QUEENSLAND FARMERS' FEDERATION

Australian and New Zealand **Draft Guidelines for Fresh and Marine Water Quality**

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Prepared for:

Department of Climate Change, Energy, the Environment and Water

Date prepared:

December 2023

The united voice of Queensland agriculture

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This submission is provided to:

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Our members

- Canegrowers
- Cotton Australia
- Queensland Fruit & Vegetable Growers
- Nursery & Garden Industry Queensland
- eastAUSmilk
- Australian Cane Farmers Association
- Queensland United Egg Producers
- Turf Queensland
- Queensland Chicken Meat Council
- Pork Queensland
- Bundaberg Regional Irrigators Group
- Burdekin River Irrigation Area
- Central Downs Irrigators Ltd
- Fairburn Irrigation Network
- Mallawa Irrigation
- Pioneer Valley Water Co-operative Ltd
- Theodore Water Pty Ltd
- Eton Irrigation
- Queensland Oyster Growers Association
- Lockyer Water Users Forum

About the Queensland Farmers' Federation

The Queensland Farmers' Federation (QFF) is the united voice of agriculture in Queensland.

We are a member-based organisation representing the interests of peak agriculture industry organisations (both state and national). Through our members, QFF represents more than 13,000 primary producers across the cotton, cane, horticulture, dairy, nursery and garden, poultry, pork, and intensive animal industries.

We unite the sector to engage in a broad range of economic, social, environmental, and regional issues through advocacy, policy development, and project activity. We work with the government of the day on behalf of industry, farmers, and the community to provide powerful representation and contribution to the policy direction, sustainability, and future growth of Queensland's agriculture sector.

Our Council of member representatives and policy committees set the strategic priorities for policy development and advocacy, while our Executive Board ensures our corporate governance.

QFF draws on the expertise and industry knowledge of our members, and through our commitment to collaboration and considered policy development, we lead Queensland's agriculture sector towards a strong future, ensuring our members are ahead of the game and have a voice at the table on the issues that matter to their members.

Submission

QFF welcomes the opportunity to provide comment on **Australian and New Zealand Guidelines for Fresh and Marine Water Quality – DRAFT default guideline values – November 2023.**

We provide this submission without prejudice to any additional submission from our members or individual farmers.

Background and toxicants under review

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) toxicant water quality guidelines are being progressively developed and released for public comment that are developed to protect aquatic ecosystems and human water uses, such as recreation, irrigation and stock watering. QFF represents intensive and irrigated agriculture in Queensland and, as such, the toxicants that are under review that could potentially impact the agricultural sector.

The current toxicants that are under review for the Australian and New Zealand Guidelines, for fresh and marine water quality are:

- Copper in fresh water
- Ammonia in fresh water

It is important to note that in Queensland, water quality is underpinned by an existing regulatory framework via the Environmental Protection Act 1994 (EP Act), and subordinate regulation including but not limited to the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP Water and Wetland Biodiversity). The EPP Water and Wetland Biodiversity upholds the object of the EP Act in relation to waters and wetlands; and the implementation of the Reef 2050 Water Quality Improvement Plan to help address water quality targets and improve reef water quality.

Overview

Copper in fresh water

The updated default guideline values (DGVs) for dissolved copper in freshwater, supersede the ANZECC/ARMCANZ (2000) DGVs. The current derivation has added new data published since 2000, including chronic data for Australasian species. The hardness corrections applied to the ANZECC/ARMCANZ (2000) DGVs have been replaced with dissolved organic carbon (DOC) corrections.[1] Copper is used as a biocide in antifouling paints, wood preservatives, fungicides and algaecides (European Copper Institute 2008).

Copper is a prime component in many fungicides and algaecides used in horticultural production systems. The use of is to mitigate crop damage and without the use of these disease management applications, many crops would be destroyed due to mildew and other diseases. It is essential that when assessing agrochemical use on horticultural crops and safeguarding aquatic ecosystems, an overall assessment of other industries is taken into consideration. Evidence based policy decisions are vital to ensure the sustainability of both our horticultural industry and our aquatic ecosystems.

There have been concerns over time that fungicides alter the microbial fungi communities responsible for recycling of nutrients in soils, which indirectly leads to population declines in aquatic organisms, and birds. Given that the global usage of agrochemicals such as fungicides is estimated to total four million tonnes per year, the distribution is heavily dependent on location, application rate, temperature, weather conditions, bioavailability and the variation of industries utilising copper in the chemical residues that are being disbursed into freshwater ecosystems.[2] It is important to note that modern fungicides are more degradable and have a lower half life than previous fungicides.

In freshwater, the geochemistry including water column characteristics such as water hardness and pH, is a significant factor that can increase copper bioavailability and toxicity. Organic ligand concentrations can also greatly exceed copper ion concentrations in the water column and therefore provide a large buffering capacity. Therefore, copper bioavailability can be severely overestimated if it is based on total dissolved copper (TDCu) concentrations.[3]

As noted in the draft guidelines report for Copper, these other mechanisms can result in contradictory effects of pH on the aquatic toxicity of metals and when assessing toxicity guidelines for copper in freshwater.[4] The total volume of ppm that could be from agrochemical use would be minimal and be limited in adverse outcomes, and as such needs to be assessed on a case by case

[1] copper-fresh-dgvs-draft-technical-brief.pdf (waterquality.gov.au)
[2] Ecological Impacts of Toxic Chemicals. (2011). Netherlands: Bentham Science Publishers.
[3] Kiaune, L., Singhasemanon, N. (2011). Pesticidal Copper (I) Oxide: Environmental Fate and Aquatic Toxicity. In: Whitacre, D. (eds) Reviews of Environmental Contamination and Toxicology Volume 213. Reviews of Environmental Contamination and Toxicology, vol 213. Springer, New York, NY. https://doi.org/10.1007/978-1-4419-9860-6_1
[4] copper-fresh-dgvs-draft-technical-brief.pdf (waterquality.gov.au)

basis to ensure there is not detrimental impacts to a farms bet management practices or ability to continue to produce crops.

Overall, from the draft guidelines, Cu-based fungicide residues are currently unlikely to significantly impact soil microbes in Australian soils but can over time impact sustainable agricultural production. The challenge between the draft guidelines, environmental sustainability and agricultural production is formulating a framework that incorporates reducing the risks of using copper-based fungicides against policy and best management practices in agriculture to ensure businesses remain sustainable. From these guidelines, it is imperative that direct consultation with agricultural producers, agrochemical suppliers and governments are undertaken to assess alternative fungicides that reduce the risk on the environment and do not adversely impact agricultural producers' best management practices or render a business unviable.[5]

Ammonia in freshwater

Ammonia is ubiquitous in the aquatic environment and plays a significant role in the nitrogen cycle. It is formed through animal waste, bushfires, nitrogen fixation reactions, and the decomposition of animals and plants. Ammonia is also a common industrial chemical (e.g. fertiliser) that enters the environment via municipal, industry and agricultural processes.

As ammonia is a non-accumulative toxicant, there is less impact to aquatic organisms or ability to directly connect the toxicity of ammonia from any site-specific links to surrounding agricultural land, due to the variability of ammonia in the aquatic environment and surrounding soil landscape.[6]

Summary

QFF supports the current DGV proposed for copper and ammonia due to the limited environmental impacts associated from the delivery of fungicides or fertilisers from different agricultural commodity groups but cannot support significant changes to the proposed DGV without meaningful consultation with a wider segment of stakeholders from the food, fibre and foliage sectors.

There are also no allowances made for the proposed changes in climate that will cause variations to the concentration of toxicants identified in various water bodies and potential bioaccumulation levels in species, or increased dissipation rates of some toxicants from elevated temperatures.

While the current methodology utilised to form the basis for the DGV's is not currently regulated, varying factors used in the calculations could potentially increase the probability that these DGV's are not at the highest accuracy level. This is especially the case for toxicants such as those that do become highly mobile within and environment, but have limited conclusive studies to confirm the concentration in aquatic environments, due to the mobility within soils, and difficulties to extract or analyse as a singular toxicant.[7] Using a variety of modality assessments for the adoption in the assessment of slightly to moderate disturbed ecosystems, has the potential to form inaccuracies in the final DGV's for both copper and ammonia.

It is recommended that any inconsistencies in the data sets are only used in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, and not to set the basis

[5] Wightwick, A.M., Reichman, S.M., Menzies, N.W. *et al.* Industry Wide Risk Assessment: A Case Study of Cu in Australian Vineyard Soils. *Water Air Soil Pollut* **224**, 1702 (2013). https://doi.org/10.1007/s11270-013-1702-2

[6] Emerson, K, Lund, RE, Thurston, RV & Russo, RC 1975. Aqueous ammonia equilibrium calculations: Effect of pH and temperature. Journal of the Fisheries Research Board of Canada, 32, 2379–2383.

[7] Toxicant default guideline values for aquatic ecosystem protection – Technical brief; Australian and New Zealand Guidelines for fresh and marine water quality. 2021

for a regulatory framework, and only intended for the application for water quality guidelines for slightly-to-moderately disturbed ecosystems as outlined in the toxicant default guideline technical briefs.

Proposal for future default value guidelines

Currently there is no immediate pathway that provides the agricultural sector with a comprehensive toxicant list to provide reference to the changes to toxicant values and what impacts these changes could impose to chemical application rates and residue levels on farm. As noted in prior QFF submissions, a cohesive and informed reporting framework is needed in Australia to provide a comprehensive list of all ANZG toxicants, and what these changes will mean to on farm use of pesticides, herbicides, and fungicides.

The ability for farmers to obtain clear and concise data on toxicant guidelines is paramount, to ensure the continued efficiency of production of food, fibre and foliage and best management practices (BMP's), whilst also maintaining the level of water quality that is not only fit for human consumption, but also livestock and irrigation to ensure the continued provision of world class agricultural products for domestic and export markets.

The development of a single national point of reference, which includes an environmental monitoring platform, and performance measures to help farms identify water quality issues will help assist the agricultural sector to balance chemical application and environmental protection that will help support sustainable agriculture into the future.

Yours sincerely

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