

Fishermen bear the financial burdens of these impacts, which in many cases occur in contravention of the law, past settlements, and management plans. Pyrethroid discharges are no exception. We are especially concerned with the cumulative impacts of pyrethroid pesticides

with other chemicals that are entering the watershed such as diazinon and chlorpyrifos, and with other water quality pollutants such as selenium, nitrates, salts, temperatures, poor pH, and phosphates. We have requested that an analysis of the cumulative effects of introduction of these various chemicals on water quality be included in the basin amendment documents, however this request seems to have been ignored. This is unacceptable.

We we have also advocated for a zero allocation of pyrethroids, pyrethroid sediments concentration standards, and a robust sampling and monitoring program as part of this process. We are disappointed with the recommendation of the UC Davis 5th percentile standard, which is not protective of the WARM and COLD beneficials uses. The staff report lays out the reasoning for at least the UC Davis 1st percentile standards for the water column and numeric standards due to the lack of monitoring data in non-listed watersheds, major exceedances where samples have been taken, already occurring bioaccumulation, genetic mutation of Hyalella azteca, and temperature impacts to toxicity. While the issues outlined in the staff report supports the adoption of stringent standards, the staff uses uncertainties to justify less protective alternative and even not regulating the agriculture industry as part of this TMDL.

The proposed concentration goals/targets are above levels of lethality for aquatic organisms such as Hyalella azteca and fail to account for increased toxicity of pyrethroids at low temperatures, and increased toxicity due to the numerous pesticides and other chemicals discharged into the estuary and its tributaries in the Central Valley, along with additive effects from multiple pyrethroids. The proposed concentration targets also allow increased concentrations of pyrethroids by assuming most of them are not "bioavailable", but this assumption is unproven in the field and the factors used to make this calculation are known to vary greatly, increasing the likelihood that there will be toxic impacts allowed by the board under the proposed concentration targets. The use of the bioavailable standard is also not protective of sediments which are likely to be mobilized when pyrethroids are most toxic in cool water months. This is the period when many species are emerging from eggs and larval stages, maximizing somatic growth and preparing for outmigration.

The adoption of basin-wide TMDL standards is the most suitable option for the conservation of fish according to Basin Plan requirements, however the compliance schedule should apply immediately to anything but WWTP. Numeric triggers and management actions could be used. We support Alternative 1 for all water bodies. The WARM and/or COLD beneficial use alternative is not viable as it does not deal with is the WARM and COLD are receiving bodies to the unregulated waters. We do not support the proposed alternative as it allows the board to decide which water bodies can have unregulated discharges using a heretofore undefined rubric.

Given the highly impacted status of the Delta and its fish populations, and given the fact that pyrethroids are identified as a likely cause of that decline, the pyrethroids targets should be well below known toxicity thresholds to ensure pyrethroids are not contributing to the further decline of aquatic life and endangered fish in the Delta and that proposed concentration goals/targets are consistent with the Board's mandates and water quality objectives. The unknowns related to additive and temperature impacts should not be dismissed, but lead the board to choose the most precautionary alternative.

Temperature and Flushing Impacts

The staff report states that the UC Davis 1st percentile is too protective. We strongly disagree with this conclusion. None of the alternatives deal with low temperature impacts, which greatly magnify pyrethroid toxicity and cumulative impacts to marine species. Furthermore, current flow processes aim to make water colder in important winter months to mimic natural spawning conditions. While these cold water flows are greatly needed, known increased cold water pyrethroid toxicity compromise their effectiveness in facilitating salmonid health. Extreme flood events and resulting unpredictable large discharges during winter months will likely occur in the future. Choosing an alternative that is barely protective if known pyrethroid toxicity is ignored will not led to water quality objective attainment.

Impacts to Hyalella azteca and other aquatic species

The impacts of pyrethroids on endangered and commercial salmon species are of grave concern to fishermen, who are dealing with the economic consequences of the ecological decline of the Delta. Pyrethroids have sublethal impacts on salmon and on species that filter water from contaminants that impact salmon. Salmon exposed to sediments and not just the water column including during their most susceptible points of lifecycle.

While the impacts to local salmon are not well documented. Studies of other Delta species, and salmon in other areas give us an indication of ways that salmon are being impacted by high concentrations of pyrethroids in the Sacramento and San Joaquin Rivers.
Some of these studies point to the need to adopt more stringent standards due to the timings of exposure.

Furthermore genetic impacts and stressors in Hyalella azteca bring up some very important questions related to endangered species in the Delta. Studies related to genetically altered salmon have found that genetic disturbance to salmon species have the chance to cause serious decline in already struggling species, however the staff report rarely mentions fisheries impacts let alone genetic and cumulative impacts.

"*The researchers did genetic analysis on the populations to investigate mechanisms of resistance and found multiple genetic mutations in the resistant field populations. These same mutations have also been identified in pesticide-resistant agricultural pests, indicating that the mutated Hyalella azteca were likely exposed to pyrethroids or other similarly acting chemicals over multiple generations. The individuals with the mutations that allow these organisms to tolerate high concentrations of pyrethroids survived and passed on the mutations to the following generations, while those without the mutations did not survive to pass on their genes, potentially reducing the overall genetic and biological diversity of the populations. Weston et al. state that the consequences of these evolutionary changes in Hyalella azteca populations are unknown for the species and for aquatic ecosystems, but reduced genetic diversity can result in populations that do not have genetic variations to tolerate other stressors*." Staff Report P. 65

Another issue that point to the need for stringent standards from pyrethroids is the fact that they are likely traveling and concentrating into estuaries.

"*pyrethroids have been detected in environmental tissue samples in California, but these detections have not been clearly linked to toxic effects. For example, a recent study detected cyfluthrin, bifenthrin and permethrin in embryos of two species of estuarine crabs in Stege Marsh and Bodega Bay* (Smalling et al. 2010). Staff Report p. 14

Water Quality Impacts

We are very concerned that there is little to no discussion of cumulative watershed impacts within this SED despite the fact that studies from Hyalella azteca point to the fact that pyrethroid can cause genetic issues and other impacts that can leave species susceptible to other water quality stressors. There is no one answer to what is killing of the food web and salmon populations in the Bay Delta and its tributaries. This makes a discussion of cumulative impacts, and recommendations based on this discussion especially important. The fact that other highly toxic chemicals such as mercury and organochlorine are also stored in sediments and mobilized by the same events that mobilize pyrethroids also point to the need for a hard look at cumulative impacts in this process. Staff dismissed Cumulative Impacts in this SED and in their recommendations .

"*Environmental characteristics of the water available, such as temperature and dissolved and particulate organic matter may alter the toxic potential or bioavailability of pyrethroids. Many water bodies also contain other pesticides and toxic pollutants that can have additive or synergistic toxicity with pyrethroids. The proposed concentration goals would account for the effect of organic matter on the toxic potential of pyrethroids by allowing the use of freely dissolved concentrations. It was not possible at this time to explicitly include temperature effects*

*or additive and synergistic effects with other pesticides in the development of concentration goals***."** Staff Report p. 97

Additive Impact with other pyrethroids are discussed but not well accounted for and additive impacts with other pesticides, including the same ones that pyrethroids were meant to replace was not addressed. This is a serious issue as one would assume that they would impact the very same waters and sediments.

"*A source identification study undertaken to identify pathways of organophosphate pesticides to WWTPs also concluded that residential sources were the largest contributor to mass loading compared to commercial sources, such as pet grooming facilities (Singhasemanon et al. 1998). This study is relevant because pyrethroids were the primary replacement products when residential uses of organophosphates were phased out early 2000s, and the products have similar residential use patterns (Teerlink 2014"*)**.** Staff Report p. 11

"*pyrethroids also have additive effects with other pesticides and toxicants, such as metals and commonly used pesticides like organophosphates as well as piperonyl butoxide (PBO) a pesticide formulation additive. These effects were considered in criteria derivation, but could not be included in the criteria since the effects could not be quantified across multiple species*." Staff Report p. 79

Algae and Biomass

The fact that pyrethroids are impacting biomass and encouraging alga, which can be harmful to fish and humans needs to be addressed further.

"In controlled experiments mimicking small streams, bifenthrin-contaminated sediments caused reduced abundance and biomass of larval macroinvertebrates, as well as fewer species occurring – meaning a loss of diversity or richness. A trophic cascade occurred that resulted in an increase in algal abundance due to fewer macroinvertebrates feeding on algae. This type of alteration may provide favorable conditions for algal blooms in streams." Staff Report p. 16

Sediments

For many of the reasons outlined above we support a goal of no pyrethroids in sediments and are extremely disappointed that not only is this option dismissed in this SED, but setting numeric standards for sediments is also dismissed. We understand that sediments already have

accumulated pyrethroids, however this only supports the need for no new discharges especially when taken into account that additional toxins are present in sediments.

"Many pyrethroids degrade in soils and water in a few days, but bifenthrin appears to be much more persistent than the other pyrethroids (Casjens 2002, Fecko 1999, He et al. 2008, Imgrund 2003, Jones 1999, Laskowski 2002). Bifenthrin may take as long a year to degrade, indicating that this compound in particular has the potential to accumulate in sediments." Staff report p 58

"Aerobic half-lives for bifenthrin in sediments collected from the environment range from 428 to 483 days (Gan et al. 2005) to stable with no degradation detected (Budd et al. 2011). Anaerobic half-lives for bifenthrin range from 251 to 1,733 days to stable." Staff report p. 60

Issues related to Bioavailability

We have concerns the that staff is suggesting not using actual pyrethroid concentrations in water samples to determine exceedances but instead want to use an undetermined method for accounting for bioavailability. This method involves estimating concentrations, and no evidence that this method is proven or exact is provided in the SED. Furthermore using whole water standards is more protective of sediments. The fact that organisms can be impacted by interaction with sediments, through mobilization in storm events, and through food sources demonstrate that this method will not be as protective of beneficial uses.

"*Over time, pyrethroids may be released from the bound state and become bioavailable to aquatic organisms depending on environmental conditions and the half-life of the specific constituen**t*** **(You et al. 2011).**

"The bioavailable concentration is not directly equivalent to the freely dissolved concentration, because the freely dissolved concentration neglects exposure via ingestion of chemicals bound to food sources, or absorption directly through exterior membranes." Staff Report p. 105

"*In aquatic environments, the amount of suspended solids and other factors that may affect bioavailability may vary greatly by season or when storm or irrigation events occur, and the bioavailability of pyrethroids will also vary with those changes*" Staff Report p. 57

Additive Toxicity

We are very concerned with additive toxicity from multiple pyrethroids. The fact that quantitative limits are not recommended to address additive toxicity, along with the fact that temperature impacts and cumulative impacts are not addressed and sediment numeric standards

are not being adopted point to the fact that the more protective UC Davis 1st percentile standard should be adopted. It seems that anywhere issues that demonstrate the need to greatly protections are dismissed for lack of data, which leads to finding the less protective alternatives would meet water quality standards. However this is a highly toxic chemical that has already could serious water quality impairments.Dismissing such serious issues should lead to the board to air on the side of caution.

"Trimble et al. (2009) concluded that the data in this study indicate that pyrethroid mixture toxicity is likely additive and that the deviations from the concentration addition model reasonably encompass expected intra- and interlaboratory variability". Staff Report p. 103

"*In all of the studies on pyrethroid mixtures, the mixtures were more toxic than a single pyrethroid tested alone*." Staff Report p. 56

"*Fojut et al. (2012) did note that the lack of sufficient data to quantify the mixture effects of pyrethroids and piperonyl butoxide (PBO), a known synergist, was a significant data gap. PBO is often in pesticide formulations with pyrethrins, which are the naturally occurring pesticides from which the synthetic pyrethroids were developed. However, due to the lack of data to quantify impacts, quantitative limits to account for these interactions are not recommended for inclusion in the Basin Plan at this time."*Staff Report p. 56

Agriculture

We do not support the proposal that agricultural discharges be regulated through the Irrigated Lands program instead of a TMDL. This is of concern because often dischargers do not have a responsibility to monitor and report regularly, and there is no monitoring plan laid out in this document.

For instance the general permit for dairy operations do not require monitoring for pesticides and orchards are still allowed to aerial spray pyrethroids, while in municipalities there are regulations on spraying.

"DRs General Order (Order R5-2013-0122). The Order prohibits discharges from milk cow dairies that cause or contribute to an exceedance of any applicable State or federal water quality criteria, or a violation of any applicable State or federal policies or regulations. Monitoring and reporting requirements are specified in an associated MRP. The MRP requires monitoring of storm water runoff from land application areas; however, in the current Order there are no requirements to monitor pesticides." Staff report *p. 126*

"The options for the croplands regulated under the dairy program with the potential to discharge pyrethroids to surface water would be to 1) develop their own management plans and monitoring programs or 2) participate in the management plans, and monitoring programs already established by the coalition groups regulated under the ILRP WDRs."

We suggest that agriculture is regulated through TMDLs and more protective BMPs are required such as riparian buffers of 200 feet from any WARM or COLD waterway and 100 feet of any conveyance. No aerial spraying should be allowed at all. We also suggest that all applicators have to be certified and trained in HazMAt protocol so that pyrethroids are not discharged through cleaning and storing or clothes and equipment.

"The existing WDRs already require a program of implementation and surveillance and monitoring when a water quality objective or water quality trigger limit is exceeded." Staff Report *p. 125*

How exceedance are detected and who is doing the monitoring, and when needs to be laid out for this effort to be effective. Do farmers do their own monitoring? Where are the samples processed Do they monitor in winter? Do they monitor in floods? How are we guaranteed this will happen? Monitoring at the wrong times can lead to lack of detecting exceedances.

Coordination with other agencies

It is stated that municipalities do not have the ability to ban pesticides, yet pesticides with similar toxicity issues have either been banned or categorized in a way where they can only be used in certain situations by certified applicators. We suggest that the Central Valley and State Boards contact the EPA, DPR, and other agencies including wildlife agencies to establish protective regulations such as no application by the general public, riparian buffers, no application in the wet season or when summer storms are expected, application standards, HazMat type protocols for equipment, storage and clothing. If protect standards, prohibitions, and BMP are used than there is no reason to not be able to obtain a zero discharge standard in most water bodies.

"USEPA OPP currently has all the pyrethroids of concern in registration review, during which USEPA will determine whether these pyrethroid pesticides are expected to have unreasonable adverse effects, and if so take steps to mitigate those effects." Staff Report p. 37

Alternatives

We wish to state again that the 5th percentile threshold is not protective enough as it does not account for the up to 3 fold toxicity during cold temperatures, sediment movement, cumulative impacts, uncontrolled discharges in flood events, and additive toxicity. It is only if there important issues are not accounted for that the proposed standard can claim to be protective.

"*Concentration goals based on the 5th percentile UC Davis criteria are just below or at the thresholds of potential toxic effects on the most sensitive aquatic species, H. aztec*a.**"** Staff Report p. 289

"It is less clear if ESGIC values based on the 2.5 or 5th percentile chronic criteria would be protective of aquatic life beneficial uses because for these two alternatives, the values exceeded MATCs for four of the six priority pyrethroids.**"** Staff Report p. 9

We also do not agree with the dropping of the no concentrations in sediments goal**.** Dismissing this goal because it is hard to regulate pyrethroids is not justified as the goal is achievable.

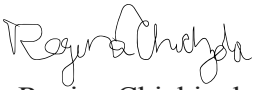
"*Unlike some naturally occurring compounds such as selenium, there are no natural sources of pyrethroids, and there are no natural, or "background" concentrations. If these pesticides were prevented from entering surface waters, then concentrations of pyrethroids in surface waters and sediments would decline in a moderate timeframe***"** State report p. 98

While controlling pyrethroid discharges may be difficult and involve coordination with other agencies it is in fact possible, and the EPA and NOAA fisheries have opportunities, to engage in processes that can help achieve this goal currently. The alternative is feasible under this type of coordination.

"*However, as long as pyrethroids remain registered for widespread use, completely eliminating all detections of pyrethroids in sediment would require cessation or an unfeasible level of treatment of all MS4 and POTW discharges and either cessation or an infeasible level of treatment for agricultural discharges or cessation agricultural pyrethroid uses. Therefore, this alternative does not meet the overall project goal of reasonable protection of beneficial uses, so it will not be further considered.***"** Staff report p. 294

Last we recommend the most protective monitoring program be implemented and that monitoring in areas where pyrethroid use is suspected begin immediately.

Thank you,



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