Australian Government
Department of Climate Change, Energy, the Environment and Water

Australian & New Zealand GUIDELINES FOR FRESH & MARINE WATER QUALITY

Response to public submissions on draft default guideline values for alpha-cypermethrin, dioxins, fipronil and mancozeb in freshwater

July 2023

Draft default guideline values (DGVs) for alpha-cypermethrin, dioxins, fipronil and mancozeb in freshwater were published on the Water Quality Guidelines website for a 3-month public consultation period from June to August 2021. During this period, comments for the draft DGVs for dioxins in freshwater were received via public submission.

Responses to comments and any associated edits to the draft DGV technical brief are outlined in this report, de-identified for public record. Where required, the responses and revisions have been approved by the original peer reviewers and the jurisdictional technical and policy oversight groups, and noted by the National Water Reform Committee. The final versions may include additional minor improvements made during the final jurisdictional review and approval process.

The default guideline values for alpha-cypermethrin, dioxins, fipronil and mancozeb in freshwater are now published as final. For additional information on the publication process, please refer to the pathway for toxicant default guideline value publication.

The Water Quality Guidelines Improvement Program thanks all submissions for their valuable contribution to the development of default guideline values for the protection of aquatic ecosystems.

Department of Climate Change, Energy, the Environment and Water's response to public submissions on draft default guideline values

Toxicants: alpha-cypermethrin, dioxins, fipronil and mancozeb in freshwater

Comment No.	Comment	Response	Action taken
Note: Only excerpts from the submission that require responses have been reproduced here.			
1	While the default guideline values (DGV), provide an avenue to align best management practices, it is also to be noted that actual risks associated with toxicity can be difficult to quantify (Navarro et al., 2021). This is because metrics such as pesticide use (kg/ha) or spray frequencies are commonly reported in aggregated form and are not linearly related to toxicity hazard and therefore are less informative in driving reductions in impact. A toxicity hazard or similar would provide a more suitable indicator.	Toxicant risk is governed by two key factors – the *effect* that a chemical has (also often referred to as the hazard) and its *exposure* in the environment. Exposure is determined by measuring chemical concentrations in the environment or modelling/predicting their occurrence based on chemical properties, environmental conditions and usage characteristics. The DGVs published by the Australian & New Zealand Guidelines for fresh & Marine Water quality (ANZG) represent the effect, or hazard, component of the risk equation. Thus, the DGVs represent the best estimate of a toxicity hazard that is available at present because they are based on the latest scientific knowledge on toxic effects and are derived using a standardised method. Should changes to the toxicant default guideline values result in increased numbers of 'exceedances' from DGVs, it may not be tied to regulation of pesticide uses (but may be tied to regulation of receiving water quality) and does not necessarily mean that adverse effects are occurring. As emphasised in the ANZG Guidelines, such exceedances need to be considered in the context of other lines of evidence (e.g. ecosystem receptor lines of evidence) and may even trigger further monitoring or research to better understand impacts.	No changes made to technical briefs.
2	(a) We support the amendments to the default value guidelines and support the DGV's used as guidelines for fresh and marine water quality but do not support this data setting the foundations for a regulatory framework. (b) This is due to the varying results from the ecotoxicological data sets in each toxicant under review, and insufficient toxicity equivalent factors that do not give an absolute	(a) The ANZG Guidelines publish DGVs as guidelines only. It is a matter for jurisdictional regulators as to how they implement the DGVs for managing water quality (in accordance with the ANZG Guidelines) and, therefore, such discussions should be held with relevant jurisdictional regulators. However, DGVs are not intended to replace or supersede the regulatory acceptable levels that are derived as part of the formal regulatory framework for agricultural and veterinary chemicals (AgVet chemicals) within Australia. Thus, the purpose of a regulatory acceptable level and DGVs are different.	No changes made to technical briefs.

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	value as outlined in the technical brief for Dioxins in freshwater.	(b) It is not possible to collate and use a standardised set of ecotoxicological data for all toxicants. The DGV derivation method (Warne et al. 2018) provides a consistent method for ensuring the best available data and information are used to inform DGVs. However, datasets of different size and quality will invariably occur for different toxicants. In recognition of this, the derivation method includes a DGV 'reliability' classification. This reliability classification is linked to guidance on how the DGVs should be applied. This guidance should help users (i.e. operators, proponents, regulators, etc.) appropriately apply DGVs. Regarding the toxicity equivalence factors (TEFs) for dioxins, these are based on the best available data and are the same as the TEFs recommended by the USEPA and WHO. Most importantly, absolute DGVs are provided for the most toxic of dioxins, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD). The task of deriving DGVs for all dioxin congeners is well beyond the capacity of the ANZG Guidelines.	
3	(a) Environmental values utilised in the assessments for all the above listed toxicants are derived from modality assessments (Warne et al. 2018). These modality assessments help determine the different sensitivities amongst diverse organisms to a chemical, which then helps to determine what statistical variants are more representative of the whole data set to inform a general guideline when there is no specific guideline value applied to the chemical. (b) Water quality guidelines are also recognised as a trigger to assess whether the water is fit for human consumption and help provide an integrated approach to the management of water quality from land use impacts. (c) Impacts to soils and waterways, resulting from pesticides can vary, and it is vital to acknowledge that each toxicant has different degradation half-lives that are impacted by their ability to adsorb to sediments, become mobile through the soil, become soluble in water, or reduce the toxicity and half-life through changes in climate.	(a) The toxicity data are not derived from the modality assessments. Modality assessments are undertaken on the collated toxicity datasets to check whether the data can be considered to be part of a single or more than one population of values. This is because the species sensitivity distribution (SSD) approach used to derive the DGVs requires that the dataset be from a single population of values. For all toxicants, the final dataset that has passed the multiple checks and assessments, including quality assessment and modality assessment, is then used to derive specific DGVs. (b) While water quality guideline values for drinking water do exist (under the NHMRC 2016 Australian Drinking Water Guidelines), the ANZG DGVs are specifically related to aquatic ecosystem protection. (c) Toxicant DGV technical briefs typically include information on factors that can affect the environmental fate and toxicity of the toxicant in water, where this information exists. Degradation pathways and half-lives as well as other important physical and chemical properties are described. These give an indication of how the toxicant behaves in the environment and where it is more likely to partition. Ultimately, measurement of environmental concentrations provides the best estimate of exposure of the toxicant in the environment, and it is the measured (not predicted) environmental concentrations that should be compared with DGVs. Information on factors that can affect toxicity is also included where this information is available. Unfortunately, only rarely is this information extensive enough to be able to factor them into the DGVs. This is most often possible for metals (e.g. corrections for pH, hardness, etc.) rather than pesticides. Where	No changes made to technical briefs.

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		environmental conditions are such that it is thought that the DGVs may not be appropriate, then ANZG (2018) recommends that site-specific guideline values be derived.	
4	(a) We support the current DGV proposed for mancozeb due to the environmental impacts that it could cause to different agricultural commodity groups but cannot support changes to the proposed DGV without meaningful consultation with a wider segment of stakeholders from the food, fibre and foliage sectors. (b) It should also be recognised that there are inconsistencies in the final assessments of the different toxicants outlined in this review, including fipronil, and mancozeb which listed varying ecotoxicological effects on limited taxonomic groups, but larger species subsets. (c) 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 bioaccumulation levels in species, or increased dissipation rates of some toxicants from elevated temperatures.	(a) The need for public consultation is important. This is why every toxicant DGV that is drafted undergoes a 3-month public consultation period prior to being finalised and drafted (b) See response to comment 2(b) (c) See response to comment 3(c).	No changes made to technical briefs.
5	While the current methodology utilised to form the basis for the DGVs is not currently regulated, varying factors used in the calculations could potentially increase the probability that these DGVs are not at the highest accuracy level, especially for toxicants such as those from the dithiocarbamate group 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 (e.g. Draft Mancozeb DGVs technical brief).	It is unclear which parts of the derivation method are being referred to. However, as noted earlier, the DGV derivation method (Warne et al. 2018) provides a consistent method for ensuring the best available data and information are used to inform DGVs. Where professional judgements are required, the basis for such decision making is clearly laid out. The challenges of measuring specific dithiocarbamate or EBDC fungicides (i.e. that current routine chemical analyses cannot discriminate between the various dithiocarbamates or EBDC fungicides) is acknowledged in the mancozeb DGV technical brief, and an approach to deal with this is proposed. The uncertainties are acknowledged, and it is clearly stated that the mancozeb DGVs should be used in conjunction with other lines of evidence. Additional cautionary text to this effect has been added to Section 4.4 (Reliability classification) of the mancozeb DGVs technical brief.	Additional cautionary text added to Section 4.4 (Reliability classification) of the mancozeb technical brief to advise that the DGVs should be used with caution and always in conjunction with other lines of evidence.

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			Other minor improvements were made throughout the text of the mancozeb technical brief.
6	(a) 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 DGVs (e.g. Draft fipronil DGVs technical brief). (b) 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 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.	(a) The guidance in the derivation methodology (Warne et al. 2018) in relation to dataset modality (section 3.5) is clear and provides for a robust assessment of modality upon which to make transparent and defensible decisions. While these decisions can affect the final DGVs, it is not correct to state that they can result in inaccuracies in the final DGVs. (b) See response to comment 2(a).	No changes made to technical briefs.
7	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. 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.	In Australia, primary responsibility for water resource management rests with the individual state and territory governments. The Australian Government's role is primarily one of providing national leadership and strategic direction through its participation in high-level fora and its work on water, and through its key natural resource management programs. In addition, the National Water Initiative (NWI) outlines the establishment of a nationally compatible system of water access entitlements, efficient water markets, institutional arrangements for the recovery and management of water for the environment, improved accounting and best practice water pricing, and urban water issues. Currently the Australian Government is working with the states and territories governments to renew the NWI. Renewing the NWI offers the opportunity to better reflect climate change, provide for increased First Nations influence in water resource management, ensure access to safe and secure drinking water and take a strategic approach to groundwater management.	No changes made to technical briefs.

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8	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.	Please see response to comment 7.	No changes made to technical briefs.

References

ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia.

Batley, GE, van Dam, RA, Warne, MStJ, Chapman, JC, Fox, DR, Hickey, CW and Stauber, JL 2018. Technical rationale for changes to the Method for Deriving Australian and New Zealand Water Quality Guideline Values for Toxicants. Prepared for the revision of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, 49 pp.

Navarro J, Hadjikakou M, Ridoutt B, Parry H & Bryan BA 2021. Pesticide Toxicity Hazard of Agriculture: Regional and Commodity Hotspots in Australia. *Environmental Science & Technology*, 55, 1290-1300.

NHMRC 2016, Australian Drinking Water Guidelines (2011) — Updated 2016, National Health and Medical Research Council, Canberra.

Warne MStJ, Batley GE, van Dam RA, Chapman JC, Fox DR, Hickey CW & Stauber JL 2018. Revised Method for Deriving Australian and New Zealand Water Quality Guideline Values for Toxicants – update of 2015 version. Prepared for the revision of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, 48 pp.