

2 April 2019

Mr. Michael Wackman  
San Joaquin & Delta Water Quality Coalition  
3294 Ad Art Road  
Stockton CA 95215

**2018 NITROGEN MANAGEMENT PLAN SUMMARY REPORT ANALYSIS APPROVAL -  
SAN JOAQUIN COUNTY AND DELTA WATER QUALITY COALITION**

Thank you for your 30 November 2018 submittal of the San Joaquin County and Delta Water Quality Coalition's (Coalition) Nitrogen Management Plan Summary Report Analysis (NMP Analysis) for the 2017 Crop Year. The NMP Analysis was submitted in response to the Waste Discharge Requirements for Growers within the San Joaquin County and Delta Area Order R5-2014-0029-03 (Order) and Attachment B (Monitoring and Reporting Program) to the Order.

Based on the enclosed staff review, the NMP Analysis meets the requirements of the Order. Therefore, I am approving the NMP Analysis for the 2017 crop year. Please continue your grower communication regarding A/Y outlier results. Alerting growers that are significantly different from their neighbors is expected to prompt them to evaluate their nitrogen use and management practices. We anticipate that future enforcement staff efforts will include follow-up with growers that have continuing outlier status based on this data.

If you have any questions or comments regarding the review, please contact Chris Jimmerson at (916) 464-4859 or [Chris.Jimmerson@waterboards.ca.gov](mailto:Chris.Jimmerson@waterboards.ca.gov).

*Original signed by*

Patrick Pulupa  
Executive Officer

Enclosure: Staff Review of the 2017 NMP Summary Report Analysis

---

## Central Valley Regional Water Quality Control Board

**TO:** Susan Fregien  
Senior Environmental Scientist  
Monitoring and Implementation Unit  
**Irrigated Lands Regulatory Program**

**FROM:** Chris Jimmerson  
Environmental Scientist  
Monitoring and Implementation Unit  
**Irrigated Lands Regulatory Program**

**DATE:** 13 March 2019

**SUBJECT:** NITROGEN MANAGEMENT PLAN SUMMARY – SAN JOAQUIN COUNTY AND DELTA WATER QUALITY COALITION

On 30 November 2018, the Central Valley Water Board received the San Joaquin County and Delta Water Quality Coalition's (Coalition) Nitrogen Management Plan (NMP) Summary Report Analysis for the 2017 crop year. The NMP Analysis was submitted in accordance with Waste Discharge Requirements for Growers within the San Joaquin County and Delta Area Order R5-2014-0029-03 (Order) and Attachment B to the Order.

Attachment B of the Order, Section V.C. Report Component (18) describes the requirements for the Coalition's NMP summary analysis. The required report components are:

- An evaluation comparing individual field data collected from the Members' NMP Summary Reports.
- These comparisons shall include the ratio of Nitrogen Applied to Nitrogen Removed<sup>1</sup> and the difference between Nitrogen Applied and Nitrogen Removed for crops in the Coalition area. Nitrogen Applied includes nitrogen from any sources, including, but not limited to, organic amendments, synthetic fertilizers, and irrigation water.
- An assessment of NMP information for, at minimum, comparisons of farms with the same crops, similar soil conditions, and similar practices (e.g., irrigation management)
- A statistical summary of nitrogen ratios by crop or other equivalent reporting units and the estimated nitrogen consumed for the different crop types and soil conditions describing the range, percentiles (10th, 25th, 50th, 75th, 90th) and any outliers
- A tabular or graphical presentation of the data approved by the Executive Officer (e.g., box and whisker plot)
- An aggregate of the members' submitted data in an electronic format, compatible with ArcGIS, identified to at least the township level.

---

<sup>1</sup> For some crops the information needed to determine nitrogen removed may not be readily available. This will be determined through N removed research and crop yield will serve as a placeholder until nitrogen removed data is made available.

**Discussion**

Growers' summary reports that have missing or ambiguous data were flagged for follow-up. The Coalition reported that the 2017 crop year had an overall survey reporting rate of 99% of the acres in the Coalition region. Most of the uncompleted surveys were due to misreported data requiring the grower to correct and resubmit. The Coalition continues to follow up with members who have not yet provided completed or revised NMP Summary Reports.

The Coalition aggregated the nitrogen management summary information including comparisons of farms with the same crops by Township Range (TR). The results are presented in the report's text and compiled in an Excel workbook compatible with ArcGIS. The Coalition also examined crops with similar soil types, and similar irrigation practices to evaluate if A/Y and the frequency of outliers varied among NMP management units.

Soil type is important when understanding the potential transport of nitrogen past the root zone. However, the Coalition reported that for crops covering almost 90 percent of the Coalition area, the average A/Y ratio and frequency of outliers were mostly not found to be affected by soil type. The lack of correlation occurred in spite of the fact that examining the data by soil categories reduced the sample size, causing statistical bias and increasing the probability of finding a significant result simply by chance. The Coalition will still continue to advocate soil management practices to properly manage nitrogen applications.

According to the Coalition's report, recommended flood and pressurized nitrogen applications vary. The Coalition grouped irrigation practices into flood irrigation (flood and furrow) and pressurized irrigation (drip, sprinkler, micro-sprinkler) for the 12 most abundant specific crops in the region. The Coalition tested if the A/Y values varied depending on the irrigation practices. Two of the 12 crops (grapes, pumpkins) had significant differences in A/Y. In both crops the A/Y values were higher in flood irrigation than in the pressurized irrigation systems. Per the report, this suggests that pressurized systems are more efficient with nitrogen management for grapes and pumpkins. The Coalition is communicating the statistical outlier results to individual growers with the expectation the grower will evaluate the information in their NMP management practices operation.

Outreach is an important component of the Order. The Coalition prepared outreach packets for all members who submitted an NMP Summary Report. An example of the outreach package is included in Appendix II of the NMP Analysis. The outreach package provides summary statistics by crop type for all management units across the Coalition, nitrogen removal estimates for crops with available R values, bell curves comparing each member's management units to others reporting on the same crop across the Coalition, and identification of outlier status for members with A/Y values above the 90<sup>th</sup> percentile. For management units identified as outliers, the Coalition notified growers about nitrogen application rates that differ from their neighbors and requested that the growers re-evaluate their nitrogen application practices.

Staff agrees with the Coalition that summary statistics are more meaningful when calculated from a larger sample size than by soil type, and irrigation management practice. This is because: 1) the differences in A/Y between soil types or irrigation practices are usually not large enough to justify separate analysis; and 2) grouping crops by TR then by soil type or management practices will reduce the sample size, and hence the accuracy of summary statistics, especially for less common crops. Nonetheless, the Coalition met the NMP reporting

requirements by grouping according to the requirements. For more reliability, the Coalition also grouped the data on a region-wide and similar crop basis to provide more robust estimate of outliers.

### **Staff Conclusions**

Staff recommends approval of the Coalition's NMP Analysis for the 2017 crop year because the requirements of the Order have been met. The Coalition prepared the required statistical analysis, 99% of Coalition members have submitted their NMP Summary Reports to the Coalition by the deadline, and the Coalition is conducting multiple follow-up activities with the recalcitrant members.

The Coalition complied with the Order and completed a statistical analysis summary by TR and crop type that includes a summary of ranges and percentiles (10th, 25th, 50th, 75th and 90th). The Coalition presented box and whisker plots and scatter plots by crop type and TR that identified outliers relative to other management units. N removal factors were also presented in various tables of the NMP Analysis and Appendix I.

According to the report, the identification of outliers has its limitations. Even with 99% of the growers NMP summary reports returned, there are TRs/crop combinations that have only one management unit, preventing the ability to perform summary statistics.

Crop-specific nitrogen coefficients that are used to calculate the N removed are not available for all crops. This is only a small percentage of the Coalition's overall acreage. As the N coefficients improve, the outliers will be more relevant.

The Coalition will submit the 2018 Irrigation NMP summary results by 30 November 2019.