From: Sarah Lopez
To: Packard, Harvey@Waterboards
Cc: kschmidt@ccwqp.org; Meertens, Peter@Waterboards; Epp, Jennifer@Waterboards; McCann, Lisa@Waterboards
Subject: FW: Follow-up from TMDL call (comment clarification)
Date: Monday, June 20, 2016 3:18:44 PM

To Mr. Harvey Packard:

In a phone call follow-up to the May RWQCB meeting, the TMDL staff requested a summary/clarification of our prior comments on the Salinas sediment toxicity and pyrethroids TMDL. The summary/clarifications for my prior comments are contained in the email below for your reference. This pertains to comments already made during the written comment period and during the May Board meeting; no new comments have been submitted.

My comments included a fair amount of technical detail. The number of questions asked by the Board members at the May meeting is an indication that this level of detail is relevant. In addition the Central Valley RWQCB, which commissioned development of the water column pyrethroid targets in question, has not yet adopted them and is in fact engaged in a lengthy public process to address the same topics covered in my comments. That process is not set to conclude for another six months at the earliest.

Sincerely,

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From: Sarah Lopez [mailto:sarah@ccwqp.org]
Sent: Tuesday, May 24, 2016 5:13 PM
To: Meertens, Peter@Waterboards (Peter.Meertens@waterboards.ca.gov); jennifer.epp@waterboards.ca.gov
Cc: 'kschmidt@ccwqp.org'
Subject: Follow-up from TMDL call (comment clarification)

Hello Peter and Jennifer,

Following up on our phone call from yesterday, here is a summary of the concerns that I mentioned. I believe that I raised all of these in front of the Board. If you're unsure that is the case with any of the below, please let me know which one(s) and I can point out the reference in my comments.

1) **Scope**. The title is TMDLs for Sediment Toxicity and Pyrethroid Pesticides in Sediment in the Lower Salinas River Watershed. While acknowledging the sediment/water connection, I am questioning the placement of **water column numeric targets** in a TMDL titled so specifically for sediment. The Santa Maria TMDL was titled as a "watershed tmdl" and did

not specifically mention sediment or the water column in the title. It also did not name specific pesticide materials or classes in the title. The response to my comment letter cited the sediment/water connection, but did not cite any other sediment TMDLs containing water column targets and I do not believe the Board members had a chance to consider this scoping question until I raised it again at the meeting.

2) **Water Column Targets are NOEC-based**. NOEC means No Observable Effect Concentration and is different in concept from the Lethal Concentration (LC) and sub-lethal Effect Concentration (EC) based standards more commonly in use. In the sub-sections below I'll try to break down my previous comments into more concise thoughts that can be responded to individually.

2a) Coupling LC50-based standards for sediment with NOEC-based targets for the water column is not ideal. In theory, when sediment waste load allocations are just met, water column targets will not be. Pyrethroid concentrations that are low enough to meet LC50-based standards are still orders of magnitude higher than NOEC-based targets, and the TMDL uses these inconsistently across the sediment/water interface. I don't think the TMDL document or the Board members have considered this distinction, or the implications for meeting one standard without the other.

2b) NOECs do not align directly with toxicity bioassays. Bioassays test for toxicity, regardless of the toxicant. Survival endpoints in bioassays align with Lethal Concentrations (LC's) for specific toxicants; sub-lethal endpoints align with Effect Concentrations (EC's) of toxicants for reproduction or growth. (There are also EC's for mortality, but leaving those aside…) By using LC and/or EC-based standards, "exceedances" can be directly compared with bioassay results from the same water samples. The result is a compelling case for impacts to aquatic life (i.e. discharger buy-in), or for lack thereof. Because NOEC's are below normal EC's, monitoring can report "exceedances" of the NOEC's but not show any toxicity in bioassays.

Aside: I understand that there potentially are marginal effects to organisms at concentrations below those detectable in a toxicity bioassay with the right organisms, but I'd be surprised to learn that this scenario has yet presented in a Central Coast water body. If we get to a point where a water body shows no toxicity in bioassays (across multiple species) and meets LC/EC-based numeric targets and there is still evidence of a compromised in-stream community due to individual chemicals and not additivity or habitat impacts, then I think it would be worth talking about lower standards. But I'd be surprised if it comes to that, and in the meantime the message being sent to the dischargers is that the Water Board cares more about low numbers than actual toxicity.

2c) NOECs by definition can be exceeded without impact. While other kinds of numeric targets prohibit concentrations above which impacts would be expected, NOECs by definition can be exceeded without measurable impact. They are below the Lowest Observable Effect Concentration (LOEC). Dischargers can fail to meet the target, without impacting aquatic life. To my knowledge no other numeric standards of this type are currently in use on the Central Coast. My comment is simply that a change in approach of

this nature appropriately merits Board consideration.

Aside: An additional question/comment is whether or not such a standard is a good management tool? The statistics used to estimate the NOEC may be sound and peer-reviewed, but one of the three peer reviews actually concluded that the standards were overly conservative for the purpose of management.

2d) NOEC-based thresholds may complicate 303d-listing/de-listing. Very few data points are needed to place a water body on the 303d list, however many data points showing no exceedance of numeric listing criteria are needed to de-list the water body. Because NOEC's are below measurable effects, if they are used as listing criteria a water body may continue to show exceedances (and hence not be eligible for de-listing), even with a substantial record of "non-toxic" bioassay results across multiple species. It may be the case that TMDL staff want to be extra-conservative/protective and rely on a NOEC as a final indicator, however that decision appropriately merits the consideration of staff responsible for 303d-listing, as well as Board members. (It is unclear whether inclusion of numeric targets in a TMDL promotes or otherwise affects their use in 303d-listing.)

3) **Water column targets present technical challenges to measurement quality**. I previously raised the issues of lack of availability of lab analysis for freely dissolved pyrethroid concentrations in water, and of potential low measurement quality if whole water sample data and/or equation-based calculations are used instead of directly-measured freely-dissolved concentrations. I also just discovered that the DPR sampling program mentioned in the TMDL does not achieve the detection limits needed to assess compliance with these targets; I have not raised this last point before.

3a) Sample analysis for "freely dissolved" pyrethroid concentrations is not, to my knowledge, commercially available at this time. However, the (UC Davis) developers of the numeric targets devote several pages of text to stressing the importance of using freely dissolved concentrations to assess compliance. (At the end of the criteria development document sections dealing with this topic there is a single sentence indicating that in the absence of freely dissolved data, a manager could choose to use whole water data instead. However this is clearly not encouraged by the developers of the criteria and is in fact criticized in the peer reviews.) In other words, it is important to make assessments based on freely dissolved concentrations, but not practical to directly measure them on a routine basis at this time.

3b) Alternative/proxy methods for assessing freely dissolved concentrations may compromise measurement quality. It is in no way accurate to use whole water concentrations as a proxy for freely dissolved concentrations, except in the case where pyrethroids are not detected at all by the whole water analysis. There ***may*** be a scenario in which very high whole water pyrethroid concentrations could be interpreted to indicate high freely dissolved concentrations, but drawing such a conclusion qualitatively would not meet the Measurement Quality Objectives (MQO's) in an SWAMP-compatible Quality Assurance Plan (i.e. the data would not be admissible for many uses or would have to be

qualified). To draw that conclusion *quantitatively*, the equation used to convert whole water concentrations to freely dissolved concentrations would need to be assessed for 6 different factors (Total Pyrethroid Concentration, KOC, TSS, fOC, KDOC, and DOC) to show the ranges for each factor over which a specific whole water concentration would definitively indicate a freely dissolved exceedance. (← I'm sorry this is awkwardly worded; I can provide clarification if needed.) In more common scenarios of low, medium, or high whole water detections, the question is whether or not an equation can produce calculated freely dissolved concentrations with sufficient precision to meet MQO's. Three or four of the equation factors can be directly measured; others must be assumed/estimated and "default values" assigned. Some spreadsheet math would be required to determine if the resulting calculated freely dissolved value is of sufficient precision to meet SWAMP MQO requirements. There is also the question of whether or not the MDL for the resulting calculated parameter (which would be the product of 4 measured parameters) would be sufficiently low to assess compliance. (It may be the case that it is, I just don't know and am raising the question.)

Aside: I understand there may be some precedent for such calculations in groundwater monitoring. If that is the response to my comment, I'd just ask that examples be provided with enough specificity to show that the situation really is analogous, especially given the likelihood of high TSS in surface water samples that may not be as common in groundwater.

3c) Issue not previously raised but I'm mentioning it anyway (I understand if you can't include it): The DPR monitoring cited in the staff report Table 7 does not, to my understanding, assess freely dissolved concentrations and does not come close to meeting the detection limits needed to assess compliance with the NOEC-based water column numeric targets. In other words, "non-detect" results in the DPR monitoring could still exceed the water column targets in this TMDL by a factor of 10 or more. I understand that there is a commercial lab that may be rolling out a method with lower MDL's in the next few months; will DPR be asked to send samples to that lab?

4) **Approach and targets encourage "pesticide-switching."** I raised this briefly at the end of the call yesterday, and in my comments to the Board. As much as possible, I would encourage the crafting of regulation that looks holistically at the issue of *toxicity to aquatic organisms* rather than focusing on individual toxicants in isolation from other toxicants. For example, this TMDL is titled as a sediment toxicity TMDL, but goes on to deal with only 6 named toxicants, which are not the sole toxicants currently measurable at toxic levels in Salinas watershed sediment. Regardless of intent, the issuance of numeric criteria for specific materials in isolation from others, and/or issuing compliance requirements for users of specific materials in isolation from others, promotes switching from the named materials to other, non-named materials. And in particular, the issuance of numeric criteria that don't align with bioassays and can actually be exceeded without effect is especially discouraging to dischargers. The original approach of bioassay-based toxicity testing (which can be expanded to include additional test organisms to address more toxicant classes) is a more holistic approach which addresses the water quality problem directly without promoting pesticide switching. I believe it *is useful* to talk about numeric thresholds for specific

toxicants, but in an educational/discussion context to inform dischargers of just how low the levels they need to achieve really are, and for managers/regulators to keep tabs on progress. For enforceable numeric objectives, I think the bioassays offer a more holistic approach that both addresses water quality problems and deters pesticide switching. I'm hopeful that future regulation from this office might consider that approach. I'm also hopeful, but not overly optimistic, that this concept might be considered for the TMDL currently in question, as the named toxicants are *easier* to address with BMP's and arguably present *less of a threat* to water quality than the alternatives. If there ever was a time to consider targeting toxicity and not named materials, it is now.

Thanks,
Sarah.

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