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Isaak Stapleton
Director of the Natural Resources Division
Oregon Department of Agriculture

Dear Isaak:

We appreciate the opportunity and invitation to contribute to the Rules Advisory Committee (RAC). As the OSU LUBGWMA Working Group, we advise those tasked with developing a plan to reduce the nitrate concentration in the region's groundwater. Our independent, science-based perspective focuses on nitrogen availability from organic amendments, applying and removing nitrogen from farm fields, and leaching nitrogen (nitrate) through the vadose zone. At this point in the process, we would like to summarize some of our main guidance on the process.

Nitrogen Availability from Organic Amendments
The current rules report only total nitrogen applied, which overlooks the critical distinction between total nitrogen and plant-available nitrogen, particularly in organic amendments such as reused water, dairy compost, or manure. Unlike synthetic fertilizers, which contain immediately available nitrogen, organic sources often release nitrogen slowly, with availability ranging from -10 to 50% in the year of application. Lumping organic amendments together with synthetic fertilizers, without accounting for nitrogen availability, comes with the risk of overestimating environmental loading and under-representation of the actual agronomic input. We recommend incorporating estimates of first-year plant-available nitrogen using science-based tools like OSU's Organic Fertilizer Calculator (https://extension.oregonstate.edu/catalog/pub/em-9235-osu-organic-fertilizer-cover-crop-calculator-predicting-plant-available) or guidelines from OSU Extension publications that factor in amendment type, mineralization potential, and volatilization losses (https://extension.oregonstate.edu/catalog). This adjustment would align the rules with agronomic reality and support improved nutrient stewardship.

Application and Removal of Nitrogen
The OSU workgroup believes an application and removal assessment of nitrogen from farms in the impacted area would be beneficial. This assessment would allow for the creation of a foundational database that could be used to evaluate on-farm nitrogen management. The quantity of applied nitrogen (the nitrogen application rate) is a "record" that farmers keep track of. Nitrogen removal can be determined from the amount of biomass removed from the field and a crop-specific nitrogen coefficient value. Removed nitrogen is usually hauled off the field during harvest. The nitrogen coefficient value is the concentration of nitrogen

in the harvested biomass. The nitrogen coefficient value could be determined from routine laboratory or grain handling facility testing. It could also be a previously established, research-based estimate.

Nitrate Leaching Through the Vadose Zone

Groundwater nitrate levels often respond slowly to improved farming practices. Measurable aquifer improvements can take years or decades, but there is a need for early (relatively short-term), quantitative evidence that nitrate leaching is being reduced. Real-time, continuous vadose zone monitoring using advanced sensors and water sample collection techniques can provide this evidence. Computer models can use acquired data to forecast plume migration and aquifer water-quality trajectories.

Pilot Test on Actual Farms

We recommend phasing the rules into place with an initial pilot project for at least an entire growing season. Testing the draft rules and procedures on a smaller scale will help uncover challenges, allowing for adjustments before full implementation. Pilot tests on selected actual farms also provide insights into the resources required (e.g., time, labor). Early involvement of farmers and other industry stakeholders during pilot tests fosters collaboration and builds support for new rules.

We believe these ideas will be beneficial in shaping the rules and ultimately lead to a more successful implementation. We are available to discuss this further at your convenience.

Sincerely,

Carlos Bonilla, Chair
OSU LUBGWMA Working Group
Oregon State University

OSU LUBGWMA Working Group

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- Larry Lutcher | PhD Soil Science | Professor Department of Crop and Soil Science | Cropping Systems and Nutrient Management
- Amber Moore | PhD Soil Science | Associate Professor Department of Crop and Soil Science | Soil Fertility and Nutrient Management
- Ruijun (Ray) Qin | PhD Agronomy | Associate Professor Department of Crop and Soil Science | Nutrient and Water Management
- Salini Sasidharan | PhD Environmental Science and Engineering | Assistant Professor Department of Biological and Ecological Engineering | Sustainable Groundwater Management