CENTRAL COAST REGIONAL WATER QUALITY CONTROL BOARD
DISCLOSURE FORM
EX PARTE COMMUNICATIONS REGARDING PENDING GENERAL ORDERS

Note: This form is intended to assist the public in providing the disclosure required by law. It is designed to document meetings and phone calls. Written communications may be disclosed by providing a complete copy of the written document, with attachments. Use of this form is not mandatory.

1. Pending General Order that the communication concerned: Ag Order 4.0

2. Name, title and contact information of person completing this form:
   Steve Shimek,
   representing only himself.

3. Date of meeting, phone call or other communication: 3/29/2021
   Time: via email sent at ~12pm
   Location: via email

4. Type of communication (written, oral or both): written

5. Names of all participants in the communication, including all board members who participated:
   Sent to all board members plus Keeling and Yu.

6. Name of person(s) who initiated the communication: Steve Shimek

7. Describe the communication and the content of the communication:
   A copy of the email is attached.

8. Attach a copy of handouts, PowerPoint presentations and other materials any person used or distributed at the meeting.

Solving the surface and groundwater nitrate problem doesn't need to be complicated but there are certain actions that must be taken

We hope the Board's mindset will be:

- Follow the science. There is no science equating "sequestered" with "removed." Sequestered nitrogen is *temporarily delayed.* (See sequestered vs removed below)
- This will take time, while surface water quality can be restored more quickly, restoring groundwater quality will take nearly 30 years.
- The growers must change their practices.
    - I.e. the days of laying out irrigation pipe and sprinklers that irrigate (plus chemigate and fertigate) the furrows as well as the crop (and the neighbor's field on a windy day) may be replaced by using sprinklers to get crops established and switching to drip as soon as possible.
    - Planting cover crops.
    - Treating any tailwater or tile drain water before final discharge.
    - Smart rotations; plantings of nitrogen and water scavenging crops (I.e. broccoli) immediately after water and nutrient intense crops (I.e. baby lettuce).
- Accepting that nitrogen sequestration is not "removed." Counting sequestered nitrogen as removed will worsen the problem. Sequestered is additive to applied. See sequestered vs removed below.
- Only counting the irrigation water required by evapotranspiration (ET) will also make the problem worse. See evapotranspiration below.
- Irrigation and nutrient management planning, reporting, *and implementation*, for *every* cropping is key. See INMP below.
- Not every solution required to restore water quality objectives is known at this moment, but we know enough today to get much of the way. Adaptive management, complete with reviews and reopeners included in the Order, is key.
- Essentially, the growers must pay close attention to what they are applying to their crops, which will require more field level monitoring, "spoon-feeding" of water, pesticides, and nutrients, and manpower.
- The best and simplest metric for the Board to regulate is "A minus R" (where A equals annualized total of available N of amendment and R equals the sum of all sources of N removed) See A minus R below.

We hope Ag Order 4.0 will require:

- Require all growers understand the basics of irrigation and nutrient management planning (INMP) for every cropping, and how to field-test available nitrogen in soil and water before every cropping.
- Require the third-party to educate growers on INMP.
- Require growers to implement and report critical components of the INMP for <u>every</u> cropping. (see INMP below)

- Require reporting of N-removed for every cropping (detailing all sources of N-removed if more than the crop itself) and the result of A minus R (where A equals available N of amendment and R equals the sum of all sources of N removed).
- Require treatment of any surface water discharge (including discharges to ditches) not meeting water quality objectives (treatment will accrue to nitrogen removed).
- Require growers to measure and report residual soil nitrogen at the beginning (should already be in the first cropping INMP) and end of the growing season. We *must* learn to what extent winter flushing of left-over N is the problem.
- Require cover cropping of any field fallowed (not being cropped or worked) for any length of time between November 15 and April 1.

Critical item explanations:

Sequestered vs removed. Organic matter is a reservoir of nitrogen made available for plant growth through decomposition by microorganisms at varying rates determined by temperature, soil type, moisture content, aeration, and critically, the ratio of carbon to nitrogen.

Cover crops and crop residues are generally tilled-in to decompose and create crop-available nitrogen for the following crops. Only if the cover crop is harvested is it truly removed.

The addition of carbon can lead to nitrogen "immobilization" but the nitrogen is not removed. According to Cornell University Cooperative Extension:

> "Incorporation of materials with a high carbon to nitrogen ratio (e.g. sawdust, straw, etc.), will increase biological activity and cause a greater demand for N, and thus result in N immobilization. **Immobilization only temporarily locks up N.** [emphasis added] When the microorganisms die, the organic N contained in their cells is converted by mineralization and nitrification to plant available nitrate." Found at: http://cceonondaga.org/resources/nitrogen-basics-the-nitrogen-cycle

Similarly, sequestered nitrogen in compost is released over the course of a few years, usually two to three, the most released in the first four to eight weeks.

Sequestered is not removed. Of course, growers and their proxies want complex formulas with many estimated factors and the counting of "sequestered" nitrogen as removed, it allows growers to add more fertilizer. As important, the inaccuracy of the complex equations, with many estimated factors, cloud the data needed for current and future discussion and regulation.

Evapotranspiration (ET). Again, of course, growers and their proxies want complex formulas with estimated factors and the counting of nitrogen only for the amount of irrigation water evapotranspired, it allows growers to add more fertilizer. By including this provision, the growers will both over-irrigate and over-fertilize.

(INMP) Irrigation and Nutrient Management for every cropping. An irrigation and nutrient management plan (INMP) is a prescription based on the specific needs of a specific crop, taking all available forms of nutrient, including soil and irrigation water, and weather into account. Every

crop has unique irrigation and fertilization requirements, and every crop will be planted in soils with varying amounts of carry-over available nitrogen in the soil. Available nitrogen in the irrigation water could also vary from month to month and well to well. Balancing nitrogen applied with available nitrogen in the soil and water is *not* an annual exercise but must be practiced and demonstrated for every cropping.

Field "quick-tests" of nitrate in soil and water measure the amount of *available* nitrogen for a crop, *not* the amount of yet-to-be mineralized organic nitrogen or sequestered nitrogen. As the organic or sequestered nitrogen becomes available, it will be caught and measured in subsequent quick tests and balanced with amendment applied. As advocated by UC ANR, conducting soil quick tests before every cropping can often eliminate the preplant fertilization because of carry-over and new nitrate created by mineralization. Balancing, crop by crop, available nitrogen already present in the soil and water, with the amount of available nitrogen applied is the only way we will ever be able to control nitrogen discharge to ground and surface waters.

Requiring certification of an annualized INMP both loses the crop specific granularity (critical to the annualized A-R discussed below) and certification is no guarantee of implementation. In the East San Joaquin (where the crops are often perennial and an annual INMP could be appropriate) certification of the INMP is required, yet only a small percentage of growers report that they measure soil or irrigation water nitrogen, defeating the entire purpose of the INMP.

<u>A-fer minus R.</u> A-fer (applied available nitrogen) minus R (removed nitrogen) directly measures nitrogen what will be discharged into the environment, the factor the board clearly has authority to regulate.

"Natural" surface water has very little available nitrate, the US Geological Survey (Bulletin 1225) estimates that on average .6 mg/L nitrate as nitrogen. Nitrate in soil is variable depending on the amount of organic nitrogen being mineralized into nitrate, but in agricultural environments the nitrate in soil is coming from irrigation water, amendments, and the mineralization of previous crops and composts.

Crop-available nitrogen is only found in the soil, irrigation water, and amendments and nitrate in irrigation water is our key concern. The nitrate in soil comes from the irrigation water and previous amendments. Therefore, the amount A-fer minus R (removed) is the new amount of nitrogen discharged.

> Example: 100 pounds of crop-available nitrogen is [A]pplied and 110 pounds is [R]emoved yielding an A minus R of negative 10. That extra 10 pounds of nitrogen removed had to come from somewhere and the only place it could have come from is the irrigation water, or the soil (the soil gets its N from irrigation water and previous amendments). This grower and crop has just pumped irrigation water and removed 10 pounds of nitrogen, a perfect example of pump and treat.
>
> Example: 100 pounds of crop available nitrogen is [A]pplied and 90 pounds is [R]emoved. A minus R is plus 10. Ten pounds of nitrogen will now be discharged.

Example: The first crop of a two-crop rotation "discharges" ten pounds of nitrogen (first crop A minus R equals +10). The grower then follows with a second crop, say broccoli a very efficient nitrogen scavenger, and the second crop A minus R is negative 10. For the two-crop season A minus R equals zero, the grower did not discharge (or treat) because the excess nitrogen from the first crop was scavenged by the second crop.

Some might suggest that precisely matching A with R is impossible as it creates too thin a margin, crops are not entirely efficient, or farming outdoors has variability and risks. But A minus R is the simplest and best measure because it works regardless of the amount of nitrogen in the irrigation water. If less nitrogen is applied (as amendment) than is removed, the nitrogen was scavenged from somewhere, most likely the irrigation water. The most polluted areas will become the most valuable farmland because the higher the nitrate in the irrigation water, the greater the safety net against under-applying fertilizer.

Some might say that crops need extra nitrogen at certain times in their growth. The grower always has the amount of nitrogen removed available as amendment, again, this will work best together with high nitrogen irrigation water.

Some might say this approach will not work forever, and that's true. Ultimately, once the irrigation water is cleaned up, likely 30 years from now, requirements can be relaxed and closely monitored.

If a grower feels they absolutely must apply more crop-available nitrogen, they have options to increase R:

- They could plant and harvest a cover crop.
- They could install a bio-reactor downslope of their field.
- They could install PAM.
- They could channel tailwater or tile drain water into an engineered treatment wetland.
- Or other innovative idea.

A final note: At the previous board meeting the staff added our suggested A-R equation, *including our timeline and target values*. Our timeline started out very liberal and tapered over 30 years to ultimately require an annualized negative 10, very achievable even with less nitrate polluted irrigation water. The subsequent public draft – hopefully inadvertently -- *changed our values* to unreasonable limits. Our proposed values are:

Table C.1-2 Discharge Limit Time Schedule and Milestones for Total Annual Nitrogen Removed Efficiency in Pounds per Acre. Any "savings" cannot be carried forward to the next crop year.

		2022	2024	2026	2030	2035	2040	2050
Total Annual A_{fer} - R for all crops		500	440	380	260	110	0	-10

Thank you!