

## Peters, Ashley@Waterboards

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**From:** Kieran Dowling <KDowling@grimmway.com>  
**Sent:** Friday, March 03, 2017 3:45 PM  
**To:** Peters, Ashley@Waterboards  
**Cc:** John Guerard; Carl Voss; Gerald Davis; Kimberly Horton  
**Subject:** N removal comments  
**Attachments:** logos140\_fd1f9887-5341-4941-849b-24fba904e297.png

Dear Ashley,

Re: The Central Valley Regional Water Board (Region 5) has released the Final Report of Y-to-N Removed Conversions which is subject to a 30 day comment period ending on March 3, 2017

I wanted to submit comments regarding the Nitrogen removal value for carrots that Dr. Daniel Geissler had recently submitted in the "Nitrogen Concentrations in Harvested Plant Parts – A Literature Review<[http://www.waterboards.ca.gov/centralvalley/water\\_issues/irrigated\\_lands/water\\_quality/coalitions/crop\\_nitro\\_know\\_gap/2017\\_0113\\_ilrp\\_nmp\\_tawg\\_rpt.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality/coalitions/crop_nitro_know_gap/2017_0113_ilrp_nmp_tawg_rpt.pdf)>."

In conducting our own research, sending in root and leaf samples of fields ready to harvest: we had analysis preformed for N concentrations, and while we can do the math to verify that the value used to represent lb. N/ton removed for roots(marketable yield) is accurate, we do not agree that leaves and stems should be discounted from the total N removal from the field.

As Dr. Geissler described, "For the present report, we mined the scientific literature for data on N concentrations in harvested crop parts." The report fails to account for the necessity to provide the plant with sufficient Nitrogen to grow a full canopyof foliage, which promotes healthy root growth and results in high yield potential. The same is true for fruiting crops and if we were to apply only what the harvested portion of the crop removes in nitrogen, we would certainly have a nitrogen deficient crop and experience diminished yields as a result.

To discount the N concentration in everything but the roots at harvest, we are making the assumption that the mineralization rate to the soil is 1:1 and that leaves which are incorporated into the soil are releasing the same amount of N to the crop as what a tissue analysis would suggest based on converting ppm to lbs/ac. We in industry know that is not the case and cannot rely on N mineralization to provide the quantity of N needed to achieve maximum yields.

There are multiple factors that influence the N concentration at harvest and as Dr. Geissler states, "Other factors, such as fruit size, dry matter content of the harvested plant part, percent marketable yield, or growth stage when harvested may also be important for some crops."

This statement clarifies the reasons for the inherent variability from sample to sample, and we have noticed each one of these factors having an effect on the value for lbs. N/ton of crop removal. For example, baby carrots have a higher N concentration at harvest compared to jumbo carrots but jumbos use more pounds of N throughout the season. Baby's are harvested early, require less N but on an analysis, will appear to remove more due to rapid N uptake at harvest. The point is that using %N at harvest is not a sure way to determine N removal due to inherent differences from field to field.

It is our contention that further research needs to be conducted on crops like carrots that have no data used in the report that is California-specific. And as Dr. Geissler mentions, "Therefore, for many crops, the dataset should be supplemented with additional samples from Central Valley fields to support a robust estimate of the N concentrations in harvested plant parts." We at Grimmway are open to collaborating with researchers on data collection/analysis and working together to come up with solutions that are sustainable for both parties.

Sincerely,

Kieran Dowling

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Sent from my iPhone

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