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Keri Yee

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Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Re: Comments on the Eastern San Joaquin River Nitrogen Management Plan Template.

Dear Ms. Lee,

The University of California Cooperative Extension Groundwater Hydrology program (<http://groundwater.ucdavis.edu>) provides technical support and outreach on groundwater issues specifically related to agricultural and rural regions in California. In 2012, we published the UC Davis report for the SWRCB SBX2 1 Report to the Legislature on “Addressing Nitrate in California’s Drinking Water” (<http://groundwater.nitrate.ucdavis.edu>). We are actively engaged in research and extension activities to support a better understanding of the interface between agriculture and groundwater (<http://groundwater.ucdavis.edu/Publications/>). I am also a member of the Central Valley Regional Water Board (“CVRWB”) Groundwater Monitoring Advisory Workgroup (“GMAW”) and, in 2013, participated in the CDFG Nitrogen Tracking Task Force (<http://www.cdfa.ca.gov/environmentalstewardship/PDFs/NTRSTFFinalReport122013.pdf>).

The comments provided here focus on the Nitrogen Management Plan (NMP) Template and Summary Report, with a focus on the Summary Report because the relevance of many items in the NMP Template arise from the transmittal of information to the Third Party and to the Regional Water Board (RWB). I am aware that staff is not soliciting comments specifically on the Summary Report. But the NMP Template, as proposed, is a detailed planning and review (assessment) document that is intended to meet two objectives:

1. to serve as the basis for good on-farm nutrient management planning through smart record keeping where the records reflect both, the planning phase and the final assessment of actual on-farm nutrients.
2. to serve as a basis for annual reporting to and review by the Third Party, which – in some aggregated form – will report the data to the RWB. For each farm, the Summary Report will provide selected data from the NMP Template to the Third Party.

To properly meet objective 2, the NMP Template cannot be viewed in isolation from the Summary Report. Hence, I felt it was necessary to include comments on the Summary Report.

My comments are complementary and in addition to the comments submitted by my UC Davis colleague Dr. G. Stuart Pettygrove, who has extensive experience and is one of the state's leading experts in nutrient management planning, training, and review of nutrient management plans. Dr. Pettygrove's comments provide specific and important suggestions on how to potentially improve the NMP Template.

Suggestion #1: Proposed changes to the NMP Worksheet

A) With respect to the NMP Template (referred to as "NMP Worksheet" in Appendix III of the Coalition Template Submittal) I suggest that a revised worksheet clearly identifies, whether the NMP Worksheet is for a future crop (planning stage) or for an already harvested crop (assessment stage). This can be achieved by either of the following alternatives:

Alternative 1: Keep two separate worksheets for each field, one that reflects the planning stage (prior to planting) and one that reflects the assessment stage (after harvest). For this alternative, simply add an additional item immediately before current Item #1 (Crop Year, Actual) in the NMP Worksheet to identify the type of Worksheet:

1. Check one of the following check-boxes:
 - Planning Worksheet (prepared prior to planting) or
 - Assessment Worksheet (prepared after harvest)

Alternative 2: Use the same NMP Worksheet for both, planning and assessment, by providing TWO entry fields under each item, one in which the projected or planned information is entered prior to planting and a second field, where the actual information is entered after the harvest has occurred, at a point in time that presents a seamless transition to the next planning period.

For both, Alternative 1 and Alternative 2, the report time periods must be structured such that there are no gaps between planning periods or between assessment periods. Also for both alternatives, the following fields in the NMP Worksheet would need to be renamed or deleted:

- Rename Item #1 from "Crop Year, Actual" to "Crop Year (Recommended/Actual)"
- Delete Item #3 "Crop Year, Recommended"
- Rename Item #7 from "Actual Yield (lbs of N per acre)" to "Yield (lbs of N per acre)"
- Rename Item #8 from "Crop N needs to meet actual yield (lbs N per acre) to "Crop N need to meet yield (lbs N per acre)" or similar (also see comments by Dr. Pettygrove).
- Delete Item #9 "Projected Yield"
- Delete Item #10 "N needs to meet projected yield"

In either case, the Worksheets must be prepared electronically, which would much simplify the submittal of the Summary Report to the Third Party in electronic format ([CDFA Nitrogen Tracking Task Force](#)).

B) For purposes of the Summary Report, I suggest to separate Item #15 and Item #17 into two items – (a) dairy manure and dairy compost and (b) other organic material (non-dairy manure, non-dairy compost). This would facilitate a cross-check (at least at the aggregated, long-term level) against dairy manure exports reported under the RWB Dairy Order. Verifiability was a key issue for the [CDFA Nitrogen Tracking Task Force](#).

C) The nitrogen in irrigation water (Item #19) should reflect the total N applied in irrigation water, whether or not it is considered plant available. All N applied in irrigation water is part of the field N mass balance ([CDFA Nitrogen Tracking Task Force](#)). This number should be computed from the average annual nitrate concentration in irrigation water, and the total amount of irrigation water applied per acre during the crop period.

D) The N balance (Item #23) shall be computed as the difference of Item #21 (Total N available) and Item #7 (actual yield): $\#23 = \#21 - \#7$. This difference reflects unknown N fluxes and is most closely related to the mass of nitrate leaching to groundwater ([Viers et al., 2012](#); [CDFA Nitrogen Tracking Task Force](#); [Rosenstock et al., 2014](#)). For the same reason, the ratio (Item #24) shall be computed as the ratio of Item #21 and Item #7.

The NMP Template, with the modifications in terminology suggested by Dr. Pettygrove and further modification suggested above, will be a relevant and adequate basis for preparing the

Summary Report. The ESJ Water Quality Coalition is to be commended for the forward looking approach it has taken in developing the NMP Template.

Importantly, the proposed Summary Report is inconsistent with the requirements for the NMP Template and does not meet either the consensus-based recommendations reached by the [CDFA Nitrogen Tracking Task Force](#), nor does it meet the recommendations set forth by the [SWRCB Ag Expert Panel](#):

The current version of the Summary Report sets forth that, for each field ID (identified by the APNs) only the crop type, acreage and Ratio (NMP Worksheet #24) be reported to the Third Party. The Ratio is the ratio of N applied (NMP Worksheet #21) to Crop N Needs (NMP Worksheet #22).

Following the recommendations of the [CDFA Nitrogen Tracking Task Force](#) and of the [SWRCB Ag Expert Panel](#), Suggestion 2 identifies the column items from the NMP Worksheet that must be included in the Summary Report to the Third Party and to the RWB:

Suggestion 2: Revised Summary Report

First, the NMP Summary Report must be compiled from the NMP Worksheet that reflects the actual assessed values, not from the Worksheet that reflects planned, projected values (see Suggestion 1A). There is no need to report planned values. However, NMP Worksheets prepared for planning purposes must be kept on-farm for review and verification/audit purposes ([CDFA Nitrogen Tracking Task Force](#), p.20-21).

The revised NMP Summary Report shall be submitted in electronic format, except in hardship cases ([CDFA Nitrogen Tracking Task Force](#), p. 15). The revised NMP Summary Report would be the same as the originally proposed format, but with the following columns added to the five proposed columns shown on page 18 of the ESJVWQ Coalition Submittal (APN, Field ID, Crop type, Acres, Ratio):

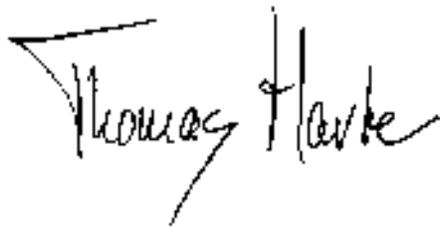
Table 1: Additional column items from the NMP Worksheet (actual assessment, post-harvest) that need to be included into the NMP Summary Report:

Column Item	Reference in the recommendations by the CDFA Nitrogen Tracking Task Force	Reference in the recommendations by the SWRCB Ag Expert Panel	Comments
#7 Crop Yield (lbs of N per acre)	p. 18	Recommendation 5, p. IV	
Sum of #12 (dry and liquid N), # 13 (foliar N), and #14 (other N)	p. 18	Recommendation 5, p. IV	Shall be reported separately from #15 for cross-check against reported fertilizer sales at an aggregated (county, state) level (multi-year average)
#15a Available N from			Shall be reported

dairy manure and dairy compost (see Suggestion 1 above)			separately for cross-check against reported dairy manure export (RWB Dairy Order) at an aggregated (county, region) level (multi-year average). (See section on “Verifiability” in CDFA Nitrogen Tracking Task Force , p.20-21)
#15b Available N from non-dairy manure and non-dairy compost (see Suggestion 1 above)			Shall be reported for completeness.
#16 Total N applied (#12 + #13 + #14 + #15a + #15b)	p. 18	Recommendation 5, p. IV	Automatically computed under electronic submittal form
#17 N from previous legume crop			
#18a Available N residual from dairy manure and dairy compost (see Suggestion 1 above)			Shall be reported separately for cross-check against reported dairy manure export (RWB Dairy Order) at an aggregated (county, region) level (multi-year average). (See section on “Verifiability” in CDFA Nitrogen Tracking Task Force , p.20-21)
#18b Available N residual from non-dairy manure and non-dairy compost (see Suggestion 1 above)			Shall be reported for completeness.
#19 N in irrigation water (lbs of N per acre)		Recommendation 6, p. IV	Shall be reported for completeness.
#20 Total N credits (#17 + #18 + #19)	p. 18	Recommendation 5, p. IV	Automatically computed under electronic submittal form
#21 Total available N (#16 + #20)	p. 18	Recommendation 5, p. IV	Automatically computed under electronic submittal form
#23 N Balance (#21 - #7), see Suggestion 1			Automatically computed under electronic submittal form
#24 Ratio (#21 / #7), see Suggestion 1	p. 18	Recommendation 2, p. IV	Automatically computed under electronic submittal form

I appreciate the opportunity to comment on the NMP Template and Summary Report.

Regards,

A handwritten signature in black ink that reads "Thomas Harter". The signature is written in a cursive style with a large, sweeping initial 'T'.

Thomas Harter, Ph.D.
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REFERENCES:

[CDFA Nitrogen Tracking Task Force](http://www.cdfa.ca.gov/environmentalstewardship/PDFs/NTRSTFFinalReport122013.pdf), 2013, Final Report, December 2013;
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