Decision Paper

Analysis of submissions on Drinking Water Standards and recommended next steps

To	KOPA
Cc	Jim Graham, Caroline Robinson, Peter Wood, Ash Cornor
From	Helen Robinson
Date	8 April 2022

Purpose

1. The purpose of this paper is to request KOPA to note the consultation process and analysis of submissions on Drinking Water Standards, and to approve the next step to achieve the implementation of the Drinking Water Standards; namely providing this analysis to the Minister of Local Government via the Department of Internal Affairs (DIA).

Recommendation

2. It is recommended that KOPA:
   (a) **Note** that there was a public consultation for the purpose of setting Drinking Water Standards under s 53 of the Water Services Act 2021. This consultation included:
      (i) adequate and appropriate notice of the content of the proposed instrument; and
      (ii) a reasonable opportunity for interested persons to make submissions; and
      (iii) appropriate consideration of any submissions received.
   (b) **Approve** the analysis of submissions and the proposed Drinking Water Standards are forwarded to the Minister via DIA.
   (c) **Note** that the only change made as a result of the consultation, was the descriptor of the determinand 'Anatoxins' was changed to "Anatoxins (includes cogeners Anatoxin-a, Homoanatoxin-a, Dihydro anatoxin-a, Dihydro homoanatoxin-a)".
   (d) **Note** that nitrates and nitrites were of concern to a number of submitters, and while the evidence does not support a change to the MAV levels, these are areas where it is important to keep abreast of public health research.
   (e) **Note** that the existing lead MAV was a concern to two submitters. We are undertaking policy work on lowering the MAV for lead and should be in a position to consult on a proposal around July 2022.
   (f) **Note** that there appears to be uncertainty about the health risk from atrazine.
   (g) **Agree** to seek approval from the Board for the Board Chair to write to the Director-General of Health asking the Ministry of Health (as the policy agency on drinking water public health matters) to consider what further policy work should be done to understand the health risks associated with nitrates, nitrites and atrazine.

Summary of proposed changes

MAVs for Inorganic Determinands

Determinand	Existing MAV	Recommended MAV	Units	Notes
Aluminium		1	mg/L	New determinand
Barium	0.7	1.5	mg/L	Increased MAV
Boron	1.4	2.4	mg/L	Increased MAV
Molybdenum	0.07		mg/L	Delete determinand
Nitrite long-term	0.2		mg/L	Delete determinand
Perchlorate		0.08	mg/L	New determinand
Selenium	0.01	0.04	mg/L	Increased MAV
Uranium	0.02	0.03	mg/L	Increased MAV

MAVs for Organic Determinands

Determinand	Existing MAV	Recommended MAV	Units	Notes
Anatoxin-a	0.006		mg/L	Delete determinand
Anatoxin-a(s)	0.001		mg/L	Delete determinand
Anatoxins (includes cogeners Anatoxin-a, Homoanatoxin-a, Dihydro anatoxin-a, Dihydro homoanatoxin-a)		0.006	mg/L	New determinand
Atrazine	0.002	0.1	mg/L	Increased MAV
Azinphos methyl	0.004	0.1	mg/L	Increased MAV
Cylindrospermopsins	0.001	0.0008	mg/L	Decreased MAV
Homoanatoxin-a	0.002		mg/L	Delete determinand
Hydroxyatrazine	No MAV	0.3	mg/L	New determinand
MCPA	0.002	0.8	mg/L	Increase MAV
Metalaxyl	0.1	0.3	mg/L	Increase MAV

Determinand	Existing MAV	Recommended MAV	Units	Notes
Nodularin	0.001			Delete MAV - Nodularin is now grouped with Microsystins
N-nitrosodimethylamine (NDMA)	No MAV	0.0001	mg/L	New Determinand
PFHxS + PFOS	No MAV	0.00007	mg/L	New Determinand
PFOA	No MAV	0.00056	mg/L	New Determinand
Sodium dichloroisocyanurate (as cyanuric acid)	No MAV	40	mg /L	New Determinand
Trichloroethene	0.02	0.03	mg/L	Increase MAV
1080				Delete and replace with a short-term and long-term MAV
1080, short term	No MAV	0.035	mg/L	New Determinand
1080, long term	No MAV	0.0035	mg/L	New Determinand

MAVs for Radiological Determinands

Determinand	Existing MAV	Recommended MAV	Unit	Notes
Total alpha activity	0.10	0.50	Bq/L excluding radon.	Increase MAV
Total beta activity	0.5	1.0	Bq/L excluding potassium-40.	Increase MAV

Background and context

3. The obligations for Taumata Arowai are to review the Drinking-water Standards for New Zealand 2005 (Revised 2018)[1], and to ensure that public consultation has been carried out before new Drinking Water Standards are established by Order in Council. The Order in Council process will be managed by DIA, rather than Taumata Arowai, through the Minister of Local Government.
4. Public consultation must include:[2]
   (a) adequate and appropriate notice of the content of the proposed instrument; and
   (b) a reasonable opportunity for interested persons to make submissions; and
   (c) appropriate consideration of any submissions received.
5. Taumata Arowai reviewed the existing Drinking Water Standards:
   (a) Where possible, MAVs have been based on the latest World Health Organization (WHO) guideline values, adjusted to a body weight of 70 kg. This is consistent with the review methodology previously used by the Ministry of Health to review the Drinking Water Standards. The WHO is an internationally recognised source for guidelines for drinking-water quality and are the basis for other standards like the EU directive. The WHO guidelines define a tolerable burden of disease of 10^{-6} DALY per person per year. A DALY is a disability-adjusted life year.
   (b) ESR also considered whether MAVs were required for contaminants and factors that have never been detected in water in New Zealand.
   (c) Taumata Arowai engaged the Cawthron Institute to review the MAVs for cyanotoxins as this is their area of expertise.
   (d) Taumata Arowai engaged two international experts to ensure the proposed determinands and associated MAVs reflected international best practice.
   (e) Following this initial development, the proposed standards were reviewed by sector reference groups established by Taumata Arowai. The reference groups included representatives from small water suppliers, Māori communities, and local authorities.
6. Based on the above advice some MAVs have decreased and some have increased. Where a MAV has increased, it is due to improved scientific information on the health impact of that determinand.
7. On 17 January 2022 Taumata Arowai commenced a 10-week public consultation process on proposed Drinking Water Standards and other instruments. The consultation process was a mix of direct engagement and public notices supported by webinars.
8. There were 77 responses to the consultation for a diverse range of interests in the Drinking Water Standards. Most of the submissions made a general comment, only a small number of these submitters provided comments at an individual determinand level.[3]

[1] Water Services Act 2021, Schedule 1, cl 2(2).

[2] Section 53(2) of the Water Services Act 2021.

[3] There were 1,744 submissions received from Groundswell NZ. These submissions did not address the Drinking Water Standards.

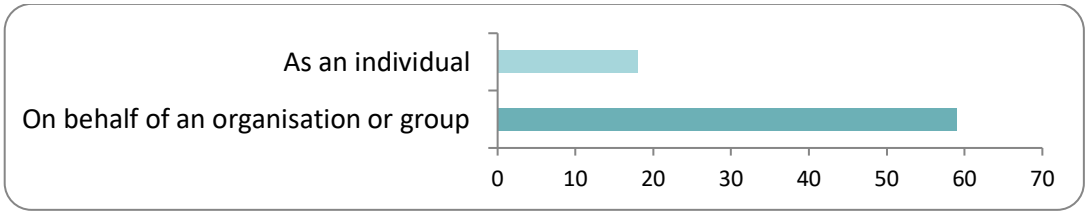
9. The issue that generated the most considered responses was the proposal to remove the long-term MAV for nitrite. The submitters linked this with the proposal not to change the MAV for nitrates. The submissions on this are analysed below. We don't consider there is enough evidence to support changes other than the removal of the long-term MAV for nitrite, however these are areas where it is important to keep abreast of public health research. It is recommended that we seek the Board's approval to approach the Ministry of Health to consider what further policy work should be done to understand the health risks associated with nitrates and nitrites.
10. There were two submissions to lower the lead MAV. Lead is a known issue, and a process is being worked through to review the lead MAV. We will work closely with MOH on this piece of work.
11. An emerging issue is the health risk associated with Atrazine. It is recommended that we seek the Board's approval to approach the Ministry of Health to consider what policy work should be done to understand the health risks associated with atrazine.
12. The proposed Drinking Water Standards will replace the existing Drinking-water Standards for New Zealand 2005 (revised 2018) established under the Health Act 1956.
13. The Drinking Water Standards set limits for contaminants and other characteristics (excluding aesthetic values) of drinking water.
14. The timeline agreed with the Minister's office is:
    (a) Taumata Arowai provides analysis of submission to DIA on 8 April 2022.
    (b) DIA provides initial advice to the Minister, including the analysis of submissions and draft Cabinet papers by 13 April 2022.
    (c) DIA issues drafting instructions to PCO by 20 April 2022.[4]
    (d) Order in Council setting the Drinking Water Standards is effective before 30 June 2022.
15. Attachment 1 – Recommended Determinands and MAVs for Drinking Water Standards provides a list of the recommended determinands and their MAVs.

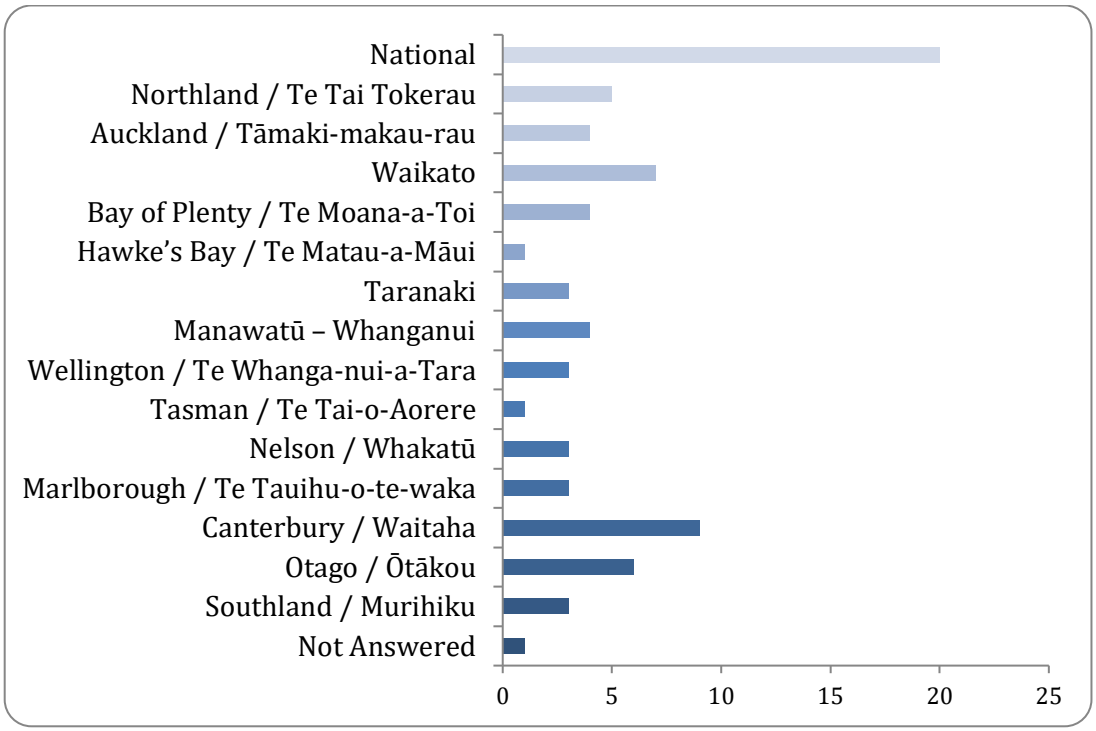
[4] There has already been an initial engagement between PCO, DIA and Taumata Arowai on the proposed regulations.

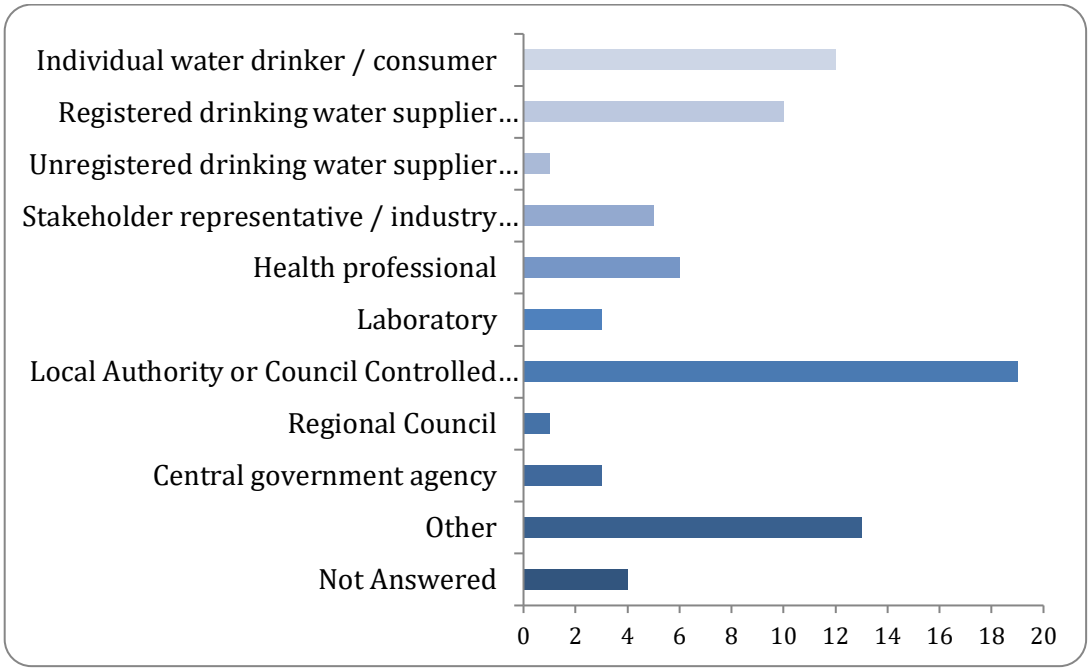
Analysis of submissions

Profile of submissions

16. The following three tables reflect what interest the submitter has in Drinking Water Standards and geographically where the submissions have come from.






Individual water drinker / consumer
Registered drinking water supplier...
Unregistered drinking water supplier...
Stakeholder representative / industry...
Health professional
Laboratory
Local Authority or Council Controlled...
Regional Council
Central government agency
Other
Not Answered
0
2
4
6
8
10
12
14
16
18
20

17. Below is a summary of the questions that the consultation asked. The submission process allowed for both quantitative and qualitative responses.
18. Note, there were only questions related to the determinands where the maximum acceptable values (MAV) are proposed to change from the existing Drinking Water Standards, there was new determinand recommended, or a determinand was removed.
19. The consultation process provided an opportunity for submitters to comment on the MAVs that are not proposed to change; the responses are summarised below.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Question - Do you agree that the process used to review the MAVs for drinking water standards was appropriate? **Key comments from submitters** I think it is unnecessarily controlling and restrictive (**individual**) At-risk communities are not protected by averages. eg Iwi /hapu/ farm workers/ community in geothermal areas exposure to arsenic (**Kahu Environment Ltd**) If we are addressing MAVs for contaminants we have never detected, why not do the same for ones we have? Such as PFAS? (**EINZ Ltd**) For the most part, changes have been made to align to the WHO Guidelines for Drinking Water Quality, however, there are some quirks relating to; - Anatoxins - Cylindrospermopsins - MPCA - Metalaxyl For most determinants, the MAVs align to those set by the WHO. However, for algae toxins, there is very limited toxicity data that can be used for setting robust MAVs. It would therefore be of benefit if the evidence upon which MAVs for all algae toxins have been set is made transparent. (**Fonterra Cooperative Group Ltd**) There is a lot of varying terminology used between WHO guideline values, WHO MAVs and the final MAVs.	**23**	**6**	**11**	Taumata Arowai notes that most submitters agree that the process used to review the MAVs for drinking water standards was appropriate. Taumata Arowai developed the standards with external technical input and review. They were reviewed by ESR (the Institute of Environmental Science and Research Limited) who ensured the MAVs generally align with guideline values set by the World Health Organisation (WHO). WHO calculates their guideline MAVs for a 60kg adult. ESR recalculated the values for a 70kg adult, which is closer to the average body weight of adults in New Zealand. This results in small changes to some MAVs. ESR also

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
The final MAVs also recognise those derived from WHO guidelines, but no recognition for those with no WHO guidelines and have adopted Australian DW guidelines. (**Gore District Council**) There is little guidance given on sampling or measurement methodologies for chemical contaminants e.g. trace elements, organic contaminants, even though there are a diversity of sampling and measurement methods available. For example, samples might be filtered in the field prior to analysis, or might be filtered in the lab (to measure "dissolved" contaminants) or might not (to measure "total" concentrations of contaminants). We recommend that at least a brief discussion or guidance be included regarding how samples are to be taken and analysed for chemical contaminants. (**ECAN**) I assume there was a reasonably broad range of people involved and would like to see the list of organisations or individuals that were part of the initial reference groups. (**Tall Tree Company**) The Drinking Water Standards should clearly outline Taumata Arowai's adopted risk assessment process used to set MAVs. (**Public Health Association of New Zealand– Auckland and Canterbury West Coast branch**) Far North District Council agree that a 70 kg adult is a more appropriate measure for the New Zealand population. In general Council agrees with how the MAV's have been established. FNDC recognises that the WHO guidance for the most part is the most appropriate basis for the MAVs. Where determinands have never been detected in water in New Zealand, FNDC believe that a risk-based approach is required. The addition of further testing parameters requiring development of new tests to be implemented,				considered whether MAVs were required for contaminants and factors that have never been detected in water in New Zealand. Taumata Arowai engaged the Cawthron Institute to review the MAVs for cyanotoxins as this is one of their areas of expertise. Taumata Arowai engaged two international experts to ensure the proposed determinands and associated MAVs reflected international best practice. Following this initial development, the proposed standards were reviewed by sector reference groups established by Taumata Arowai. The reference groups included representatives from small water suppliers, Māori communities, and local authorities.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
needs to be balanced with the increased costs and timeframes for testing especially for smaller suppliers with limited access to laboratories and funding. A formal process to review MAVs needs to be established. This needs to identify the triggers that required a MAV to be reviewed as well as the consultation process to be undertaken. It is unclear whether MAVS can be reviewed as a" one off" of if the full suite of MAVs should be reviewed on a fixed schedule. (**Far North District Council**). We agree that a robust process was followed in the development of the proposed Drinking Water Standards including a review of drinking water MAVs by ESR to ensure that they are aligned with changes the World Health Organisation (WHO) made to their guidelines. MAVs. The proposed MAVs will support the objective of ensuring drinking water suppliers provide safe drinking water to consumers. (**Selwyn DC**) No risk assessments are provided; no reasons given for the proposed changes (**Pesticide Action Network Aotearoa New Zealand**) The World Health Organisations are underpinned by robust science. ESR are a credible local scientific body to be ensuring the MAVs for a local context. We are also supportive of the adoption of values from the Australian Drinking Water Guidelines for PFHxS, (**Water NZ**) The process seems technically sound but we do question the outcome of having more permissible MAVs simply because NZ's average adult weight is higher. Ministry of Health data (New Zealand Health Survey: prevalence/mean 2021) shows that the risks associated with this change do not fall evenly across ethnic and gender demographics. Essentially raising				The proposed standards were then reviewed by the Ministry of Health prior to public consultation. The risk assessment profile, for the WHO based MAVs, is the WHO risk assessment process. This is based on 1 extra case of cancer from 100,000 people where a person drinks 2 litres of water, with the determinand concerned at the level of the MAV per day for 70 years. The recalculation of values for a 70kg adult is consistent with the past approach to setting drinking water standards in New Zealand.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
the MAV to a higher level in proportion to an increase in adult weight is less risky for population groups that tend to be heavier than average. Hence it exposes men to less risk than women, and Pasifika, Māori and NZ Europeans to less risk than Asians. (**Ashburton District Council - Management and technical officers**) HDC agree with the process that has been used to review MAVs and support the continued alignment with World Health Organisation guideline MAVs (with the average body weight adjustment). HDC consider that continued alignment with World Health Organisation guidance is essential to ensure international best practice is followed with respect to review of international research that may prompt a MAV level adjustment. (**Hurunui District Council**) Kaipara District Council, Far North District Council and Whangarei District Council (the Councils) agree that a 70 kg adult is a more appropriate measure for the New Zealand population. In general. The Councils agree with how the MAV's have been established. KDC recognises that the WHO guidance for the most part is the most appropriate basis for the MAVs. A formal process to review MAVs needs to be established. This needs to identify the triggers that required a MAV to be reviewed as well as the consultation process to be undertaken. (**Kaipara District Council**) Hamilton City Council staff agree with the process to review the maximum acceptable values ("MAVs") for drinking water standards. Staff support the alignment of MAVs with guideline values set by the World Health Organisation and review and refinements by New Zealand experts and technical reference groups. (**Hamilton CC**)				

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
We agree that a robust process was followed in the development of the proposed Drinking Water Standards (DWS), including a review of drinking water Maximum Acceptable Values (MAVs) by ESR to ensure that they are aligned with changes the World Health Organisation (WHO) made to their guidelines. The proposed MAVs will support the objective of ensuring drinking water suppliers provide safe drinking water to consumers. (**Canterbury Mayoral Forum**) Hauraki District Council understands that there are technical specialists involved in the setting of MAV's and Aesthetic Values and for this reason is making no submission on the values. Hauraki District Council encourages Taumata Arowai to continue to seek international science and expertise to set these values for the industry. (**Hauraki District Council**) The papers signal a better alignment with WHO health-based values, in terms of MAVs. We have no further comment, the methodology is sound, as is moving toward World standards. (**Lincoln University**)				
Question - Do you agree that the proposed MAVs will support the objective of ensuring that drinking water suppliers provide safe drinking water to consumers? **Key comments from submitters** In principle the Councils agrees that the MAVS as outlined will support the objectives. However, it is apparent that for some supplies this will increase workloads and costs for suppliers to mitigate a very small risk and that consideration needs to be made of the risk / costs for suppliers.	**23**	**7**	**10**	Taumata Arowai notes most submitters agree that the proposed MAVs will support the objective of ensuring that drinking water suppliers

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
The increase in the number of MAV's to be tested and the time requirements for tests to be reported will add strain to already stretched testing services. (**Far North District Council**) and (**Far North Councils**) Some small suppliers have commented to us that it had previously been unclear to them what limits were allowable. The proposed MAV's make it very clear what is required to provide safe drinking water. (**Water NZ**) Whilst the proposed standards and quality assurance rules provide a good general framework they appear silent on Māori public health and deeper implications around Te Mana o Te Wai and Te Tiriti o Waitangi. MAV limits and monitoring for example based on latest science are useful but could be supplemented by other considerations impacting Māori and their relationship with water - particularly at the small supply end and amongst those most vulnerable to burdens of compliance. It is recommended for example a Māori Impact Analysis is provided where modern standards or controls significantly impact tangata whenua traditional relationships with water. (**Public Health Association of New Zealand**) Yes, the MAV levels provide an essential benchmark and are relatively easy for the public to understand in comparison to operational rules / risk management approaches to safe water. (**Hurunui District Council**)				provide safe drinking water to consumers. Taumata Arowai has not undertaken a cost- benefit analysis of the changes to the Drinking Water Standards. Taumata Arowai is consulting on the Drinking Water Quality Assurance Rules, and an emerging theme in this consultation is compliance costs. It is appropriate that this issue is addressed in the Drinking Water Quality Assurance Rules. Taumata Arowai notes the recommendation for a Māori impact analysis and will consider how this can be better addressed in future revisions to the Standards.
Question - Do you agree with the proposed MAV for Aluminium?	**7**	**2**	**4**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Existing MAV - No MAV exists Proposed MAV - 1 (mg/L) **Key comments from submitters** Yes, as it is similar to the WHO value (**Fonterra Cooperative Group Ltd**) It is too high (**Individual**) The Councils have no concerns with adding a test for Aluminium. However, as it is not tested for at the present time there will be a cost impact on drinking water suppliers to undertake this testing. (**Far North District Council)** We support a MAV of 0.1 mg/L, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) and (**Greenpeace Aotearoa**) PNCC doses aluminium (in the form of Poly Aluminium Chloride) at the Turitea Water Treatment Plant for the Palmerston North water supply and actively monitors concentrations in the distribution system. We support the introduction of a MAV for aluminium. We support that this MAV be set at the proposed level of 1.0 mg/L. Concentrations reported on the Palmerston North network are well below the MAV. We believe it is set at an appropriate level to allow potential impacts on public health to be addressed. We request that the Drinking Water Standards specify the test to be used to determine compliance, for example whether this measurement is dissolved aluminium or total. Leaving this key piece of information out of the standards would lead to a lack of clarity. (**Palmerston North CC**)				Taumata Arowai notes most submitters agree with the proposed MAV for Aluminium. The proposed MAV is consistent with the WHO guideline value. The European Union (EU) sets upper limit values for a range of parameters in drinking water. These were last updated in 2020. Some of the values are lower than the WHO guideline values, however the EU values have 'uncertainty measurements' associated with them which allow in some cases levels to vary by up to 50% above upper limit. The EU allows a lead in period of 10 years for any new or changed values.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
The Councils have no concerns with adding a test for Aluminium. However, it as it is not tested for at the present time there will be a cost impact on drinking water suppliers to undertake this testing. (**Far North Councils**) Based on WHO value makes sense. (**Waimakariri District Council**)				Testing methods are an issue for IANZ and laboratories and are not an issue for Drinking Water Standards. **Recommendation – Add a new determinant; Aluminium with a MAV of 1 (mg/L)**
Question - Do you agree with the proposed MAV for Barium? Existing MAV - 0.7 (mg/L) Proposed MAV - 1.5 (mg/L) **Key comments from submitters** Yes, as it is similar to the WHO value (**Fonterra Cooperative Group Ltd**) Should not be doubled. Keep it as is. (**Individual**) Yes - The Councils have no concerns on the MAV for Barium. (**Kaipara DC**) and (**Far North Councils**) and (**Far North Council**) This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**)	**5**	**3**	**4**	Taumata Arowai notes most submitters agree with the proposed MAV for Barium. The proposed MAV is consistent with the WHO guideline value. **Recommendation – Increase the MAV for Barium to 1.5 (mg/L).**

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
We do not support raising the MAV and neither do we support the adjusted weight formula. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**) Yes, based on WHO value makes sense. (**Waimakariri District Council**)				
Question - Do you agree with the proposed MAV for Boron? Existing MAV - 1.4 (mg/L) Proposed MAV - 2.4 (mg/L) **Key comments from submitters** Yes, as it aligns to the WHO value (**Fonterra Cooperative Group Ltd**) No do not raise these levels. (**Individual**) This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV and neither do we support the adjusted weight formula. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**)	**2**	**1**	**2**	The proposed MAV is consistent with the WHO guideline value. **Recommendation – Increase the MAV for Boron to 2.4 (mg/L).**

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Yes - The Councils have no concerns on the MAV for Barium (**Kaipara DC**) and (**Far North Councils**) Yes, based on WHO value makes sense. (**Waimakariri District Council**)				
Question - Do you agree with the proposed MAV for Molybdenum? Existing MAV - 0.07 (mg/L) Proposed MAV – No MAV is proposed **Key comments from submitters** Yes, as it aligns to the WHO which has not set any value (**Fonterra Cooperative Group Ltd**) Should have a lower level. And definitely keep a level. (**Individual**) Yes – The Councils have no concerns on the MAV for Molybdenum (**Far North Councils**) We oppose elimination of the MAV without a detailed risk assessment. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We oppose elimination of the MAV on the grounds provided (**Greenpeace Aotearoa**)	**4**	**2**	**4**	Taumata Arowai notes most submitters agree with the proposed removal of a MAV for molybdenum. WHO has not set a guideline value for molybdenum. WHO notes molybdenum occurs in drinking-water at concentrations well below those of health concern, except in emergency situations following a spill to a water source. **Recommendation – Remove Molybdenum as a determinand.**

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Question - Do you agree with the proposed MAV for Nitrite, long term? Existing long-term MAV - 0.2 (mg/L) Proposed long-term MAV – No MAV is proposed **Key comments from submitters** Ridiculous to remove the allowable level. (**Individual**) I support retaining the provisional drinking water limit for nitrite. I support a lower drinking water limit for nitrate-nitrogen of 1.0 mg/L to protect environmental and human health. (**Individual**) I support a lower drinking water limit for nitrate-nitrogen of 1.0 mg/L to protect environmental and human health. (**Individual**) We are still experiencing health implications of this contaminant such as blue baby syndrome and this type of change will therefore only benefit our already inappropriate dairy industry. Such an adoption will complety undermine all of the work around Te Mana of te wai by dismissing a clear and obvious human health risk for the sake of economic benefit. This is not the sentiment shared by Te Ao Maori. (**EINZ Ltd)** Yes, as it aligns to the WHO which has not set any value. (**Fonterra Cooperative Group Ltd**)	**5**	**6**	**3**	The proposal is to remove the provisional long-term MAV for Nitrite consistent with the WHO approach. WHO has removed the provisional long-term MAV due to uncertainty about its derivation. The long-term nitrite level in the existing New Zealand Drinking Water Standard was a provisional MAV, indicating that for some time there has been uncertainty about the accuracy of the WHO provisional guideline value. The existing New Zealand MAV was based on the former WHO MAV. The WHO has now indicated that there is no longer a

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Removing MAV on nitrite seems risky in a country with so much dairy industry. I am concerned that this will lead to high level of contamination. WHO has guidelines on nitrite and nitrate and we should at least stick to those (or better). (**Individual**) The Standards state that the MAV for Nitrate is 50mg/L and Nitrate is 3mg/L. The standards do not specifically state that these limits are measured at Nitrate (NO3) and Nitrite (NO2) respectively. The MAV limit for Nitrate can also be expressed as Nitrate as N in which case the MAV would be 11mg/L. In our experience this difference has caused concern where persons do not understand the difference in the expression of the MAV. We believe that the MAV stated in the Standards should be clearly expressed to avoid confusion. (**New Plymouth DC**) We support Taumata Arowai's proposal of retaining the current Maximum Acceptable Value (MAV) of 50 mg NO3/l but recognise that continuing ongoing review and advances in scientific knowledge may lead to changes in the MAV. We disagree with the decision to remove the provisional MAV of 0.2 (mg/L) for long term exposure to nitrite based on the rationale that the WHO has suspended the value due to uncertainty. Uncertainty is not a valid justification for removing MAVs. (**Public Health Association of New Zealand**) Nitrite, long term - We oppose elimination of the MAV on the grounds of uncertainty. Uncertainty should not be grounds for zero precaution. We support a MAV of 0.1 ug/L, based on the EU default value. Nitrite (NO2) - The MAV for nitrate should certainly not be eliminated. Nitrate is linked to creation of carcinogenic compounds. If the MAV for				justification for providing a guideline value for nitrite The current short term (acute) MAV is recommended to be retained at the existing level. **Recommendation – Remove the long-term MAV for Nitrite.** Note there are associated submissions on Nitrates noted below.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
nitrite is eliminated then what will become of the sum of the ratio for nitrate and nitrate which presently should not exceed 1? (**Greenpeace Aotearoa**) The Councils agree with removing the MAV due to uncertainty about its accuracy. (**Kaipara DC**) and (**Far North Councils**) We support the temporary removal of a long-term MAV for nitrite given the uncertainty of information and the advice from the WHO. We request that Taumata Arowai give urgency to reviewing short-term and long-term limits for nitrites and nitrates. (**Palmerston North CC**) Forest & Bird disagree with the decision to remove the provisional MAV (0.2 mg/L) for long term exposure to nitrite. We do not consider "uncertainty" to be a strong enough basis for removing MAVs and consider a precautionary approach should be taking to protecting people's health. We understand an International Agency for Research on Cancer (IARC) Working Group concluded that ingested nitrate or nitrite is probably carcinogenic to humans. The close association between nitrate and nitrite, and their association with health issues, justifies the retention of a nitrite MAV, particularly further research is still being called for. Yes, it makes sense not to include a value where the uncertainty is too great, as is indicated. (**Waimakariri District Council**) We also note the removal of Nitrite within the Drinking Water Standards due to the WHO suspending its provisional Maximum Acceptable Value because of accuracy concerns. Nitrate and Nitrite contamination of drinking water supplies continues to be a significant issue across New Zealand, with high levels of concern across the general public.				

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
We urge Taumata Arowai, alongside the Ministry of Health and Crown-Research Institutes, to continue working with the WHO to formalise advice on Nitrate and Nitrite levels in drinking water supplies, and subsequently amend the Drinking Water Standards to align with WHO guidance, as a priority. (**Auckland Council / Watercare**)				
Question - Do you agree with the proposed MAV for Perchlorate? Existing MAV - No MAV listed Proposed MAV – 0.08 (mg/L) **Key comments from submitters** Yes, as it is similar to the WHO value. (**Fonterra Cooperative Group Ltd**) Not tested for at present. The Councils have no concerns with the MAV for Perchlorate. Council acknowledges the need for the MAV as perchlorate is a by-product of certain treatment processes. However, the frequency of testing may need to be reviewed especially where the source, treatment and distribution processes are not changing. The costs for testing for perchlorate have been quoted at approximately $400 per test which over a 52-week period is a significant additional cost to water treatment operations. This will increase overall operational costs. (**Far North District Council**) and (**Kaipara District Council**) and (**Far North District Councils**)	**6**	**2**	**4**	Taumata Arowai notes most submitters agree with the proposed MAV for Perchlorate. The proposed MAV is consistent with the WHO guideline value. **Recommendation – Add a new determinant; Perchlorate with a MAV of 0.08 (mg/L)**

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We support a MAV but it should be 0.1 ug/L, based on the EU default value. We do not support the adjusted weight formula. (**Greenpeace Aotearoa**) We oppose the introduction of a MAV for perchlorate on the basis of advice we've received from our laboratory services contractor that there are no available laboratories currently testing for perchlorate in water (only in dairy products). Further, the advice we received is that because these are unstable compounds, laboratories may be disinclined or unable to achieve accreditation to test for them. We see no benefit in having tests completed that are not accredited. We are conscious of the need to test for disinfection by-products, and are generally supportive of moves by Taumata Arowai to increase surveillance in this area. However, we do not feel that it is practical to introduce a requirement that we cannot meet through lack of ability to assess compliance. (**Palmerston North DC**)				Taumata Arowai is aware that drinking water laboratories are not currently testing for perchlorate in water. Taumata Arowai is not aware of any barriers to laboratories testing for perchlorate in the future.[5]

[5] Based on discussions with two Laboratories it is noted that currently some non-drinking water laboratories can test for perchlorate, no drinking water laboratories are currently accredited for perchlorate testing, there are issues with sample preservation for perchlorate , the cost of the test (which will not be cheap) will ultimately depend on the number of samples analysed, what other analyses they can use this equipment for, and whether perchlorate can be analysed together with chlorate, bromate and other oxyhalogenated compounds together – this would reduce the overall cost.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Question - Do you agree with the proposed MAV for Selenium? Existing MAV - 0.01 (mg/L) Proposed MAV - 0.04 (mg/L) **Key comments from submitters** Do not raise this from.01 to .04. Keep it at .01 (**Individual**) Yes, as it aligns to the WHO value. (**Fonterra Cooperative Group Ltd**) We do not support raising the MAV. We support a MAV of 0.1 mg/kg, based on the EU default value (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**) The Councils have no concerns on the MAV for Selenium (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**)	**5**	**2**	**4**	Taumata Arowai notes that the majority of submitters agree with the proposed MAV for Selenium. The proposed MAV is consistent with the WHO guideline value. **Recommendation – Increase the MAV for Selenium to 0.04 (mg/L).**
Question - Do you agree with the proposed MAV for Uranium? Existing MAV - 0.02 (mg/L) Proposed MAV - 0.03 (mg/L) **Key comments from submitters**	**4**	**3**	**5**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Do not raise the MAV (**Individual**) Yes, as it aligns to the WHO value. (**Fonterra Cooperative Group Ltd**) The Councils have no concerns on the MAV for Uranium. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We do not support raising the MAV. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) and (**Greenpeace Aotearoa**)				The proposed MAV is consistent with the WHO guideline value. **Recommendation – Increase the MAV for Uranium to 0.03 (mg/L).**
Do you agree with the proposed MAV for Anatoxins? Existing MAV 1. Anatoxins - a 0.006 (mg/L) 2. Anatoxins – a(s) 0.001 (mg/L) Proposed MAV - 0.006 (mg/L **Key comments from submitters** Keep it at .0001 (**Individual**) Anatoxins -a(s) (as a group) has a limit of 0.006 mg/L as toxicity equivalents of anatoxin-a. However, there should be a definition of the group to list the specific compounds that it includes.	**2**	**4**	**5**	Advice was provided by the Cawthron Institute (the leading research agency on toxins) that it was appropriate

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
The MoH Guideline datasheet lists: homoanatoxin-a (HTX); 2,3-epoxy-anatoxin-a; 4-hydroxy- and 4-oxo-derivatives; dihydroanatoxin-a (dhATX); dihydrohomoanatoxin-a (dhHTX); and 11-carboxyanatoxin-a. The Standard needs to be clear whether these are the only anatoxins to be included by the MAV. The toxic equivalences of each compound within the group also needs to be stated to enable calculation of the presence of each of these as a single toxicity equivalent value for the entire group. This is also the one of the few determinands where the limit is expressed as "mcg/L" — for consistency, it would be better to set the limit as 0.001 mg/L. (**Fonterra Cooperative Group Ltd**) The wording for that determinand should specify inclusions. Some Anatoxins congeners are more toxic than others. To ensure safe drinking water, this ""Anatoxins"" MAV should specify which congeners to include. We recommend this to be the ""Anatoxins"" for which the Toxicity Equivalent Factor is known and for which an analytical method is available. It is advised to specify which congeners should be included in that sum, as per the list below: Anatoxin-a Homoanatoxin-a Dihydro anatoxin-a Dihydro homoanatoxin-a A combined MAV of 0.006 m/L is indeed appropriate." (**Cawthron Institute**) The Councils have no concerns in combining the anatoxins into one unit. (**Far North District Council**) and (**Far North Councils**)				to combine the two existing determinands into one. As part of the consultation process Cawthron advised that the list of the congeners included in the proposed determinand are included in the definition. **Recommendation:** 1. **Delete the determinands Anatoxins – a and Anatoxins- a(s), and** 2. **Add the determinant Anatoxins (includes cogeners Anatoxin-a, Homoanatoxin-a, Dihydro anatoxin-a, Dihydro homoanatoxin-a) with a MAV of 0.006 (mg/L)** Congeners are chemical substances related to each other by origin, structure, or function.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
We question the reasons for combining Anatoxins and why the highest figure was chosen as the new MAV? We oppose this change. (**Greenpeace Aotearoa**) Yes – The Councils have no concerns in combining the anatoxins into one unit. MV 0.006m/L vs mg/L - there is an inconsistency between the MAV units stated here and what is in the standards table - which states 6 micrograms /L. A consistent use of mg/L would be preferred." (**Kaipara District Council**) Yes, this appears to have simplified this parameter. (**Waimakariri District Council**)				
Question - Do you agree with the proposed MAV for Atrazine? Existing MAV - 0.002 (mg/L) Proposed MAV - 0.1 (mg/L) **Key comments from submitters** Keep it at .002 (**Individual**) Is this indicative of risk? (**EINZ Ltd**) Yes, as it aligns to the WHO value (**Fonterra Cooperative Group Ltd**)	**4**	**4**	**4**	The proposed MAV is consistent with the WHO guideline value. The European Union (EU) does not set a specific value for Atrazine, but has a default value for all pesticides of a 0.1 microgram. The WHO sets a specific guideline value for Atrazine, but considers that Atrazine is unlikely to be

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Yes – The Councils have no concerns on the MAV for Atrazine. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We strongly oppose raising the MAV. This is a known endocrine disruptor, banned in 41 countries with no safe threshold for exposure. It should be banned in Aotearoa too. (**Pesticide Action Network Aotearoa New Zealand**) We strongly oppose raising the MAV, and by 50 times. We support a MAV of 0.1 ug/L, based on the EU default value. Atrazine has numerous adverse effects on health including tumors, breast, ovarian, and uterine cancers as well as leukemia and lymphoma. It is an endocrine disrupting chemical interrupting regular hormone function and causing birth defects, reproductive tumors, and weight loss in amphibians as well as humans. Research has linked atrazine to birth defects and cancer in people, and even miniscule doses can chemically castrate frogs. It is a banned substance in all 27 European Union countries and in some US states and, in all, has been banned or is being phased out in 41 countries. While rates of contamination may be decreasing in those areas - It is still used in New Zealand so risks of water contamination - particularly in rural areas - remain. There is no sound justification for increasing the MAV for Atrazine. The proposal is to increase it by a massive 50 times or 5000% (from 0.002 mg/L to 0.1mg/L). The MAV should not be raised at all. (**Greenpeace Aotearoa**)				genotoxic and not likely to pose a carcinogenic risk to humans WHO *Guidelines for Drinking Water Quality*; 4th Ed. 2017. **Recommendation – Increase the MAV for Atrazine to 0.1 (mg/L).**
Do you agree with the proposed MAV for Azinphos-methyl?	**4**	**3**	**4**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Existing MAV - 0.004 (mg/L) Proposed MAV - 0.1 (mg/L) **Key comments from submitters** Keep it at the lower level (**Individual**) For this determinand that lacks any WHO MAV, there needs to be transparency of the evidence used to produce the proposed MAV. (**Fonterra Cooperative Group Ltd**) Yes – The Councils have no concerns on the MAV for Azinphos-methyl. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We do not support raising the MAV as there is no risk assessment provided to prove that this level would be safe. This pesticide is banned in 107 countries and should be banned in Aotearoa too. (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV as there is no risk assessment provided to prove that this level would be safe. This pesticide is banned in 107 countries and should be banned in Aotearoa too. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**) Yes, it is trusted that the ESR advice is sound. (**Waimakariri District Council**)				There is no WHO guideline value Azinphos-methyl due to uncertainty. The existing drinking water MAV in New Zealand is a provisional MAV. ESR has provided advice on updating the existing provisional MAV. The NZ EPA began a 5-year phase out programme for Azimphos-methyl pesticides in 2009 but it was still in use in 2014. **Recommendation – Increase the MAV for Azinphos-methyl to 0.1 (mg/L).**

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Do you agree with the proposed MAV for Cylindrospermopsins? Existing MAV - 0.001 (mg/L) Proposed MAV - 0.0008 (mg/L) **Key comments from submitters** Cylindrospermopsins (as a group) have a limit of 0.0007 mg/L as toxicity equivalents of cylindrospermopsin. (**Fonterra Cooperative Group Ltd**) Cylindrospermopsins are identified as measures of Cyanotoxin expressed cylindrospermopsin toxicity. There is difference in the expression from 0.0008 (ml/L) to 0.8 (ug/L) between the standards table. A consistent use of mg/L would be preferred. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We support lowering the MAV (**Greenpeace Aotearoa**)	**4**	**1**	**3**	Taumata Arowai notes that most submitters agree with the proposed MAV for Cylindrospermopsins. The proposed MAV is consistent with advice from the Cawthron Institute. **Recommendation – Decrease the MAV for Cylindrospermopsins to 0.0008 (mg/L).**
Question - Do you agree with the proposed MAV for Homoanatoxin-a? Existing MAV - 0.002 (mg/L) Proposed MAV – No MAV is proposed **Key comments from submitters** Keep it at .002 (**Individual**)	**3**	**4**	**3**	Homoanatoxin-a is now included in the combined

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
cynotoxins are an issue therefore so should these be. (**EINZ Ltd**) Anatoxins -a(s) (as a group) has a limit of 0.006 mg/L as toxicity equivalents of anatoxin-a. However, there should be a definition of the group to list the specific compounds that it includes. The MoH Guideline datasheet lists: homoanatoxin-a (HTX); 2,3-epoxy-anatoxin-a; 4-hydroxy- and 4-oxo-derivatives; dihydroanatoxin-a (dhATX); dihydrohomoanatoxin-a (dhHTX); and 11-carboxyanatoxin-a. The Standard needs to be clear whether these are the only anatoxins to be included by the MAV. The toxic equivalences of each compound within the group also needs to be stated to enable calculation of the presence of each of these as a single toxicity equivalent value for the entire group. This is also the one of the few determinands where the limit is expressed as "mcg/L" — for consistency, it would be better to set the limit as 0.001 mg/L. (**Fonterra Cooperative Group Ltd**) Yes – The Councils have no concerns that the MAV for Homoanatoxin-a is removed. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**)				MAV for Anatoxins – see above. **Recommendation – Do not set a MAV for Homoanatoxin-a.**
Question - Do you agree with the proposed MAV for Hydroxytrazine? Existing MAV – No MAV exists Proposed MAV - 0.3 (mg/L)	**6**	**2**	**3**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Key comments from submitters Lower it to .003 (**Individual**) Yes, as it is similar to the WHO value. (**Fonterra Cooperative Group Ltd**) Yes – The Councils have no concerns on the MAV for Hydroxytrazine. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We support a MAV of 0.1 ug/L, based on the EU default value. We do not support the adjusted body weight formula. (**Greenpeace Aotearoa**)				Taumata Arowai notes most submitters agree with the proposed MAV for Hydroxytrazine. The proposed MAV is consistent with the WHO guideline value. **Recommendation – Add a new determinant; Hydroxytrazine with a MAV of 0.03 (mg/L)**
Question - Do you agree with the proposed MAV for MCPA? Existing MAV - 0.002 (mg/L) Proposed MAV - 0.8 (mg/L) **Key comments from submitters** No keep it at .002 (**Individual**)	**4**	**4**	**3**	The WHO do not provide a guideline value for MCPA as it occurs in drinking-water or drinking-water sources at concentrations well below

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
MCPA is no longer included in the WHO Guidelines for Drinking Water Quality (2017). Given that it only occurs in drinking-water at concentrations well below those of health concern, should it even be included in the NZ drinking water standards? (**Fonterra Cooperative Group Ltd**) Yes – The Councils have no concerns on the MAV for MCPA. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. Please leave the MAV as it is. (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV and neither do we support the adjusted weight formula. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**)				those of health concern. This is due to its rapid degradation in water. **Recommendation – Increase the MAV for MCPA to 0.8 (mg/L).**
Question - Do you agree with the proposed MAV for Metalaxyl? Existing MAV - 0.1 (mg/L) Proposed MAV - 0.3 (mg/L) **Key comments from submitters** Keep the existing level (**Individual**)	**3**	**4**	**4**	There is no WHO guideline value Metalaxyl due to uncertainty and the EU does not provide a default value. The existing New Zealand MAV is a provisional MAV.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Metalaxyl is not included in WHO, Australia, EU, USA or Chinese water regulations. This seems to have been found in 2 out 279 well-water samples in a 2019 survey by ESR. However, it is not clear whether those well waters are relevant to either small or large drinking water suppliers. We therefore question the necessity for having a MAV for metalaxyl. (**Fonterra Cooperative Group Ltd**) Yes – The Councils have no concerns on the MAV for Metalaxyl. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We do not support raising the MAV; there is no reason given, no risk assessment. Please leave the MAV as it, in line with the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**)				ESR has provided advice on updating the MAV. **Recommendation – Amend the MAV for Metalaxyl to 0.3 (mg/L).**
Question - Do you agree with the proposed MAV for N-nitrosodimethylamine? Existing MAV - No MAV exists Proposed MAV - 0.0001 (mg/L) **Key comments from submitters** Yes, as it aligns to the WHO value. (**Fonterra Cooperative Group Ltd**)	**6**	**0**	**5**	Taumata Arowai notes that most submitters agree with the proposed MAV for nitrosodimethylamine.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Yes – The Councils have no concerns on the MAV for N-nitrosodimethylamine. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We support a MAV (**Greenpeace Aotearoa**)				The proposed MAV is consistent with the WHO guideline value. **Recommendation – Add a new determinand; nitrosodimethylamine with a MAV of 0.0001 (mg/L).**
Question - Do you agree with the proposed MAV for PFHxS + PFOS? Existing MAV – No MAV exists Proposed MAV - 0.00007 (mg/L) **Key comments from submitters** Risk level differs therefore adoption of both as equivalent undermines the level of risk. (**EINZ Ltd**) Yes, as it is similar to the Australian Drinking Water Guidelines. **Fonterra Cooperative Group Ltd**) PFHxS and PFOS are very specific to sites where fire retardants have been used. A requirement for across-the-board testing of all water sources seems to be an unnecessary requirement that increases the cost and testing load on water providers. The Councils would like to recommend that this is	**5**	**1**	**3**	Taumata Arowai notes that the majority of submitters agree with the proposed MAV for PFHxS + PFOS. **Recommendation – Add a new determinand; PFHxS + PFOS with a MAV of 0.00007 (mg/L).** PFHxS + PFOS is being found in areas other than airports.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
only applied to supplies that have a known source within an area of a specified site (e.g., use the SWRMA 2 boundaries). (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We support this. (**Pesticide Action Network Aotearoa New Zealand**) We support a MAV. There is no safe level of these substances. It is appropriate to set a very low MAV is suggested. (**Greenpeace Aotearoa**)				A supply Source Water Risk Management Plan would determine the need for testing.
Question - Do you agree with the proposed MAV for PFOA? Existing MAV – No MAV exists Proposed MAV - 0.00056 (mg/L) **Key comments from submitters** Yes, as it is similar to the Australian Drinking Water Guidelines (**Fonterra Cooperative Group Ltd**) PFOA are very specific to sites where fire retardants have been used. A requirement for across-the-board testing of all water sources seems to be an unnecessary requirement that increases the cost and testing load on water providers. The Councils would like to recommend that this is only applied to supplies that have a known source within an area of a specified site (e.g., use the SWRMA 2 boundaries). (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**)	**6**	**0**	**3**	Taumata Arowai notes most submitters agree with the proposed MAV for PFOA. **Recommendation – Add a new determinand; PFOA with a MAV of 0.00056 (mg/L).** PFOA is being found in areas other than airports.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
We support this. (**Pesticide Action Network Aotearoa New Zealand**) We support a MAV. There is no safe level of these substances. It is appropriate to set a very low MAV is suggested. We support this part of the proposal. (**Greenpeace Aotearoa**)				A supply Source Water Risk Management Plan would determine the need for testing
Question - Do you agree with the proposed MAV for Sodium dichloroisocyanurate (as cyanuric acid)? Existing MAV – No MAV exists Proposed MAV - 40 (mg/L) **Key comments from submitters** Put it down to 1 mg/L (**Individual**) Yes, as it is similar to the WHO value (**Fonterra Cooperative Group Ltd**) Yes – the Councils have no concerns on the MAV for Sodium dichloroisocyanurate (as cyanuric acid). This will be a new element to test for and will increase testing costs for water providers. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We support a MAV (**Greenpeace Aotearoa**)	**5**	**1**	**4**	Taumata Arowai notes that most submitters agree with the proposed MAV for Sodium dichloroisocyanurate (as cyanuric acid). **Recommendation – Add a new determinand; Sodium dichloroisocyanurate (as cyanuric acid) with a MAV of 40 (mg/L).**
Question - Do you agree with the proposed MAV for Trichloroethene?	**4**	**4**	**3**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Existing MAV - 0.02 (mg/L) Proposed MAV - 0.03 (mg/L) **Key comments from submitters** Keep it at lower level. (**Individual**) Has the potential production of VC tresulting from 0.03 been assessed and deemed suitable? (**EINZ Ltd**) Yes, as it is similar to the WHO value (**Fonterra Cooperative Group Ltd**) This is totally unacceptable. Using a 70kg weight grossly underestimates the risk for women, children and the ill. It captures only the healthy 70kg male, of which there are few in this country. It is not legitimate to so discriminate against women and children. We support a MAV of 0.1 mg/kg, based on the EU default value. (**Pesticide Action Network Aotearoa New Zealand**) We do not support raising the MAV and neither do we support the adjusted weight formula. We support a MAV of 0.1 ug/L, based on the EU default value. (**Greenpeace Aotearoa**) Yes – the Councils have no concerns on the MAV for Trichloroethene. **Far North Councils**) and (**Kaipara District Council**)				The proposed MAV is consistent with the WHO guideline value. **Recommendation – Increase the MAV for Trichloroethene to 0.03 (mg/L).**
Question - Do you agree with the proposed MAV for 1080?	**6**	**1**	**3**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Existing MAV – Long term MAV of 0.0035 (mg/L) Proposed MAV – Short term MAV 0.035 (mg/L) **Key comments from submitters** Keep it at the lowest level. (**Individual**) There needs to be transparency of the evidence used to produce the proposed short-term MAV. (**Fonterra Cooperative Group Ltd**) It is unclear as to the what the testing timeframes for the pesticide acute exposure (short term MAV) is to be. It is also unclear what the response should be if the source tests between these two levels. The Councils request further clarification of the timeframes and distinctions between these two levels. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We support retention of long term MAV and addition of short term MAV. (**Pesticide Action Network Aotearoa New Zealand**) and (**Greenpeace Aotearoa**)				The proposal is to add a short-term MAV for 1080 to complement the existing long-term MAV. Taumata Arowai notes most submitters agree with the proposed short-term MAV for 1080. This MAV was developed by ESR and reviewed by MoH as there is no WHO guideline value for 1080. Testing timeframes where 1080 is applied as a pesticide are agreed between Regional Councils and Public Health Services. Responses should be based on risk circumstances and should be set out in Councils' risk management and emergency response plans.

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
				Recommendation – Add a short-term MAV for 1080 at 0.035 (mg/L).
Question - Do you agree with the proposed MAV for Total alpha activity? Existing MAV – 0.1Bq/L Proposed MAV - 0.5 Bq/L **Key comments from submitters** Keep it as is. (**Individual**) Yes, as it aligns to the WHO value (**Fonterra Cooperative Group Ltd**) Yes – the Councils have concerns on the MAV for Total alpha activity (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We do not support raising the MAV (**Greenpeace Aotearoa**)	**6**	**2**	**3**	Taumata Arowai notes most submitters agree with the proposed MAV for Total alpha activity. The recommended MAV is consistent with WHO guideline values. **Recommendation – Reduce the MAV for Total alpha activity to 0.5 (Bq/L).**
Question - Do you agree with the proposed MAV for Total beta activity?	**6**	**2**	**3**	

Survey Question	Submission Response			Taumata Arowai comment
	YES	NO	DON'T KNOW	
Existing MAV -0.5 Bq/L Proposed MAV – 1.0 Bq/L **Key comments from submitters** Keep it at the lowest level (**Individual**) Yes, as it aligns to the WHO value (**Fonterra Cooperative Group Ltd**) Yes – the Councils have no concerns on the MAV for Total beta activity. (**Far North Councils**) and (**Kaipara District Council**) and (**Far North Council**) We do not support raising the MAV (**Greenpeace Aotearoa**) We support the raising of these MAVs to bring them in line with the revised WHO GVs. We currently test for alpha and beta activity, as required under the Drinking Water Standards, and all recent results have been below the detection limit. We do not believe there is a risk of radioactive compounds in our water supplies, or that raising this MAV would negatively impact public health. (**Palmerston North CC**)				Taumata Arowai notes that most submitters agree with the proposed MAV for Total beta activity. The recommended MAV is consistent with WHO guideline values. **Recommendation – Increase the MAV for Total beta activity to 1.0 (Bq/L).**

Feedback on other MAVs

The consultation process asked for feedback on the MAVs in the Drinking Water Standards that are not proposed to be changed. The following submissions were received.

Submitter	Feedback on other MAVs	Taumata Arowai comments
Kahu Environmental Ltd	Arsenic in drinking water The current NZ DWS are inappropriately high for this carcinogen which causes a high frequency of incurable cancers. The limits of laboratory testing for As are currently 10 fold below the current limit, so regular testing is possible and common place. Testing is available in both New Zealand and Australia. Differential testing for As species is also available. Drinking water providers have the tools and ability to protect the public better. There is no reason for this carcinogen to have a MAV above other carcinogens. A review of the NZDWStd for Arsenic is required. **and** Arsenic seems to have been overlooked in this review list. Previous reasons for NZ MAV for arsenic are no longer valid. Arsenic should be reviewed and bought into line with other carcinogen MAVs and not allowed a ten-fold factor higher MAV. Testing is easily and reasonably available, and technology exists to remove both arsenic chemical species. New Zealand water consumers and especially Iwi/Hapu and communities residing in geothermally influenced areas require active protection.	The existing MAV for Arsenic is consistent with WHO guideline values.

Submitter	Feedback on other MAVs	Taumata Arowai comments
Ōtorohanga District Council	As there is limited raw water quality data available in NZ, is there an expectation that all determinands will need to be analysed to ensure they aren't present in the final water at levels of concern? It would be easier to have one list of determinands that covers both health and aesthetic parameters rather than as two separate document. They can be presented in separate tables and specified within the same document. For determinands like Cu, Pb and Zn is the MAV related to a flushed or non-flushed sample? Will both flushed and non-flushed samples need to be taken? For determinands such as Fe and Mn, is that total dissolved particulate that the MAV relates to? Does asbestos need to be included in the list of determinands giving New Zealand's' aged pipe network? Can a rotation system for sampling across councils be employed when drawing from the same water? e.g. the Waikato River has many abstractors along its length and it would not be expected that levels would change much from Taupo down. This could help reduce monitoring costs. Why is Beta radiation from Potassium excluded from the MAV? Is there a requirement for algal cell counts and chlorophyll(a) data to be collected also?	There is no MAV for asbestos as the health risk from asbestos relates to inhalation of asbestos, rather than the ingestion of asbestos. Humans actively regulate the level of potassium in their bodies. The amount of beta radiation from Potassium 40 is constant, irrespective of the amount of Potassium in the water. The Drinking Water Quality Assurance Rules will provide guidance on the requirements for algal cell counts and chlorophyll(a) data to be collected.

Submitter	Feedback on other MAVs	Taumata Arowai comments
Auckland Council/Watercare	Auckland Council group supports the alignment of the Drinking Water Standards to international and scientific best practice. We note that a majority of the proposed amendments align with World Health Organisation (WHO) guidance, with support from New Zealand's Institute of Environmental Science and Research and the Cawthron Institute where WHO guidance isn't available. We note the allowable exceedances have been removed from the proposed Drinking Water Standards. We urge Taumata Arowai to retain provisions for the allowable exceedances, recognising the efforts of water suppliers that collect additional samples than what is required by the rules to have a higher level of confidence in monitoring and managing risks to drinking water supplies.	The issue of exceedance will be addressed in the Drinking Water Quality Assurance Rules, not the Drinking Water Standards.
Waimakariri District Council	There is no clarity for the vast majority of parameters in the standards as to whether these represent a health risk from long term exposure, or an acute health risk. This information is critically important in determining next steps should a MAV ever be exceeded, and rather than water suppliers urgently trying to access this information after an exceedance, it would improve decision making and responses, and therefore public safety by having this differentiated and defined in the standards. Presumably when the WHO undertake studies to determine a recommended limit, they are either thinking from a long term or short-term impact perspective, so it would make sense to research and publish this information.	The recommended MAVs are all long-term MAV, unless specified otherwise. The explanation notes the Drinking Water Standards will clarify that the MAVs are long term unless specified otherwise.
Far North Councils, Far North District Council,	There is an overall concern that there are a large number of elements to test for and on a range of frequencies.	There are a net 8 new tests. These new tests generally have across the board support. The requirements for testing will be set out in the Drinking Water Quality Assurance Rules.

Submitter	Feedback on other MAVs	Taumata Arowai comments
	There are potentially significant costs for large supplier such as Councils and smaller supplies within the community will not have the capacity or funding to undertake the level of testing required. There are issues where in many cases the labs control the delivery and testing frameworks, these may not meet the specified frequencies and testing timeframes specified in the rules and guidelines. The Councils are concerned that some of the elements such as disinfection by-products should be controlled via rolling averages MM report rather than one off test results.	Those rules do not require testing for all determinands that have a MAV.
Heather Uwins-England	Page 1: "The MAVs for any determinand should not be exceeded at any time." This statement implies that drinking water would be unsafe if an exceedance was to occur. This is incorrect for chemical determinands. Chemical MAVs can be exceeded occasionally, and the water remain safe to drink. As MAV's are based on a lifetime consumption and are conservatively set, minor occasional exceedances DO NOT impact on public health. Although every exceedance should be reported and acted upon, it would be far better to measure compliance to MAVs and the ability to supply safe drinking water by using a rolling annual average rather than on single samples. Determining compliance to standards based on individual sample results could very easy result in a supplier being deemed non-compliant but whilst continually providing safe drinking water to its customers. This will be an unfortunate outcome. Table 1: MAVs for Microbial Determinands - Consider including "human pathogenic bacteria and viruses" as a determinand with a MAV of less than 1 in 100mL of sample or not detected. Although pathogenic bacteria and viruses are not routinely monitored, individual pathogens may be monitored during an event or a suspected or confirmed outbreak. This	

Submitter	Feedback on other MAVs	Taumata Arowai comments
	inclusion will give a clear message that any pathogenic bacteria or viruses should not be present in drinking water and is a breach of the standards. If human pathogenic bacteria and viruses are not included, there is potential for a drinking water supplier to be providing unsafe water but still be deemed compliant with standards. Table 2: MAVs for Inorganic Determinands. The Ministry of Health made recommendations to Taumata Arowai last year that the MAV for Lead should be reduced to 0.005 mg/L. The World Health Organisation recognises that there is no 'safe' level of lead in drinking water which supports the reduction of the MAV for lead 0.005 mg/L. The Ministry of Health's advice to reduce the MAV for lead to 0.005 mg/L should be incorporated into the new standards as a matter of urgency."	There is an agreed pathway with MoH, MBIE, and Taumata Arowai around lead in the water distribution system. This will allow for an informed decision on revising the MAV for Lead.
Master Plumbers, Gasfitter & Drainlayers NZ Inc	1. MAVs for Inorganic Determinants Drinking water standards in New Zealand currently allow for a lead MAV of 0.01 mg/L, which is a lax amount by international standards. We are surprised - particularly following the health scares at Waikouaiti in 2021, and the (albeit "informal") recommendation received from Director of Public Health Dr. Caroline McElnay to reduce the MAV of lead to 0.005 mg/L (in a letter to Bill Bayfield, dated 15th November 2021) - that Taumata Arowai's new drinking water standards have not included a proposal to lower the acceptable level of lead in water. There is no safe threshold for lead exposure; concentrations in potable water should therefore be maintained as low as possible. The risk of lead exposure has been recognised by the Ministry of Business, Innovation and Employment (MBIE), which has resolved to review the plumbing standards	There is an agreed pathway with MoH, MBIE, and Taumata Arowai around lead in the water distribution system. This will allow for an informed decision on revising the MAV for Lead.

Submitter	Feedback on other MAVs	Taumata Arowai comments
	for allowable lead in plumbing products themselves, and bring New Zealand's standards into line with Australia's stricter ones by 2025. The fact that consultation for these changes is due within the next few months increases our surprise at Taumata Arowai's decision to not consult on the acceptable level of lead in the water flowing through these products; does it not make sense to have Taumata Arowai and MBIE on the same page, making sure that both products and supply do not contain lead? It is absolutely imperative that Taumata Arowai consults on reducing lead's MAV as soon as possible. We understand that the drinking water supply sector may need to take steps to adapt to any potential new rules; but, in the case of lead, the health of the people should always come first. 2. MAVs for Microbial Determinants Taumata Arowai should consider the inclusion of "human pathogenic bacteria and viruses" as a determinant with an MAV of less than 1 in 100ml of sample. Although neither are routinely monitored, individual pathogens may be monitored during an event or suspected or confirmed outbreak, and their inclusion will give a clear message that any pathogenic bacteria or viruses should not be present in drinking water.	
Ashburton DC (Manager's comment)	The vast majority of the MAVs in the draft standards do not specify if the MAV represents an acute health risk or a long term exposure health risk. As this information is critical to inform the water supplier's response to a MAV exceedance it would be of high value to have this information readily available by publishing it in the standards alongside the MAVs themselves.	The recommended MAVs are all long-term MAV unless specified otherwise. The explanation notes to the Drinking Water Standards will clarify that the MAVs are long term unless specified otherwise.
RJ Hill Laboratories	Recommend expressing all determinands as the scientific name, followed by the common/abbreviated name ie. sodium fluoroacetate (1080)	

Submitter	Feedback on other MAVs	Taumata Arowai comments
Tall Tree Company	Given the reasonably high use of aluminium salts to help with coagulation in NZ water supplies, I would like to see a summary of any toxicity testing or other investigations regarding this aspect of the proposed DWS and how the MAV's were established. I would also like to know if NZ has an approved method of neutralising or responsibly dealing with sludge disposal from filtration systems that use aluminium as a coagulating adjunct to water treatment. Perhaps if this is not the case Taumata arowai could approve bulk funding to initiate and see this sort of thing successfully implemented.	
Mauku School	Schools -especially rural ones, have inherited water issues. By their nature, these schools have staff with very little expertise around water supplies and usually no caretaker. They also often have high staff turn over. If there are impacting changes to the water supply, testing and new regulations, individual schools will need to be carefully supported with this and also compensated financially for any expenses incurred.	
Susan Easterbrook	Having read through this document it seems you are trying to raise the allowable levels of toxic elements instead of lowering them in the water. This belies the heading that you want consumers to believe you are working towards lower levels of toxicity.	
Yolande Manson	This is unnecessarily controlling and will disrupt NZers BIRTH RIGHT to FREE ACCESS to water. You MAY NOT trip to take over control of this right... You are contravening the Treaty! :-[	

Submitter	Feedback on other MAVs	Taumata Arowai comments
Fertiliser Association	The New Zealand MAV for safe drinking water in terms of nitrate is in line with current international standards. The World Health Organization published the results of a survey of drinking water standards across the world in 2018. Over 100 countries participated in the review. Sixty-nine of these counties use the same guideline figure as New Zealand. The most conservative guideline figure set internationally is 40 mg NO3/l.	
Public Health Association of New Zealand	In summary, given new and emerging science around risks of nitrates in drinking water, we recommend adoption of the precautionary principle. We acknowledge the Maximum Allowable Values (MAVs) were determined through external technical input and review, which were later reviewed by the Institute of Environmental Science and Research Limited (ESR) and the Ministry of Health (MoH). Nitrate is one of the most common drinking water contaminants in NZ, largely driven by agricultural activity (nitrogen fertiliser application and livestock urine). Nitrate leached into water from dairy farming has doubled since 1990. There is currently no proposed MAV for chronic nitrate exposure. Epidemiological evidence has observed associations between nitrate in drinking water and a range of adverse health outcomes including colorectal cancer, congenital anomalies, preterm births and childhood cancer far below the current MAV. Additionally, there is recent suggestive genetic and experimental evidence that implications nitrate in drinking water and colorectal cancer.	It is noted that the current New Zealand research on the links between Nitrate and cancers is contested. The sector implications need to be understood before a reduction of the MAV for nitrate is considered.

Submitter	Feedback on other MAVs	Taumata Arowai comments
Royal Forest and Bird Protection Society of New Zealand Inc	It is recommended a provisional MAV for chronic nitrate exposure is established. Nitrogen is a primary cause of the degradation of freshwater ecosystems in Aotearoa and one of the most common contaminants in our drinking water. This is largely a result of the widespread use of synthetic nitrogen fertiliser and of the high stocking rates associated with intensive agriculture. There is an increasing body of evidence suggesting an association between nitrogen in drinking water and human health impacts. There is evidence suggesting a relationship between nitrate contamination and cancer, as well as suggestive evidence linking nitrate with congenital anomalies, preterm births, and childhood cancer. While we acknowledge uncertainty remains around the potential health impacts of nitrate in drinking water, this uncertainty supports the need for a precautionary approach. This is particularly important in Aotearoa, as nitrate levels in water are continuing to rise in many areas.	It is noted that the current New Zealand research on the links between Nitrate and cancers is contested. The sector implications need to be understood before a reduction of the MAV for nitrate is considered.
Tauranga CC	Need to ensure clarity that this MAV limit is Nitrate as NO3 not Nitrate as Nitrogen (N). If it is as Nitrogen, then needs to be 11.3mg/L. Some labs currently report as N not NO3. This MAV should also be reviewed once additional studies have been completed on establishing links between nitrate levels and colorectal cancer. Suggest - Notes should specify units as NO3.	
Ashburton DC – Manager's comments	We note no movement on the Nitrate MAV at this time. This is somewhat surprising given the published science to date and the increasing concerns being expressed nationally that the WHO levels no longer fit the science.	It is noted that the current New Zealand research on the links between Nitrate and cancers is contested. The sector implications need to be understood before a reduction of the MAV for nitrate is considered.

Transition issues

The consultation process asked for feedback on transition issues from the Drinking-water Standards for New Zealand 2005 (revised 2018) to the proposed Drinking Water Standards. The following feedback was received.

Submitter	Feedback on transition issues	Taumata Arowai comment
Yolande Manson	There will be NO TRANSITION ISSUES if you TAKE YOUR HANDS OFF OUR WATER!!!	Taumata Arowai does not believe there are significant transitional issues for the Drinking Water Standards as the proposed changes have been well signalled and are not material. It is noted that there will be more transitional issues with the Drinking Water Quality Assurance Rules.
Far North Councils, Far North District Council	There are significant questions on the additional lab capacity required across the country to undertake the tests some of which are quite specific.	
Ōtorohanga District Council	Is there enough laboratory capacity / expertise to undertake PFA's and refractory organics in NZ?	

Next steps

20. The next step is to provide this analysis of submissions on Drinking Water Standards to DIA by 8th April 2022 so they can provide an initial briefing to the Minister, with the associated draft Cabinet papers, by the 13th of April 2022.

Endorsement

21. Please record your endorsement by circling the relevant entries below and signing underneath.

I endorse / do not endorse the recommended action above	I endorse / do not endorse the recommended action above
_____ Melinda Sando Acting Head of Regulatory Date:	_____ Katy Te Amo Head of Strategy and Insights Date:

Decision

22. Please record your decision by circling the relevant entries below and signing underneath.

I approve / do not approve the recommendations set out in this memo.
_____ Bill Bayfield Chief Executive Officer Date:

Attachment 1 – Recommended Determinands and MAVs for Drinking Water Standards

Table 1: MAVs for Microbiological Determinands

Determinand	Existing MAV[6, 7]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV
Escherichia coli[8]	Less than 1 in 100 ml of sample		Less than 1 in 100 ml of sample
Total pathogenic protozoa	Less than one infectious (oo)cyst per 100 L of sample[9]		Less than one infectious (oo)cyst per 100 L of sample[5]

[6] Drinking-water Standards for New Zealand 2005 (revised 2018).

[7] These are maximum acceptable values for regulatory purposes. They do not represent a dose/response relationship that can be used as the basis for determining acceptable concentrations of pathogens in drinking water.

[8] Indicator organism.

[9] The methods available for enumerating pathogenic protozoa are becoming less expensive and more reliable, but they are not yet suitable for routine monitoring of treated water quality. Although new methods of assessing the infectiousness of protozoa by using human cell cultures have been developed, they are not yet suitable for routine monitoring of Cryptosporidium contamination of drinking water. The referee method cannot identify the species of Giardia or Cryptosporidium; nor can it determine the viability or infectivity of detected cysts or oocysts. Until the methodology improves, results are to be reported as verified (oo)cysts.

Table 2: MAVs for Inorganic Determinands

Determinand	Existing MAV[10]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Aluminium	No MAV	1	1	mg/L	Health-based value derived by WHO, but no guideline value established. Concentrations near the MAV in some NZ supplies.
Antimony	0.02		0.02	mg/L	
Arsenic	0.01		0.01	mg/L	For excess lifetime skin cancer risk of 6×10^{-4}. Limited by analytical and treatment difficulties.
Barium	0.7	1.5	1.5	mg/L	
Boron	1.4	2.4	2.4	mg/L	
Bromate	0.01		0.01	mg/L	For excess lifetime cancer risk of 7×10^{-5}.
Cadmium	0.004		0.004	mg/L	
Chlorate	0.8		0.8	mg/L	Disinfection must never be compromised.
Chlorine	5		5	mg as Cl_2/L	Disinfection must never be compromised.
Chlorite	0.8		0.8	mg/L	
Chromium	0.05		0.05	mg/L	Total chromium.
Copper	2		2	mg/L	

[10] Drinking-water Standards for New Zealand 2005 (revised 2018).

Determinand	Existing MAV[10]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Cyanide	0.6		0.6	mg/L	
Cyanogen chloride	0.4		0.4	mg/L	
Fluoride	1.5		1.5	mg/L	
Lead	0.01		0.01	mg/L	Based on WHO GV but WHO states there is no safe level for lead and level should be as low as reasonably practical. EU MAV is 0.005 mg/L.
Manganese	0.4		0.4	mg/L	Health-based value derived by WHO, but no guideline value established. Concentrations near the MAV in some NZ supplies.
Mercury	0.007		0.007	mg/L	Inorganic mercury.
Molybdenum	0.07	No MAV		mg/L	
Monochloramine	3		3	mg as Cl_2/L	
Nickel	0.08		0.08	mg/L	
Nitrate, short term[11]	50		50	mg/L	Expressed in mg/L as NO_3. The sum of the ratio of the concentrations of nitrate and nitrite to each of their respective MAVs must not exceed one
Nitrite long-term	0.2	No MAV		mg/L	

[11] Now short-term only. The short-term exposure MAVs for nitrate and nitrite have been established to protect against methaemoglobinaemia in bottle-fed infants.

Determinand	Existing MAV[10]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Nitrite, short term[11]	3		3	mg/L	Expressed in mg/L as NO_2. The sum of the ratio of the concentrations of nitrate and nitrite to each of their respective MAVs must not exceed one
Nitrate and nitrite	The sum of the ratio should not exceed 1		The sum of the ratio should not exceed 1		The sum of the ratio of the concentration of each to its respective MAV should not exceed 1.
Perchlorate		0.08	0.08	mg/L	Disinfection must never be compromised.
Selenium	0.01	0.04	0.04	mg/L	
Uranium	0.02	0.03	0.03	mg/L	

Table 3: MAVs for Organic Determinands

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Acrylamide	0.0005		0.0005	mg/L	For excess lifetime cancer risk of 10^{-5}.
Alachlor	0.02		0.02	mg/L	Pesticide. For excess lifetime cancer risk of 10^{-5}.
Aldicarb	0.01		0.01	mg/L	Pesticide.
Aldrin + dieldrin	0.00004		0.00004	mg/L	Pesticide. Sum of, not each.
Anatoxin-a	0.006	Combine as Anatoxins		mg/L	Combine as Anatoxins
Anatoxin-a(s)	0.001	Combine as Anatoxins		mg/L	Combine as Anatoxins
Anatoxins(includes cogeners Anatoxin-a, Homoanatoxin-a, Dihydro anatoxin-a, Dihydro homoanatoxin-a)		0.006	0.006	mg/L	Cyanotoxin. PMAV. Expressed as anatoxin-a toxicity equivalents.
Atrazine	0.002	0.1	0.1	mg/L	Pesticide. Sum of atrazine and its metabolites.
Azinphos methyl	0.004	0.1	0.1	mg/L	Pesticide.
Benzene	0.01		0.01	mg/L	For excess lifetime cancer risk of 10^{-5}.
Benzo(a)pyrene	0.0007		0.0007	mg/L	For excess lifetime cancer risk of 10^{-5}.
Bromacil	0.4		0.4	mg/L	Pesticide.

[12] Drinking-water Standards for New Zealand 2005 (revised 2018).

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Bromodichloromethane	0.06		0.06	mg/L	DBP. For excess lifetime cancer risk of 10^{-5}.
Bromoform	0.1		0.1	mg/L	DBP.
Carbofuran	0.008		0.008	mg/L	Pesticide.
Carbon tetrachloride	0.005		0.005	mg/L	
Chlordane	0.0002		0.0002	mg/L	Pesticide.
Chloroform	0.4		0.4	mg/L	DBP.
Chlorotoluron	0.04		0.04	mg/L	Pesticide.
Chlorpyriphos	0.04		0.04	mg/L	Pesticide.
Cyanazine	0.0007		0.0007	mg/L	Pesticide.
Cylindrospermopsin	0.001	0.0008	0.0008	mg/L	Cyanotoxin. PMAV. Expressed as cylindrospermopsin toxicity equivalents.
2,4-D	0.04		0.04	mg/L	Pesticide.
2,4-DB	0.1		0.1	mg/L	Pesticide.
DDT + isomers	0.001		0.001	mg/L	Pesticide. Sum of all isomers.
Di(2-ethylhexyl) phthalate	0.009		0.009	mg/L	
1,2-Dibromo-3-chloropropane	0.001		0.001	mg/L	For excess lifetime cancer risk of 10^{-5}.
Dibromoacetonitrile	0.08		0.08	mg/L	DBP
Dibromochloromethane	0.15		0.15	mg/L	DBP.
1,2-Dibromoethane	0.0004		0.0004	mg/L	For excess lifetime cancer risk of 10^{-5}.

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Dichloroacetic acid	0.05		0.05	mg/L	DBP.
Dichloroacetonitrile	0.02		0.02	mg/L	DBP.
1,2-Dichlorobenzene	1.5		1.5	mg/L	
1,4-Dichlorobenzene	0.4		0.4	mg/L	
1,2-Dichloroethane	0.03		0.03	mg/L	For excess lifetime cancer risk of 10^{-5}.
1,2-Dichloroethene	0.06		0.06	mg/L	Total of cis and trans isomers.
Dichloromethane	0.02		0.02	mg/L	
1,2-Dichloropropane	0.05		0.05	mg/L	
1,3-Dichloropropene	0.02		0.02	mg/L	Total of cis and trans isomers. For excess lifetime cancer risk of 10^{-5}.
Dichlorprop	0.1		0.1	mg/L	Pesticide.
Dimethoate	0.008		0.008	mg/L	Pesticide.
1,4-Dioxane	0.05		0.05	mg/L	For excess lifetime cancer risk of 10^{-5}.
Diuron	0.02		0.02	mg/L	Pesticide.
EDTA (editic acid)	0.7		0.7	mg/L	
Endrin	0.001		0.001	mg/L	Pesticide.
Epichlorohydrin	0.0005		0.0005	mg/L	
Ethylbenzene	0.3		0.3	mg/L	
Fenoprop	0.01		0.01	mg/L	Pesticide.

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Hexachlorobutadiene	0.0007		0.0007	mg/L	
Hexazinone	0.4		0.4	mg/L	Pesticide. PMAV
Homoanatoxin-a	0.002	No MAV		mg/L	
Hydroxyatrazine	No MAV	0.3	0.3	mg/L	Atrazine metabolite.
Isoproturon	0.01		0.01	mg/L	Pesticide.
Lindane	0.002		0.002	mg/L	Pesticide.
MCPA	0.002	0.8	0.8	mg/L	Pesticide. Health-based value derived by WHO, but no guideline value established. Occasionally found in NZ bores, at concentrations an order of magnitude below the MAV.
Mecoprop	0.01		0.01	mg/L	Pesticide.
Metalaxyl	0.1	0.3	0.3	mg/L	Pesticide.
Methoxychlor	0.02		0.02	mg/L	Pesticide.
Metolachlor	0.01		0.01	mg/L	Pesticide.
Metribuzin	0.07		0.07	mg/L	Pesticide.
Microcystins / Nodularins	0.001		0.001	mg/L	Cyanotoxin. PMAV. Expressed as microcystin-LR toxicity equivalents.
Molinate	0.007		0.007	mg/L	Pesticide.
Monochloroacetic acid	0.02		0.02	mg/L	DBP
Nitrilotriacetic acid (NTA)	0.2		0.2	mg/L	

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Nodularin	0.001	No MAV			Nodularin is now grouped with Microsystins so a MAV does not need to be set
N-nitrosodimethylamine (NDMA)	No MAV	0.0001	0.0001	mg/L	
Oryzalin	0.4		0.4	mg/L	Pesticide.
Oxadiazon	0.2		0.2	mg/L	Pesticide.
Pendimethalin	0.02		0.02	mg/L	Pesticide.
Pentachlorophenol	0.009		0.009	mg/L	Pesticide. For excess lifetime cancer risk of approximately $10^{-5.}$
PFHxS[13] + PFOS[14]	No MAV	0.00007	0.00007	mg/L	Sum of.
PFOA[15]	No MAV	0.00056	0.00056	mg/L	
Picloram	0.2		0.2	mg/L	Pesticide.
Pirimiphos methyl	0.1		0.1	mg/L	Pesticide.
Primisulfuron methyl	0.9		0.9	mg/L	Pesticide.
Procymidone	0.7		0.7	mg/L	Pesticide.
Propazine	0.07		0.07	mg/L	Pesticide.

13 PHFxS – perfluorohexane sulfonate.

14 PFOS - perfluorooctane sulfonate.

15 PFOA - perfluorooctanoic acid.

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Pyriproxifen	0.4		0.4	mg/L	Pesticide.
Saxitoxins	0.003		0.003	mg/L	Cyanotoxin. PMAV. Expressed as saxitoxin-equivalents.
Simazine	0.002		0.002	mg/L	Pesticide.
Sodium dichloroisocyanurate (as cyanuric acid)	No MAV	40	40	mg /L	
Styrene	0.03		0.03	mg/L	
2,4,5-T	0.01		0.01	mg/L	Pesticide.
Terbacil	0.04		0.04	mg/L	Pesticide.
Terbuthylazine	0.008		0.008	mg/L	Pesticide.
Tetrachoroethene	0.05		0.05	mg/L	
Thiabendazole	0.4		0.4	mg/L	Pesticide.
Toluene	0.8		0.8	mg/L	
Trichloroacetic acid	0.2		0.2	mg/L	DBP
Trichloroethene	0.02	0.03	0.03	mg/L	
2,4,6-Trichlorophenol	0.2		0.2	mg/L	For excess lifetime cancer risk of 10^{-5}.
Triclopyr	0.1		0.1	mg/L	Pesticide.
Trifluralin	0.03		0.03	mg/L	Pesticide.

Determinand	Existing MAV[12]	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Units	Notes
Trihalomethanes (THMs)	The sum of the ratio should not exceed 1		The sum of the ratio should not exceed 1		The sum of the ratio of the concentration of each to its respective MAV should not exceed 1.
Vinyl chloride	0.0003		0.0003	mg/L	For excess lifetime cancer risk of 10^{-5}.
Xylenes (total)	0.6		0.6	mg/L	
1080	0.0035				
1080, short term	No MAV	0.035	0.035	mg/L	Pesticide acute exposure.
1080, long term	No MAV	0.0035	0.0035	mg/L	Pesticide chronic exposure.

Table 4: MAVs for Radiological Determinands

Determinand	Existing MAV	Consultation MAV (note only MAV that were proposed to change were consulted on)	Recommended MAV	Unit	Notes
Total alpha activity	0.10	0.50	0.50	Bq/L excluding radon.	
Total beta activity	0.5	1.0	1.0	Bq/L excluding potassium-40.	
Radon	100		100	Bq/L.	