

# Protect drinking water supplies to protect people's health.

*Protecting source water is of “paramount importance”<sup>1</sup>!*

## Our position in a nutshell

You are responsible for protecting sources of human drinking water. This is the second obligation in the objective of the NPS-FM<sup>2</sup> and is required by the Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007 (NES-DW)<sup>3</sup>.

The Government Inquiry into the Havelock North campylobacter outbreak stressed that protecting source water is of “paramount importance”, and that it is “the first, and most significant, barrier against drinking water contamination and illness”<sup>4</sup>. The consequence of not protecting drinking water sources are serious impacts on human health, including cases of permanent, long-term health effects. In some instances (such as Havelock North’s outbreak), people have died because of contaminated drinking water. International literature is clear that treatment alone does not provide sufficient protection for people and communities. Multiple barriers are needed, including source water protection. You need to know where drinking water sources are and include rules in your regional plan to protect their quality and quantity.

To prioritise human health, you must identify activities in the catchment such as livestock effluent from agriculture activities, human sewage from residential and municipal systems, or fertiliser application from horticulture activities<sup>5</sup>, that can impact on drinking water quality. Once identified, you must control those activities, so they do not contaminate drinking water supplies. You must also ensure enough water is allocated for drinking water supply before it is allocated for the social, economic, and cultural well-being of people and communities.

You will need to manage drinking water for both acute risks, pathogenic risk from faecal contamination, and long-term exposure risk from contaminants such as nitrates. Emerging science indicates that increased nitrate concentrations in sources of drinking water elevates health risks for people at concentrations much lower than New Zealand’s current Maximum Allowable Value (MAV, 11.3mg/L nitrate)<sup>6,7</sup>. You must take a precautionary approach to protecting source water.

<sup>1</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)

<sup>2</sup> [Link to](#): Clause 2.1 of the NPS-FM

<sup>3</sup> [Link to](#): Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007: <https://www.legislation.govt.nz/regulation/public/2007/0396/latest/DLM1106901.html>

<sup>4</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)

<sup>5</sup> [Link to: https://www.ehinz.ac.nz/indicators/water/recreational-water/about-recreational-water-quality-and-health/#:~:text=rainfall%20washing%20livestock%20effluent%20from,or%20piggeries%20directly%20into%20waterways.](https://www.ehinz.ac.nz/indicators/water/recreational-water/about-recreational-water-quality-and-health/#:~:text=rainfall%20washing%20livestock%20effluent%20from,or%20piggeries%20directly%20into%20waterways.)

<sup>6</sup> Ward, M. H., Jones, R.R., Brender, J. D., de Kok, T. M., Weyer, P. J., Nolan, B. T., Villanueva, C. M. and van Breda, S. G. (2018). Drinking Water Nitrate and Human Health: An Updated Review. *Int J Environ Res Public Health*. 15(7). eng.

<sup>7</sup> Coffman, V. R., A. Søndergaard, Jensen, B. B. Trabjerg, C. B. Pedersen, B. Hansen, T. Sigsgaard, J. Olsen, J. Schullehner, M. Pedersen, and L. T. Stayner. (2022). Prenatal Exposure to Nitrate from Drinking Water and the Risk of

Remember the lessons of Havelock North's campylobacteriosis outbreak – that source water protection is the first, and most significant, barrier against contamination and illness. Take care to understand the connection between surface and groundwater, and how heavy rain and storm events can increase risks of contamination.

You must take serious, proactive steps now to protect drinking water sources and reduce the risk of water contamination and illness from drinking water.

## The NPS-FM directive

Drinking water supplies are a value you must consider in each freshwater management unit (FMU) or part of the FMU. Appendix 1B (2 Drinking water supply) sets out the matters that you will need to consider ensuring there is sufficient water to take and use for drinking water supplies<sup>8</sup>. These include physical, chemical, and microbiological contaminants as well as aesthetic values such as appearance, taste, and smell.

The NES-DW requires you to identify and protect drinking water sources. It directs that your regional plan's permitted activities, and issuing any resource consent cannot allow for activities that reduce the quality of water used for drinking water supplies so that it needs additional treatment. This means you will need to control the inputs such as nitrogen and microbial contaminants in your FMU through rules. Your regional plan may include rules that control stocking rates, fertiliser application and intensive winter grazing<sup>9</sup>.

Protecting drinking water sources means recognising the connectivity between surface and groundwater, and providing for Te Mana o te Wai because when water bodies are healthy, subsequent drinking water will more likely be safe to consume. Sources for drinking water such as rivers, lakes and groundwater are of course, water bodies themselves. Under the NPS-FM the health of water bodies must be maintained and improved (if the community choose or where water bodies are below bottom lines)<sup>10</sup>. If they are degraded, then they *must* be improved. This means that if water bodies are improved, by default, drinking water sources will also be improved.

You must avoid over allocation<sup>11</sup>. This means that if there is over allocation in a catchment, you will need to make a hard but critical decision to restrict the allocation of water for other activities such as irrigation to provide drinking water for people. This is because drinking water is a second priority obligation of the NPS-FM objective. You will need to have a robust, complete, and up to date freshwater accounting system<sup>12</sup> to make good decisions on allocation and the efficient use of freshwater.

## What do we want to see?

It is your responsibility to manage drinking water sources properly. We want you to uphold the six fundamental principles of drinking water safety for Aotearoa New Zealand which came from

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Preterm Birth: A Danish Nationwide Cohort Study. *Environmental Epidemiology* 6(5): e223. Online: <https://doi.org/10.1097/ee9.000000000000223>.

<sup>88</sup> [Link to:](#) Appendix 1B – Other values that must be considered: 2 Drinking water supply in the NPS-FM

<sup>9</sup> [Link to:](#) Intensive winter grazing PN

<sup>10</sup> [Link to:](#) Policy 5 of the NPS-FM

<sup>11</sup> [Link to:](#) Policy 11 of the NPS-FM

<sup>12</sup> [Link to:](#) 3.29 Freshwater accounting system in the NPS-FM

the Havelock North Drinking Water Inquiry: Stage 2<sup>13</sup>. The Havelock North inquiry found that many drinking water sources have been poorly managed across the country and called for urgent and early action<sup>14</sup>. We expect to see a proactive response to protect your drinking water sources. This means precautionary input controls<sup>15</sup> to manage activities that result in contaminants entering water ways, such as stocking rates and fertiliser application.

*Escherichia coli* (*E. coli*) is an indication that faecal matter is present which contains very harmful pathogens<sup>16</sup>. Where *E. coli* is found to be present in drinking water, then faecal contamination needs investigated as it can seriously impact human health. Learn the lessons of Havelock North's outbreak and be proactive in your investigation of where *E. coli* is found to be present<sup>17</sup>.

While microbial contaminants from faecal contamination tend to be commonly understood, nitrate contamination of drinking water tends to be poorly considered in drinking water protection. Because of the time it takes for nitrate to travel through soils, surface, and groundwater, it is not possible to suddenly reduce nitrate contamination. The best approach you can take is to think ahead and be precautionary by stopping it from entering sources for drinking water in the first place.

We want to see nitrate levels reduced to a level well below the drinking water standards. The Water Services (Drinking Water Standards for New Zealand) Regulations 2022 ('Drinking Water Standards') have set maximum acceptable values (MAV) for inorganic determinands. The MAV for nitrate is set at 11.3 mg/L as NO<sub>3</sub>-N. This is to protect against blue baby syndrome (methemoglobinemia) - a condition that interferes with oxygen transfer around infants' bodies<sup>18</sup>. However, 11.3 mg/L is still an extremely high level of nitrogen<sup>19</sup>. Natural background levels of nitrogen in NZ groundwater have been estimated to be between 0.3 – 1.2 mg/L as NO<sub>3</sub>-N<sup>20</sup>.

NZ College of Midwives currently recommends pregnant women seek alternative supplies if their water is found to be >5 mg/L<sup>21</sup>. Some studies show cancer risks may significantly increase

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<sup>13</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)

<sup>14</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. Pg. 3 [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)

<sup>15</sup> [Link to:](#) Input controls PN.

<sup>16</sup> [Link to:](https://www.ehinz.ac.nz/indicators/water/drinking-water-quality/about-drinking-water-quality-and-health/) <https://www.ehinz.ac.nz/indicators/water/drinking-water-quality/about-drinking-water-quality-and-health/>

<sup>17</sup> Graham J, Russell K, Gilpin B. 2023. When the implementation of water safety plans fail: rethinking the approach to water safety planning following a serious waterborne outbreak and implications for subsequent water sector reforms. *Journal of Water and Health* 2023:188.

<sup>18</sup> [Link to:](https://www.health.govt.nz/your-health/healthy-living/drinking-water/nitrate-drinking-water#:~:text=Nitrate%20can%20be%20reduced%20to,tiredness%2C%20and%20shortness%20of%20breath.) <https://www.health.govt.nz/your-health/healthy-living/drinking-water/nitrate-drinking-water#:~:text=Nitrate%20can%20be%20reduced%20to,tiredness%2C%20and%20shortness%20of%20breath.>

<sup>19</sup> Rogers, K. M., R. van der Raaij, A. Phillips, and M. Stewart. (2023). A National Isotope Survey to Define the Sources of Nitrate Contamination in New Zealand Freshwaters. *Canadian Journal of Fisheries and Aquatic Sciences*. Online: 617:129131. <https://doi.org/10.1016/j.jhydrol.2023.129131>.

<sup>20</sup> Daughney, C., and M. Wall. (2007). "Groundwater Quality in New Zealand: State and Trends 1995-2006." GNS Science Consultancy Report 23.

<sup>21</sup> Office of the Prime Minister's Chief Science Advisor. 2022. "Nitrates in Drinking-Water." <https://www.pmtsa.ac.nz/topics/nitrates/>.

at concentrations <1mg/L and that there may be complications for pregnancy due to elevated nitrate levels<sup>22</sup>.

Recent research found it was reasonably common (10% of sampled sites) for ground water to breach the 11.3mg/L drinking water standards<sup>23</sup>. 33% of surface and groundwater sites sampled in the same study were found to breach 5.65mg/L (the trigger value at which ongoing monitoring of the source is required by law). The study found that this elevated nitrate was strongly associated with agricultural sources of nitrogen.

Intensive dairy farming contributes the largest source of nitrate contamination in Aotearoa New Zealand waterways<sup>24,25</sup>. One in six New Zealanders are exposed to high levels of nitrates in their drinking water<sup>26</sup>. You must take a precautionary approach in your regional plan to setting limits to manage nitrogen loss to water from dairy farming and other activities such as horticulture to appropriately protect peoples drinking water. We acknowledge that there will be a level of impact from land use activities, but we cannot accept the disparate gap between the 11.3mg/L MAV and the much lower level at which human health is likely to be negatively impacted.

We want you to take critical measures to protect the source of your drinking water and move away from the mind-set that any contaminants and toxins can simply be treated out of the water. Treatment alone is not a sufficient barrier, and it can be an extremely expensive exercise, especially for nitrates. As nitrogen levels in drinking water increase, so do health risks and financial costs<sup>27,28</sup>. If you fail to protect drinking water sources, you are setting up your community to pick up a huge bill and continued health risks in the future.

High sediment loads can also increase costs and effectiveness of water treatment, and in some cases can damage treatment facilities. It is safer and more cost effective to prevent contaminants from entering water bodies than paying the large expense to remove them. So do your best to keep contaminants and excess sediment out of the water in the first place.

The contamination risk is higher in communities that are not on reticulated or registered drinking water supplies, which is up to 15 percent or approximately 600,000 New Zealanders. These

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<sup>22</sup> Schullehner, J., B. Hansen, M. Thygesen, C. B. Pedersen, and T. Sigsgaard. (2018). Nitrate in Drinking Water and Colorectal Cancer Risk: A Nationwide Population-Based Cohort Study. *International Journal of Cancer* 143 (1): 73–79. <https://doi.org/10.1002/ijc.31306>.

<sup>23</sup> Rogers, K. M., R. van der Raaij, A. Phillips, and M. Stewart. (2023). A National Isotope Survey to Define the Sources of Nitrate Contamination in New Zealand Freshwaters. *Canadian Journal of Fisheries and Aquatic Sciences* 617:129131. <https://doi.org/10.1016/j.jhydrol.2023.129131>.

<sup>24</sup> Rogers, K. M., R. van der Raaij, A. Phillips, and M. Stewart. (2023). A National Isotope Survey to Define the Sources of Nitrate Contamination in New Zealand Freshwaters. *Canadian Journal of Fisheries and Aquatic Sciences* 617:129131. Online: <https://doi.org/10.1016/j.jhydrol.2023.129131>.

<sup>25</sup> Richards, J., Chambers, T., Hales, S., Joy, M., Radu., Woodward, A., Humphrey, A., Randal, E. And Baker, M. G. (2022). Nitrate contamination in drinking water and colorectal cancer: Exposure assessment and estimated health burden in New Zealand. *Environmental Research*. Vol 204: Part C. Online: <https://doi.org/10.1016/j.envres.2021.112322>

<sup>26</sup> Link to: <https://www.newshub.co.nz/home/new-zealand/2021/02/study-finds-one-in-six-kiwis-exposed-to-high-levels-of-nitrates-in-tap-water-links-to-bowel-cancer.html>

<sup>27</sup> Prickett M, Chambers T, Hales S. 2023. When the first barrier fails: public health and policy implications of nitrate contamination of a municipal drinking water source in Aotearoa New Zealand. *Australasian Journal of Water Resources*.1-10.

<sup>28</sup> Foote, K. J; Joy, M K and Death, R. G. (2015). New Zealand Dairy Farming: Milking Our Environment for All Its Worth. *Environmental Management*. Vol. 56, pg. 709-720. Online: <https://doi.org/10.1007/s00267-015-0517-x>

people may be on very small, networked supplies or self-supplied drinking water sources, more prominently located in rural areas. It is important not to forget about these communities in your strategy to protect source water for drinking.

As directed by the Havelock North Drinking Water Inquiry, you need to take action to prioritise human health by protecting your sources for drinking water.

## **How should the NPS-FM be implemented?**

### **Take an integrated approach to manage drinking water sources**

Drinking water sources are part of the interconnected water way and you must adopt an integrated approach, ki uta ki tai<sup>29</sup>.

Water takes for drinking water can be from groundwater, through a surface water take or via reservoirs higher up in the catchment. Remember that all these sources are from water bodies themselves and Policy 5 states that you must maintain and if specified, improved all water bodies.

Some areas of Aotearoa New Zealand are taking a proactive lead in managing drinking water sources and taking a catchment scale approach to deliver this. For example, Tairāwhiti Gisborne are reforesting areas of their land specifically to manage issues they have with drinking water supplies. Council have also employed mana whenua within their team to embed te ao Māori's wholistic and integrated approach into how they manage their resources.

You should champion innovative, catchment scale solutions to prioritise the protection of your drinking water sources to meet Policy 1, 2 and 3 of the NPS-FM.

### **Control surrounding land use activities**

You will need to include strict controls in your regional plan where there is a risk that land use could compromise a drinking water supply<sup>30</sup>.

A tool developed by Greenpeace called 'Know Your Nitrate map'<sup>31</sup> uses thousands of data points across the country to indicate nitrate contamination levels in local communities<sup>32</sup>. This tool provides a high-level indication of areas where land use activities may be contributing to increase nitrate levels in drinking water. We would expect more detailed investigations are

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<sup>29</sup> [Link to:](#) Clause 3.5 Integrated management in the NPS-FM

<sup>30</sup> Phiri, B. J, Pita, A. B, Hayman, D. T. S, Biggs, P. J, Davis, M. T., Fayaz, A., Canning, A. D., French, N. P. and Death, R. G. (2020). Does land use affect pathogen presence in New Zealand drinking water supplies? *Water Research*. Online: 185:116229

<sup>31</sup> [Link to: https://maps.greenpeace.org/maps/aotearoa/know-your-nitrate/](https://maps.greenpeace.org/maps/aotearoa/know-your-nitrate/)

<sup>32</sup> [Link to: https://www.greenpeace.org/aotearoa/press-release/nitrate-contamination-map-nz-launched-challenge-acts-agriculture-minister/](https://www.greenpeace.org/aotearoa/press-release/nitrate-contamination-map-nz-launched-challenge-acts-agriculture-minister/)

undertaken to determine the local context for each area identified for higher nitrate levels by this tool.

We know that some locations in this country require more urgent action and more strict controls, considering the extent of high to extremely high levels of nitrate concentration as indicated on the nitrate map (see the toolbox section of this PN for visual summary of identified problem areas).

## **Protect your entire drinking water source**

You must protect the whole source catchment above the intake, and not just the intake point.

The Report of the Havelock North Drinking Water Inquiry: Stage 2 identified six important principles' for protecting drinking water. The second principle emphasised was that the 'protection of source water is of paramount importance'<sup>33</sup>. There are examples around the country that demonstrate the devastating consequence of not protecting your source water's, including thousands of people ill, hospitalisations and in extreme cases, people can be left with serious long term health conditions or even death.

Contaminants can enter water ways that are sources for human drinking water from a variety of avenues, including surface run-off during high periods of rainfall, from drains, when flooding occurs and through leaching. Because of the range of ways contaminants can enter water ways, you have a responsibility to carefully control discharges and land-use activities in the catchment above the drinking water source and protect the entire source.

## **Identify every drinking water source**

Make sure that you know where every drinking water source is in your region and identify its catchment. The Ministry for the Environment have guidance online about how to do this<sup>34</sup>.

## **Install meters to separate drinking water from other use**

For large water takes such as irrigation schemes and municipal supplies, separate meters should be installed to determine what proportion of the take is for human drinking water, and what is for other municipal or commercial use such as for stock drinking water or industrial uses.

A case in Balclutha found that approximately 80 percent of municipal water supply was being used for stock water and dairy shed use<sup>35</sup>. It is inefficient, expensive (to the rate payer) and unnecessary to provide treated potable water for purposes that are not human drinking water.

You need to understand the proportions of water use being used for drinking water purposes so that these quantities can be prioritised over third hierarchy of obligation matters such as social, economic, and cultural use.

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<sup>33</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)

<sup>34</sup> Link to: <https://environment.govt.nz/publications/delineating-source-water-risk-management-areas/>

<sup>35</sup> Link to: <https://newsroom.co.nz/2022/03/22/high-court-rules-on-councils-water-battle/>



See our practice note on Environmental flows and limits; and water takes<sup>36</sup> for more detail.

## **Think about acute risks and the long-term exposure risks of contaminated drinking water**

Risk management is often focused on acute risk where people are impacted immediately or in an extreme way. For example, microbial contaminants and pathogens in drinking water leading to outbreaks of sickness in people and animals. However, long-term exposure risks are just as important to manage. They impact people in more gradual ways but just as critically. For example, nitrate in drinking water is a long-term exposure risk.

Long term exposure risks can sometimes be forgotten or overlooked because they are harder to track exactly who, when and how severely the contaminant has impacted people's health. However, nitrates can impact on a range of health risks and the level at which some of these health issues occur (see section above on what we want to see).

Take all measures necessary to protect your drinking water sources, including the different contaminates that pose acute and long-term exposure risks to people.

## **Contribute to Aotearoa New Zealand's integrated approach to climate change**

As part of an integrated management approach, you will need to think about the impact that climate change can have on your sources for drinking water and future proof this by identifying which locations and associated infrastructure may be a risk. Climate change modelling predicts more frequent and intensive rainfall events<sup>37</sup>, resulting in increased risk of damage to water take and distribution infrastructure<sup>38</sup>. Although sediment isn't a direct contaminant of concern to the health risks of drinking water sources, it can block infrastructure and make water untreatable and undrinkable. Larger quantities of sediment can reach sources of drinking water during storm events and with more severe events predicted across Aotearoa New Zealand, you will need to take into account climate change when protecting drinking water sources.

This includes building greater resilience into natural water systems when storm events or drought occurs. Provision in your regional plan for sediment controls and vegetated riparian margins, protecting river extent, and making room for rivers all aid in reducing climate change impacts on people's livelihoods and infrastructure.

Water allocation, provided the environmental flows and levels can protect the health and well-being of water bodies and freshwater ecosystems, must then prioritise the health needs of people, such as drinking water. You will need to plan for this in your regional plan, including the potential need of storage for drinking water supplies.

## **Implement the six principles to protect drinking water sources**

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<sup>36</sup> [Link to:](#) Environmental flows and levels; and take limits Practice Note.

<sup>37</sup> [Link to: https://niwa.co.nz/our-science/climate/information-and-resources/clivar/scenarios](https://niwa.co.nz/our-science/climate/information-and-resources/clivar/scenarios)

<sup>38</sup> [Link to:](#) Ministry for the Environment 2018. Climate Change Projections for New Zealand: Atmosphere Projections Based on Simulations from the IPCC Fifth Assessment, 2nd Edition. Wellington: Ministry for the Environment. Online: <https://environment.govt.nz/assets/Publications/Files/Climate-change-projections-2nd-edition-final.pdf>

Uphold the six fundamental principles of drinking water safety for Aotearoa New Zealand which came from the Havelock North Drinking Water Inquiry: Stage 2<sup>39</sup>. As follows (taken verbatim from the Report Inquiry):

<u>Principle 1:</u>	<b>A high standard of care must be embraced</b>	Unsafe drinking water can cause illness, injury, or death on a large-scale. All those involved in supplying drinking water (from operators to politically elected representatives) must therefore embrace a high standard of care akin to that applied in the fields of medicine and aviation where the consequences of a failure are similarly detrimental to public health and safety. Vigilance, diligence, and competence are minimum requirements and complacency has no place.
<u>Principle 2:</u>	<b>Protection of source water is of paramount importance</b>	Protection of the source of drinking water provides the first, and most significant, barrier against drinking water contamination and illness. It is of paramount importance that risks to sources of drinking water are understood, managed, and addressed appropriately. However, as pathogenic microorganisms are found everywhere, complete protection is impossible and further barriers against contamination are vital.
<u>Principle 3:</u>	<b>Maintain multiple barriers against contamination</b>	Any drinking water system must have, and continuously maintain, robust multiple barriers against contamination appropriate to the level of potential contamination. This is because no single barrier is effective against all sources of contamination and any barrier can fail at any time. Barriers with appropriate capabilities are needed at each of the following levels: source protection; effective treatment; secure distribution; effective monitoring; and effective responses to adverse signals. A “source to tap” approach is required.
<u>Principle 4:</u>	<b>Change precedes contamination</b>	Contamination is almost always preceded by some kind of change and change must never be ignored. Sudden or extreme changes in water quality, flow, or environmental conditions (for example, heavy rainfall, flooding, earthquakes) should arouse particular suspicion that drinking water might become contaminated. Change of any kind (for example, personnel, governance, equipment) should be monitored and responded to with due diligence.
<u>Principle 5:</u>	<b>Suppliers must own the safety of drinking water</b>	Drinking water suppliers must maintain a personal sense of responsibility and dedication to providing consumers with safe water. Knowledgeable, experienced, committed, and responsive personnel provide the best assurance of safe drinking water. The personnel, and drinking water supply system, must be able to respond quickly and effectively to adverse monitoring signals. This requires commitment from the highest level of the organisation and accountability by all those with responsibility for drinking water.
<u>Principle 6:</u>	<b>Apply a preventive risk management approach</b>	A preventive risk management approach provides the best protection against waterborne illness. Once contamination is detected, contaminated water may already have been consumed and illness may already have occurred. Accordingly, the focus must always be on preventing contamination. This requires systematic assessment of risks

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<sup>39</sup> Report of the Havelock North Drinking Water Inquiry: Stage 2. (December 2017). Department of Internal Affairs. [www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water](http://www.dia.govt.nz/Government-Inquiry-Into-Havelock-North-Drinking-Water)



throughout a drinking water supply from source to tap; identification of ways these risks can be managed; and control measures implemented to ensure that management is occurring properly. Adequate monitoring of the performance of each barrier is essential. Each supplier's risk management approach should be recorded in a living WSP which is utilised on a day-to-day basis.

## **How we know the NPS-FM is being achieved**

You will have identified all drinking water sources and be actively managing the activities in the catchment which pose a risk (acute and long term) to these sources. You will be using the six principles from the Havelock North Inquiry (2017) and all drinking water supplies will be maintained to a level that is acceptable to protect human health. Drinking water allocation will be prioritised above other activities (social, cultural, and economic).

As a result, there will be fewer cases of compromised drinking water supplies, demonstrating the serious and immediate action that you have taken to protect the health of people and their drinking water supplies.

# Implementation Toolbox

The toolbox will continue to be developed as new information becomes available:

<b>Tools:</b>	are helpful diagrams, processes, or ways to support how you should implement the NPS-FM.
<b>Examples:</b>	provide text suggestions to help draft objectives (values and environmental outcomes), policies, and rules (limits) in your regional plans, including how monitoring could be achieved. It includes examples of how attributes and base line states, target attribute states, environmental flows and levels, and other criteria, where appropriate, can be written or presented to help achieve environmental outcomes.
<b>Case studies:</b>	illustrate where the NPS-FM has been well applied (or not) throughout the country and provides national or international lessons to help implement the NPS-FM.
<b>Evidence:</b>	provides relevant case law to support how the NPS-FM must be applied.
<b>Resources:</b>	provide links to supporting literature and best information available to implement the NPS-FM.

## Tools

[Know your nitrate map](#): example of home page to website below.



Figure 1 Example screenshot from March 2024 of nitrate levels across Aotearoa New Zealand

## Examples

[When available]

## Case studies

### Case study: Invercargill and Southland example

Invercargill draws its drinking water from Oreti river. The river's water quality has had an upward trend in nitrate concentration due to the intensification of land use over recent decades, and in particular the increase of cows on land<sup>40</sup>. Southland has had a 16-fold increase in the number of dairy cattle over the last 30 years, with nitrate levels trending up<sup>41</sup>.

The \$11.5 million dollar upgrade of the Branxholme Water Treatment Plant was required to provide residents with cleaner drinking water. Local government has also been scoping alternative sources of drinking water.

Additionally, the council has identified that over 30 percent of monitored groundwater sites now exceed the 11.3mg/L drinking water standard for nitrate<sup>42</sup>.

### Case study: Lake Taupō Protection Trust

In 2007, the Lake Taupō Protection Trust was set up to protect the lakes excellent water quality. \$81.5 million dollars over 15 years was set aside to reduce nitrogen levels entering Lake Taupō by 20 percent (100 tonnes of N to the lake). Taupō District Council, Waikato Regional Council and Central Government funded this initiative, meaning that it was paid for by the public.

The majority of Taupō residents drinking water is sourced from Lake Taupō or the wider catchment, where nitrogen posed a risk to people's health. The fund was used to purchase land to convert to low nitrogen land use and support other initiatives that assisted landowners to reduce nitrogen levels entering the lake such as mitigation measures for nitrate loss to water, feasibilities on less impactful land uses to agricultural activities and trails on food for stock.

The project has been groundbreaking and achieved the 20 percent nitrogen reduction four years ahead of target. Monitoring and compliance continue to be undertaken.

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<sup>40</sup> Link to: [https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/environment/science/science-summary-reports/land\\_use\\_change\\_in\\_the\\_southland\\_region.pdf](https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/environment/science/science-summary-reports/land_use_change_in_the_southland_region.pdf)

<sup>41</sup> [https://www.stats.govt.nz/indicators/livestock-numbers#:~:text=Between%201990%20and%202019%3A,percent\)%20from%2038%2C000%20to%20636%2C000](https://www.stats.govt.nz/indicators/livestock-numbers#:~:text=Between%201990%20and%202019%3A,percent)%20from%2038%2C000%20to%20636%2C000)

<sup>42</sup> Environment Southland (2019). Current Environmental State and the "Gap" to Draft Freshwater Objectives for Southland: Technical Report. Retrieved from <https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/document-library/reports/Values%20and%20Objectives%20reports%20-%20People%2C%20Water%20and%20Land/Current%20environmental%20state%20and%20the%20%E2%80%9Cgap%E2%80%9D%20to%20draft%20freshwater%20objectives%20for%20Southland%20%28December%202019%29.pdf>

## Evidence

[When available]

## Resources

[When available]

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*Fish & Game, Forest & Bird and Choose Clean Water have written this practice note to communicate their expectation on how regional councils should implement the National Policy Statement for Freshwater Management 2020 (NPS-FM) into their regional plans. This is one in a series of practice notes which have been prepared on various topics relating to NPS-FM implementation.*