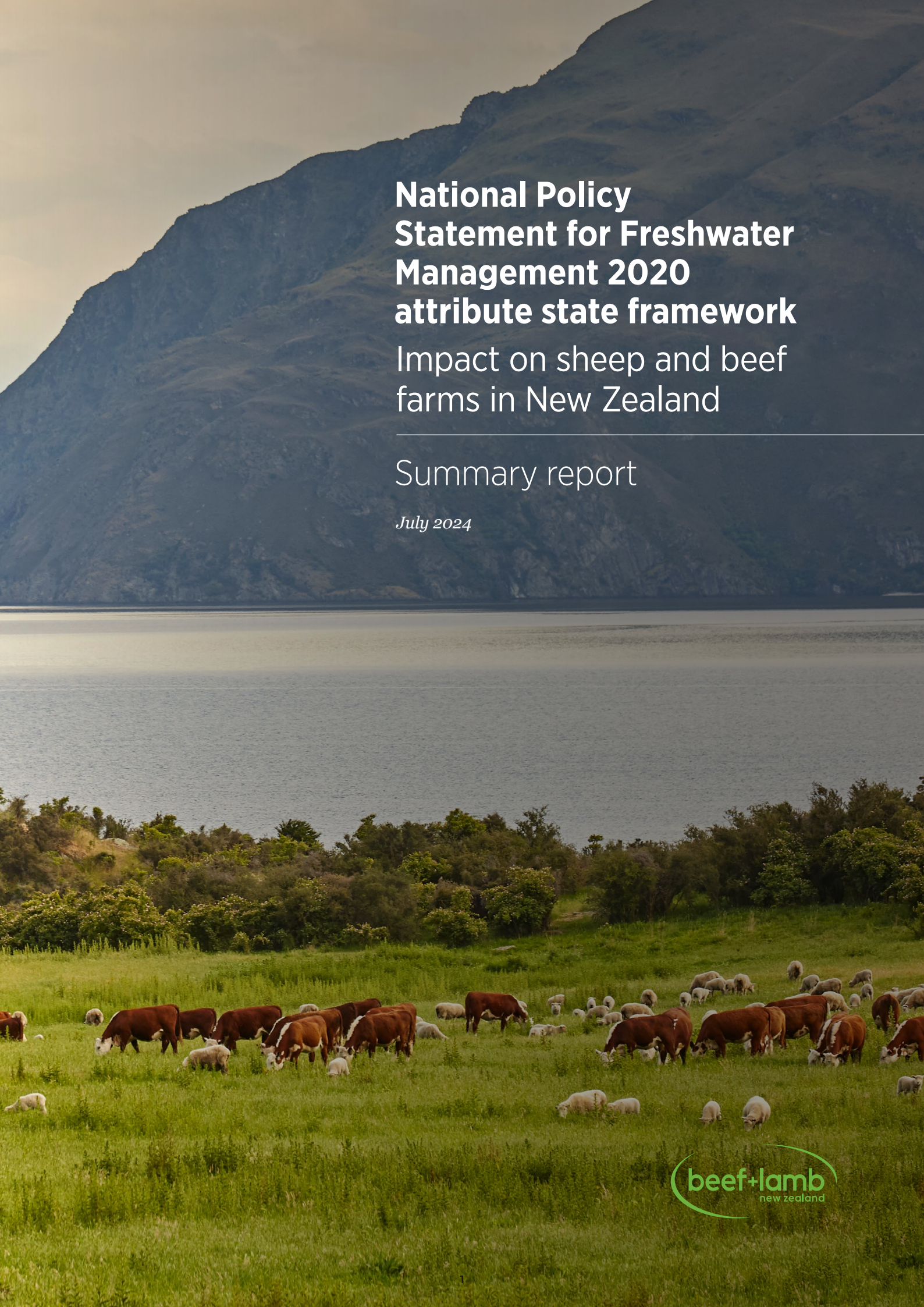


National Policy Statement for Freshwater Management 2020 attribute state framework

Impact on sheep and beef farms in New Zealand

Summary report

July 2024

beef+lamb new zealand

Key points

- Freshwater health is extremely important to sheep and beef farmers, but there are some significant issues in the framework for managing it.
- Some of the National Policy Statement for Freshwater Management (NPS-FM) target attribute states are fundamentally flawed and inappropriately calibrated.
- The NPS-FM suspended fine sediment national bottom lines (NBLs) and *E. coli* 95th percentile human contact target are not achievable from a technical or economic point of view.
- Even if agriculture was stopped and all catchments returned to their natural state, up to 38 percent of all rivers would not meet the suspended fine sediment national bottom lines.
- Trying to achieve the NPS-FM suspended fine sediment national bottom lines will decimate farming and rural communities – an estimated 44 percent of all sheep and beef farmland would likely need to be retired along with other extensive mitigations, but even then the NBL would only be met in around 50 percent of these catchments.
- Current regional freshwater planning processes need to stop immediately until an alternative framework to manage water quality is in place.

Executive summary

Freshwater health is extremely important for sheep and beef farmers – who have been proactively managing impacts and risks – and to communities. However, the current framework for managing this is not robust and the social, economic and environmental impacts have not been adequately considered.

Under the requirements of the NPS-FM regional councils must meet in-stream national bottom lines for contaminants regardless of social or economic impact. Regional councils set rules and limits for activities such as farming through regional planning processes to manage contaminant loss and impacts on water quality.

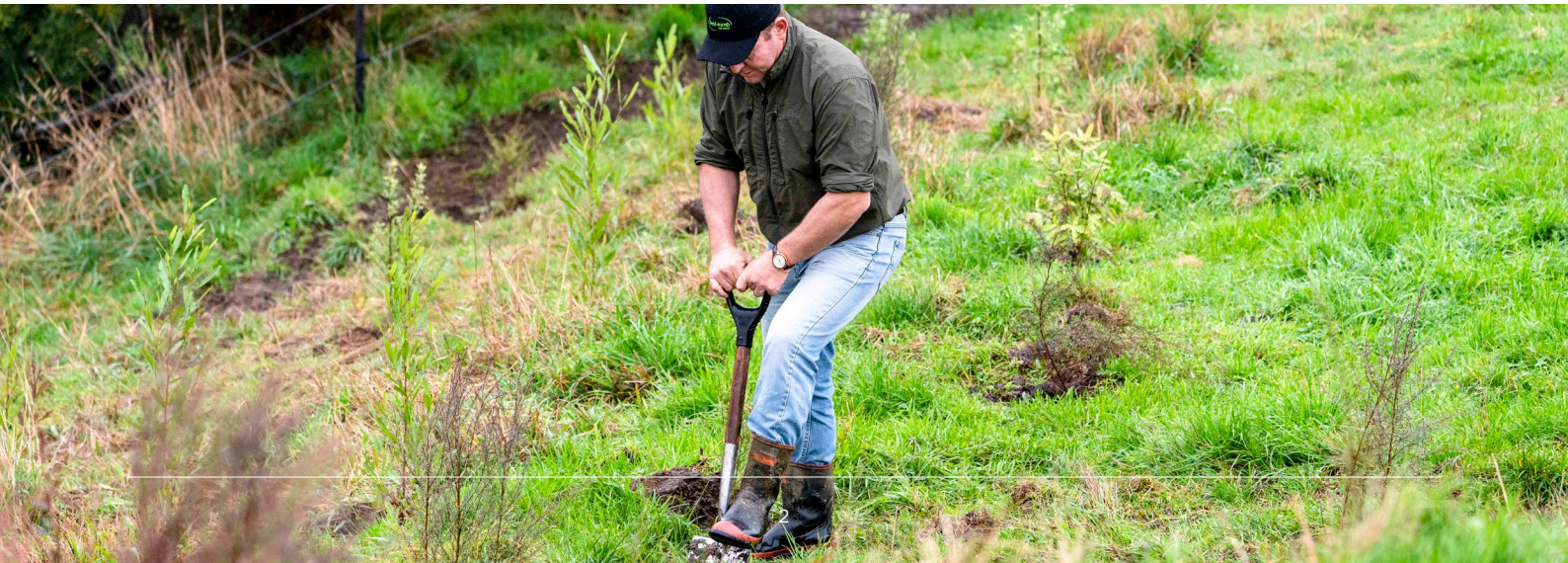
B+LNZ commissioned an independent review by environmental consultants Torlesse Environmental Ltd of the development of the NPS-FM target attribute states. It found significant issues in the way the suspended fine sediment and *E. coli* attribute frameworks were set up and in the achievability of these targets.

Key flaws identified in the suspended fine sediment attribute framework include:

- it was based on impacts to only a small number of indigenous fish species rather than all in-stream flora and fauna
- the sediment–fish relationship used to establish the national bottom line is based on recent modelled sediment data (not measured data) paired with fish abundance surveys beginning in the 1970s, and this relationship model has significant uncertainty
- the NBLs do not adequality account for natural variability – research released publicly indicates around 20 percent of waterways coming out of catchments in their natural state (for example national parks) do not currently meet the suspended fine sediment NBLs and up to 38 percent of rivers could not meet the NBLs even if developed catchments were reverted back to their natural state.

Key flaws identified in the *E. coli* attribute framework include:

- the inclusion of the 95th percentile statistics without allowing regional councils to exclude data collected during heavy rainfall and floods – because these must be included and most mitigations are much less effective during high flow from heavy rainfall events, it can be very difficult to meet the requirement to improve from one *E. coli* attribute state band to the next
- the minimum required improvement for *E. coli* applies all year round, including winter months, during storm events and to all waterways, including those not suitable for swimming or other contact recreation.



The review also assessed what actions may need to be implemented on sheep and beef farms across New Zealand to achieve the suspended fine sediment NBLs using farms in the B+LNZ Sheep and Beef Farm Survey and the models used by MfE and regional councils.

The following actions would **all** be needed to attempt to meet the suspended fine sediment NBLs:

- an estimated 44 percent of all sheep and beef farmland would likely need to be retired from production
- pole planting on an estimated 8 percent of the remaining farmland
- nearly 13,000km of additional waterway fencing.

B+LNZ assessed the economic impact of undertaking these mitigations on the sheep and beef sector. It estimated that:

- retiring 44 percent of sheep and beef farmland could cost the economy $3.9 billion per year in reduced sheep meat and beef exports
- pole planting and additional fencing of waterways could cost over $1.4 billion to implement.

Even if these mitigations were implemented, the suspended fine sediment NBLs would still not be achieved across more than 50 percent of the catchments nationally that are currently non-compliant with the NBLs. This is because the values are so harsh that many waterways that are in catchments in their natural state do not currently meet the NBLs.

This review supports the urgent need for a fundamental rethink of the management framework for suspended fine sediment and *E. coli*.

The Government pushed out the end date that councils can notify their freshwater plan for the implementation of the NPS-FM, and said it intends to amend the policy settings in the NPS-FM, which B+LNZ welcomes. The Government has asked regional councils to pause their freshwater planning processes until this is complete. However, this does not solve the fundamental issue.

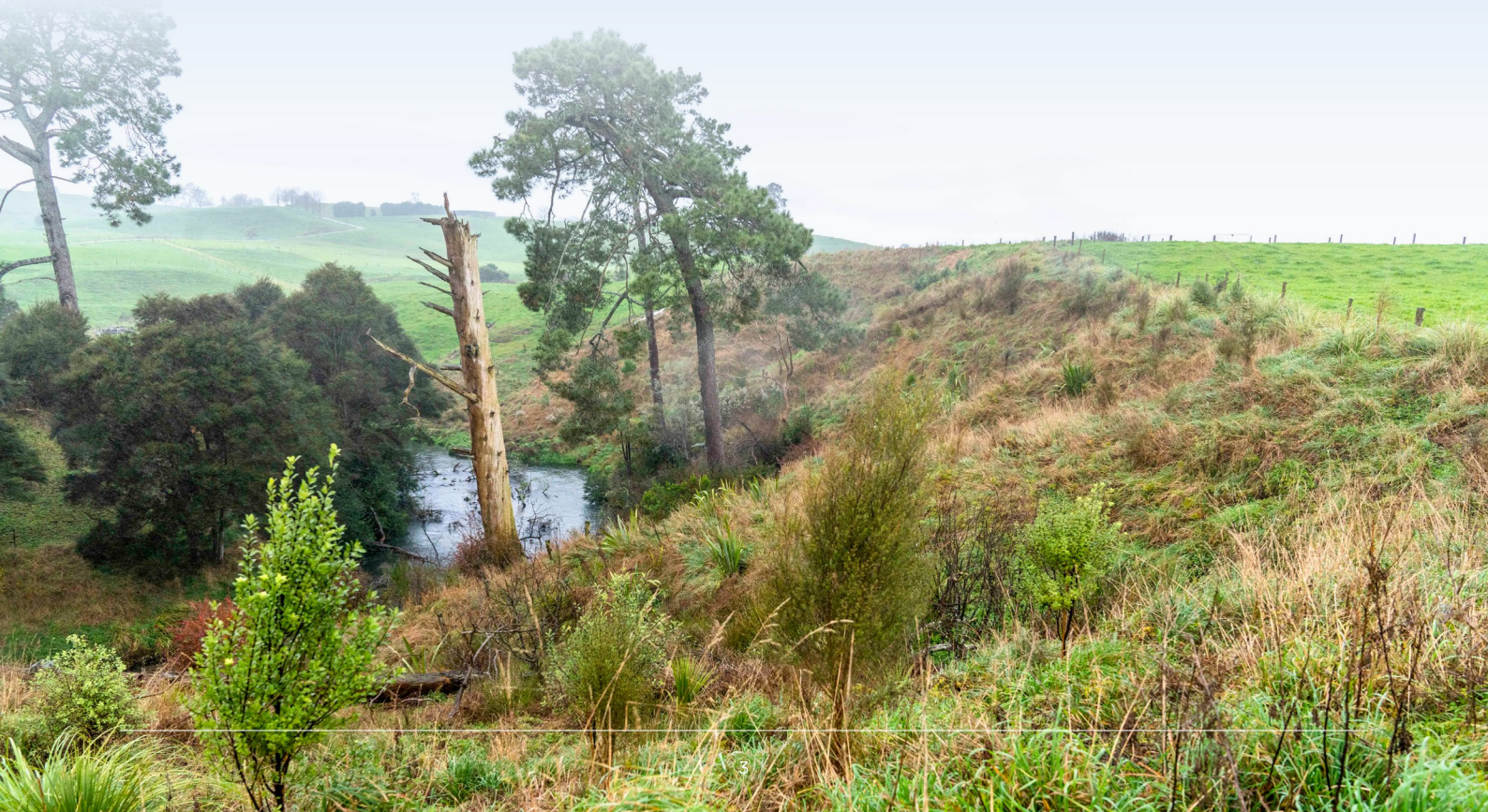
The problem is that the NPS-FM is still in place and many regional councils are continuing with their planning processes on the basis of the current flawed attribute state targets and national bottom lines.

It is likely to be another two years before the revised NPS-FM is in place, by which time the framework for achieving the current targets will be locked in if regional councils' freshwater plans become operative. Urgent changes to the suspended fine sediment and *E. coli* attribute frameworks in Tables 8 and 9 of the NPS-FM, therefore, are needed so that regional councils stop implementing them in the regional freshwater plans being developed.

B+LNZ's recommendation is that the suspended fine sediment attribute (table 8) and the 95th percentile statistic in table 9 are removed from the NPS-FM as an interim measure, while urgent work is undertaken on the replacement of the NPS-FM and the development of a more appropriate national framework for managing suspended fine sediment and *E. coli.*

B+LNZ acknowledges sediment and *E. coli* issues need to be managed, but these attribute states are fundamentally flawed.

Based on the experience of the NPS-FM, and the significant natural regional variation of sediment, B+LNZ's view is that a more targeted regional approach would be a more appropriate framework than a national bottom line for suspended fine sediment.



Background

Sheep and beef impacts on water quality and management approaches

Freshwater health is extremely important to sheep and beef farmers, with intergenerational farming families connected to the water. Freshwater is also vital for farming businesses for a multitude of uses from stock drinking water to irrigation.

B+LNZ acknowledges sheep and beef farming can have an impact on freshwater quality and that this needs to be managed. For sheep and beef farms the predominant risk comes from the loss of sediment, faecal microbes (represented by *E. coli*), phosphorus and to a lesser extent nitrogen.

The risk varies between and within farms due to both the underlying characteristics of the land but also the farming system and management practices adopted. Typically, drystock farming in New Zealand is extensive, with low stocking rates and low inputs of fertiliser.

Areas of farms that have a higher risk of contaminant loss are generally erosion-prone landscapes, critical source areas and unprotected stream banks. Higher risk activities can include winter cultivation, intensive winter grazing, intensive stocking of cattle, and access of intensive stock to waterways.

These risks can be managed in a myriad of ways and actions need to be tailored to the farm and catchment context.[1]

Background to the NPS-FM attribute states

The NPS-FM[2] provides regional councils with direction on how they should manage freshwater under the RMA. Under the NPS-FM regional councils must set water quality targets and limits with associated timeframes and rules to meet the community's 'vision' and values for freshwater.

The NPS-FM framework also stipulates national bottom lines and targets for attributes (characteristics you can measure in the water that affect those community values) such as suspended fine sediment and *E. coli* (among others) that regional councils must meet.

Potential impacts of contaminants are reflected by bands from A-D indicating excellent through to poor in-stream contaminant levels. Regional councils then must set rules and limits on resource use and activities, such as farming, irrespective of the social or economic cost or community's wishes, in order to achieve the NBLs.

Regional councils around the country are in the process of updating their regional plans to give effect to the current NPS-FM, with some formally notifying their plan changes this year. Regions where processes are continuing with pace include Greater Wellington, Otago, Tasman, Canterbury, Southland, Taranaki, and Bay of Plenty.

Independent review

As a result of concerns about the achievability of some of the NBLs and targets identified though preliminary analysis conducted as part of our regional plan work, B+LNZ commissioned an independent review by Dr Michael Greer, Torlesse Environmental Ltd (Torlesse).

The reviewer was asked to examine:

- how the NPS-FM NBLs for suspended fine sediment, and target attribute states for *E. coli* and phosphorus were developed/determined, and
- what the impacts would be on the sheep and beef sector to try and meet them.

Torlesse's report was peer-reviewed by Dr Duncan Gray[3] who conducted a full editorial and technical review of the report.

Findings of the independent review

Torlesse reviewed the relevant scientific literature relating to suspended fine sediment, *E. coli* and phosphorus, and the documentation surrounding the development of the corresponding targets.

The results of this independent review found serious issues with the process used to develop the suspended fine sediment NBLs and *E. coli* target attribute states and highlight significant challenges to meet them.

The same models used by the Government in the Essential Freshwater process for the development of the suspended fine sediment NBLs were interrogated to determine the impact of on-farm mitigations on sediment loss in order to assess the ability of sheep and beef farms to meet the suspended fine sediment NBLs.

This methodology is available to, and being used by, regional councils to estimate the actions that may be required to meet the NBLs and to develop their updated freshwater regional plans to give effect to the NPS-FM.

[1] https://beeflambnz.com/knowledge-hub/environmental-management/managing-stock-near-water
[2] National Policy Statement for Freshwater Management 2020
https://environment.govt.nz/assets/publications/National-Policy-Statement-for-Freshwater-Management-2020.pdf
[3] Dr Duncan Gray is a freshwater ecologist with 20 years' experience in the public and private sector. His areas of expertise include flow and allocation reviews for regional councils, mine impacted streams, braided rivers, fish and macroinvertebrate surveys and monitoring program design.

Suspended fine sediment

Setting of the suspended fine sediment attribute states:

The suspended fine sediment attribute in Table 8 of the NPS-FM sets a four-band (A-D) framework for visual clarity (how far the human eye can see in water) that applies differently to rivers that fall within each of four sediment classes[4]. See Appendix 1.

Multiple issues were identified in the methodological framework that was used to set the suspended fine sediment NBLs:

1. A new methodology which modelled the impact of suspended fine sediment on fish abundance was developed to create the NBLs. Torlesse identified five key flaws for its use as a framework for managing the impact of sediment on instream flora and fauna:
   a. The NBLs for suspended fine sediment are presented in the NPS-FM as being set at a level below which "sensitive macroinvertebrate species are lost or at high risk of being lost". However, the reviewer found it is in fact based on a limited number of fish with no reference to "sensitive macroinvertebrate(s)".
   b. The sediment—fish relationship used to establish the NBLs is based on recent modelled sediment data (not measured data) paired with fish abundance surveys from a different time period (1970s onwards).
   c. The relationship model has a significant amount of uncertainty. There may only be a 50 percent probability that the paired estimate of visual clarity was within ± 25 percent of what actually occurred. This means that a fish site modelled to be in the B band was more likely than not to be in either the A, C or D band.
   d. The NBLs are linked to approximately 10 percent of the diversity of New Zealand fish species (including brown trout). Thus, they were developed to protect a very small number of fish species from the adverse effects of suspended fine sediment, rather than ecosystem health.
   e. The NBLs do not adequately account for natural variability.
2. In addition, this is a new metric for setting target attribute states for fish that is different to the metric regional councils must use when setting target attribute states for fish. This is a novel indicator that was made solely for the purpose of developing NBLs for the NPS-FM.
3. Torlesse reviewed published literature (including by Our Land and Water[5]) and also found that water coming from areas of native vegetation (natural state) is often unable to meet the suspended fine sediment NBLs. See page 7 of the Torlesse review.
4. The research reviewed estimates that approximately **20 percent of rivers currently in natural state catchments do not meet the suspended fine sediment NBLs[6]**. This means target attribute states do not accurately account for natural variability/natural state and will be unachievable in many rivers. The research reviewed also estimated **around 38 percent of all waterways could not meet the NBLs even if developed catchments were reverted back to their natural state[7].**

It is important to acknowledge that these limitations or caveats were discussed by the authors of the technical reports behind the suspended fine sediment attribute. However, their caveats were not reflected by MfE and the Government's Science and Technical Advisory Group in their work to set the bottom lines.

Impact of meeting the suspended fine sediment NBLs on sheep and beef farms:

Torlesse took the same models available to or used by MfE during the draft phase of the NPS-FM[8] to assess the impact of the suspended fine sediment attribute states and applied these to the 500 actual sheep and beef farms that make up the B+LNZ Sheep and Beef Farm Survey which are statistically representative of all sheep and beef farms in New Zealand[9]. GIS maps for each farm were used to accurately measure stream lengths, slope and soils, and therefore sediment loss risk on those farms.

Many regional councils are also using the model used by MfE to determine what mitigations need to be included in their regional plans to meet the suspended fine sediment NBLs. The mitigations modelled by Torlesse were:

1. riparian margin retirement and stock exclusion of rivers
2. pole planting on class 6e, 7e, 8e land
3. retirement of Class 6e, 7e, 8e land.

The mitigations were applied to each farm where catchment water quality did not meet the suspended fine sediment NBLs, starting with riparian margin retirement. If the model showed the catchment still didn't meet the suspended fine sediment NBL then the second mitigation was applied, and so on.

The results show, extrapolated to a national level, that:

- 44 percent of sheep and beef farmland would likely need to be retired
- a further 8 percent of the remaining farm area would require pole planted trees
- nearly 13,000km of fencing could be required nationwide[10]
- in more than 50 percent of catchments that are already non-compliant with the NBLs, even if these measures were taken, the NBLs for suspended fine sediment would still not be met.

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[4]The class framework is intended to account for the natural variability between rivers with different climates, source of flow and catchment geology.
[5]Snelder, T., Smith, H., Plew, D., Fraser, C., 2023. Nitrogen, phosphorus, sediment and *Escherichia coli* in New Zealand's aquatic receiving environments Comparison of current state to national bottom lines. Pg 85-88. Our Land & Water Science Challenge (OLW) shows that the water coming out of areas in their natural state (e.g. Southern Alps) are exceeding the NBL for suspended fine sediment by between 5 and 50+ %. Large areas of the North Island which are pre-dominantly national parks are exceeding suspended fine sediment NBL targets by more than 50%. Overall, OLW identified that sediment loads would need to be reduced by [33]% nationally to meet the suspended fine sediment NBLs.
[6]McDowell, R.W., Snelder, T.H., Cox, N., Booker, D.J., Wilcock, R.J., 2013. Establishment of reference or baseline conditions of chemical indicators in New Zealand streams and rivers relative to present conditions. Marine and Freshwater Research 64, 387–400.
Whitehead, A., Fraser, C., Snelder, T.H., Walter, K., Woodward, S., Zammit, C., 2022. Water quality state and trends in New Zealand Rivers: Analyses of national data ending in 2020 (NIWA Client Report No. 2021296CH). NIWA, Christchurch, New Zealand.
[7]McDowell *et al*., 2013
[8]See page 13 of Torlesse review.
[9]Beef + Lamb New Zealand Economic Survey farm dataset.
[10]Assuming the B+LNZ Economic Farm Dataset farms, which are an extensive and representative sample of sheep and beef farms in NZ, are also representative of the river network throughout farms.

E. coli

Setting of the* E. coli *attribute state:

The current *E. coli* human contact targets in Table 9 of the NPS-FM require regional councils to include the 95th percentile statistic data[11], including those collected during heavy rainfall (e.g. storms) and high flow events. These events do generally cause greater runoff and therefore *E. coli* losses, however *E. coli* losses cannot be as effectively mitigated during heavy rainfall and there is little health risk to recreational users given swimming is generally unsafe in flood conditions due to high flows.

By not allowing regional councils to remove the 95th percentile data points from their calculations it is difficult to make the required improvement from one band to the next without reducing stock numbers.

While current mitigations such as riparian management, buffer zones and excluding stock from waterways have been shown to be successful most of the time, they are unable to effectively reduce losses via overland flow pathways during storm events. This issue will become exacerbated by the effects of climate change with more frequent and intense rain events predicated in parts of the country.

A second issue is the requirement of regional councils to set targets for *E. coli* at least one state higher than the baseline state. This means if a waterway is currently in D band they have to move to a C (fair) band, C band to a B band (good), and B band to an A band (excellent).

Because most mitigations are less effective during high flow from heavy rainfall events, and the analysis must include samples from high flow events, it can be very difficult to improve from one band to another.

In addition, Table 9 of the NPS-FM requires all waterways to meet the human contact targets regardless of whether they are used for recreational purposes or not[12]. Some rivers are unsuitable for swimming due to access, aesthetics, or dangers, regardless of *E. coli* levels.

Impact of meeting the 95th percentile* E. coli *target attribute state on sheep and beef farms:

The review notes the scientific literature indicates there is limited potential to mitigate *E. coli* losses from sheep and beef farms through methods other than stock exclusion and/or destocking. While stock exclusion is effective at reducing *E. coli* levels in rivers during base/low flows it is far less effective during high rainfall.

Our Land & Water Science Challenge data shows that waterbodies in the majority of the North Island, including National Parks, exceed the human contact target states for *E. coli* by between 50 and 100 percent and on average would need to reduce by 73 percent nationally to achieve the targets. The same paper notes that:

> *the national bottom line for E. coli is a very ambitious target because the ability to reduce E. coli loads from catchments with large areas of non-productive land is negligible.*[13]

To achieve the reductions required in all rivers would mean significant destocking of farm animals across New Zealand as well as other significant measures such as addressing feral animals in the DoC estate, addressing impacts of birdlife, and significant upgrades to human wastewater processes.

[11] If the data requirements are met (monthly measurements over 5 years = 60 measurements) then if the number between the 3rd and 4th highest measurement is over the threshold it will fail. See page 17 of the Torlesse review.
[12] This is in comparison to Table 22 of the NPS-FM which is specific to popular primary contact sites during summer months only. Please note that B+LNZ is not suggesting any changes to Table 22.
[13] Snelder *et al.* 2023. Pg 78-81 and 98.

Phosphorus

Setting of the phosphorus attribute state:

The phosphorus management framework of the NPS-FM requires regional councils to set:

- nutrient outcomes (NOs) for phosphorus in rivers
- target attribute states (TASs) for dissolved reactive phosphorus (DRP) in rivers
- TASs for periphyton (algae) in rivers
- TASs for total phosphorus (TP) in lakes
- TASs for phytoplankton (algae) in lakes
- limits to achieve the phosphorus NOs and the TASs for periphyton (rivers), TP (lakes) and phytoplankton (lakes)
- action plans to achieve the DRP TASs for rivers.

The review concluded that from a scientific perspective, this is a sensible method for managing phosphorus. The periphyton, TP and phytoplankton attribute state frameworks are all well established and based on commonly used and accepted guideline values. Furthermore, a national approach has been developed for setting phosphorus NOs to achieve various periphyton attribute states.

Impact of meeting the phosphorus NBL on sheep and beef farms:

There is a risk to the sheep and beef sector arising from the potential for regional councils to set nutrient outcomes and associated limits to achieve the target states for attributes other than periphyton. The review also noted that the DRP attribute state framework is not fit for this purpose.

Setting phosphorus NOs in rivers to achieve TASs for non-periphyton attributes (e.g. macroinvertebrate community health) is unnecessary, as in most rivers the primary mechanism through which phosphorus affects such attributes is indirectly through periphyton growth.

B+LNZ analysis of the economic and social impacts of meeting the suspended fine sediment NBL

B+LNZ calculated the economic impacts of the mitigations identified by the Torlesse review that would be needed to achieve the NPS-FM suspended fine sediment NBLs.

We focused on calculating the impacts of meeting the suspended fine sediment NBLs alone, given the lack of effective mitigations to reduce *E. coli* beyond stock exclusion and/or destocking.

However, we also acknowledge while the phosphorus framework is relatively sound, there may still be catchments or areas that require a reduction in phosphorus and how far and fast that reduction occurs must be decided by communities that are fully aware of the associated costs and benefits.

Expanding from the modelling done above, following are the costs of mitigation actions required to attempt to meet the suspended fine sediment NBLs:

1. Retirement of 44 percent of sheep and beef land is expected to result in a similar reduction in sheep and beef production which equates to $3.9 billion[14] per year loss in export earnings.
2. Pole planting on 8 percent of remaining sheep and beef land could cost around $409 million assuming a cost of $1,250/ha[15].
3. Fencing of an additional 13,000km of waterways (assuming all the fencing to meet the stock exclusion regulations has occurred) would cost $980 million assuming $24/m for fencing, a 5-metre setback with associated riparian planting cost and the net present value (NPV) opportunity cost of the riparian area. On top of this cost would be other costs such as the cost of reticulation of stock drinking water, pest and weed control costs, maintenance costs etc which is not included in this calculation.

The potential $3.9 billion loss in annual export earnings from sheep meat and beef is more than double the annual value of wine exports, more than double the value of fish exports and is a 14 percent reduction in total pastoral exports.[16]

In addition, the likely flow-on effects of this scale of reduction in sheep meat and beef production would be the closure of associated businesses such as meat processing works, sale yards and farm supply and servicing businesses. A significant overall reduction in jobs in rural areas would also be seen, resulting in the relocation of families out of rural communities, closure of rural schools, rural businesses, community groups and sports clubs, to name a few.

[14]Average of the last 6 years export earnings
[15]https://waikatoriver.org.nz/wp-content/uploads/2020/04/Standard-Costs-and-Assumptions.pdf
[16]Statistics New Zealand https://www.stats.govt.nz

Policy implications

The review shows that while sediment and *E. coli* losses from pastoral farms are issues that need to be managed, the current approach is unachievable both from a technical and economic point of view and needs to be fundamentally revised.

With regard to the suspended fine sediment and *E. coli* target attribute states not taking account of background levels and rivers in their native state not meeting targets, clause 3.32 of the NPS-FM allows for non-compliance due to "naturally occurring processes" such as glacial flour and naturally highly coloured brown-water streams.

However, this doesn't go far enough to address the full extent of naturally occurring sediment and *E. coli* loss from native catchments, such as the Southern Alps and in national parks.

If up to nearly 40 percent of rivers where a developed catchment is reverted back to a natural state may not meet the suspended fine sediment national bottom lines, then it is clear that the NBLs are wrongly calibrated and do not adequately account for natural background levels and go far beyond what the is the NPS-FM is actually trying to achieve.

Further, from a practical sense, clause 3.32 has not been utilised to date to adequately account for such high levels of naturally occurring suspended fine sediment or *E. coli* levels.

Any instream water quality targets must be based on real world measured data and be appropriate, reasonable and achievable. Because the suspended fine sediment NBLs were developed using modelled data with a high level of uncertainty the NBLs do not accurately reflect background levels of contaminants. Urgent investment in more water quality monitoring sites is needed, to help ensure that targets are based on spatially and temporally robust data that is relevant to individual catchments. This is supported by recent comments by the Parliamentary Commissioner for the Environment.[17]

B+LNZ supports the Government's extension out to the end of 2027 for regional councils to notify their freshwater plan changes which need to give effect to the NPS-FM, and the Government's intention to review the NPS-FM within this timeframe.

The issue, however, is that many regional councils are still proceeding with their freshwater planning processes to give effect to the current NPS-FM policy settings. Greater Wellington, Otago, Tasman, Canterbury, Southland, Taranaki, and Bay of Plenty are still proceeding with their planning processes having either already notified a plan change, or have notification scheduled before the end of 2024, or mid-end of 2025.

Given the fundamental flaws with the suspended fine sediment attribute and 95th percentile *E. coli* targets urgent changes are needed to the NPS-FM, so that regional councils stop seeking to apply these targets until a new fit for purpose framework is in place.

B+LNZ's view is that the simplest way to fix the issue is to remove Table 8 - the suspended fine sediment attribute and the 95th percentile *E. coli* attribute state in Table 9 from the NPS-FM.

This would be an interim measure while urgent work is undertaken on the revised NPS-FM.

As the NPS-FM is reviewed and revised, B+LNZ believes a community-driven, targeted, and risk-based approach is needed. Every river is different and will respond differently to different actions (e.g. lag times), therefore we do not believe one-size-fits-all NBL limits are appropriate for suspended fine sediment.

The following examples illustrate our concerns about some processes that are underway, showing why they should be stopped. This is not an exhaustive list.

Example 1 – Horizons Regional Council: Horizons consulted with the community in late 2023/early 2024 about the modelled scale of reductions required to meet the potential target attribute states to achieve the current NBLs. Their modelling indicates that moderate to large reductions (20-100 percent) of both sediment and *E. coli* would be required across the majority of the region by 2055. This would decimate the region's economy and rural communities, as 44 percent of the land in the region is used for sheep and beef farming. Horizons is working towards notifying this plan change late 2026/early 2027.

Example 2 – Greater Wellington Regional Council: GWRC has already notified its Plan Change 1 to the Natural Resources Plan. They are proposing that all Class 7e and 8e land be retired by 2040 and pole planting be required on 6e land, plus minimum 10m-wide vegetated riparian margins in order to attempt to achieve the NBLs in the Te-Awarua-o-Porirua and Te Whanganui-a-Tara catchments. They are intending to progress further plan changes for the remaining catchments throughout 2024.

The flaws with these bottom lines reinforce the importance of a review of the NPS-FM overall, and a rethink of the approach to all of the national bottom lines.

[17]In the PCE's recent review of freshwater models used to support the regulation and management of water in New Zealand it is noted within the report that "A shortage of data affects models. Without robust data there will be no robust models. Experts within councils generally agree that there is a shortage of data in the form needed for freshwater policy and planning purposes. The view is that, despite some recent improvements, databases within councils are still piecemeal and disconnected." Overall, the PCE report notes that "freshwater modelling in New Zealand is fragmented and under-resourced, under-supported, with many gaps, overlaps, inefficiencies and inconsistencies in modelling between councils."
See https://pce.parliament.nz/our-work/news/health-of-nzs-waterways-requires-improved-freshwater-modelling-support-and-coordination/

Next steps

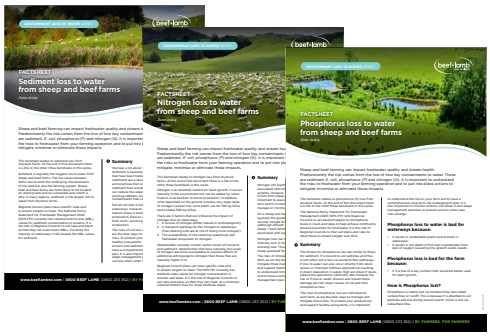
B+LNZ has commissioned a **literature review** to help us understand the gaps in knowledge about sediment loss coming from sheep and beef farms and what other information is needed to develop a more appropriate sediment management framework.

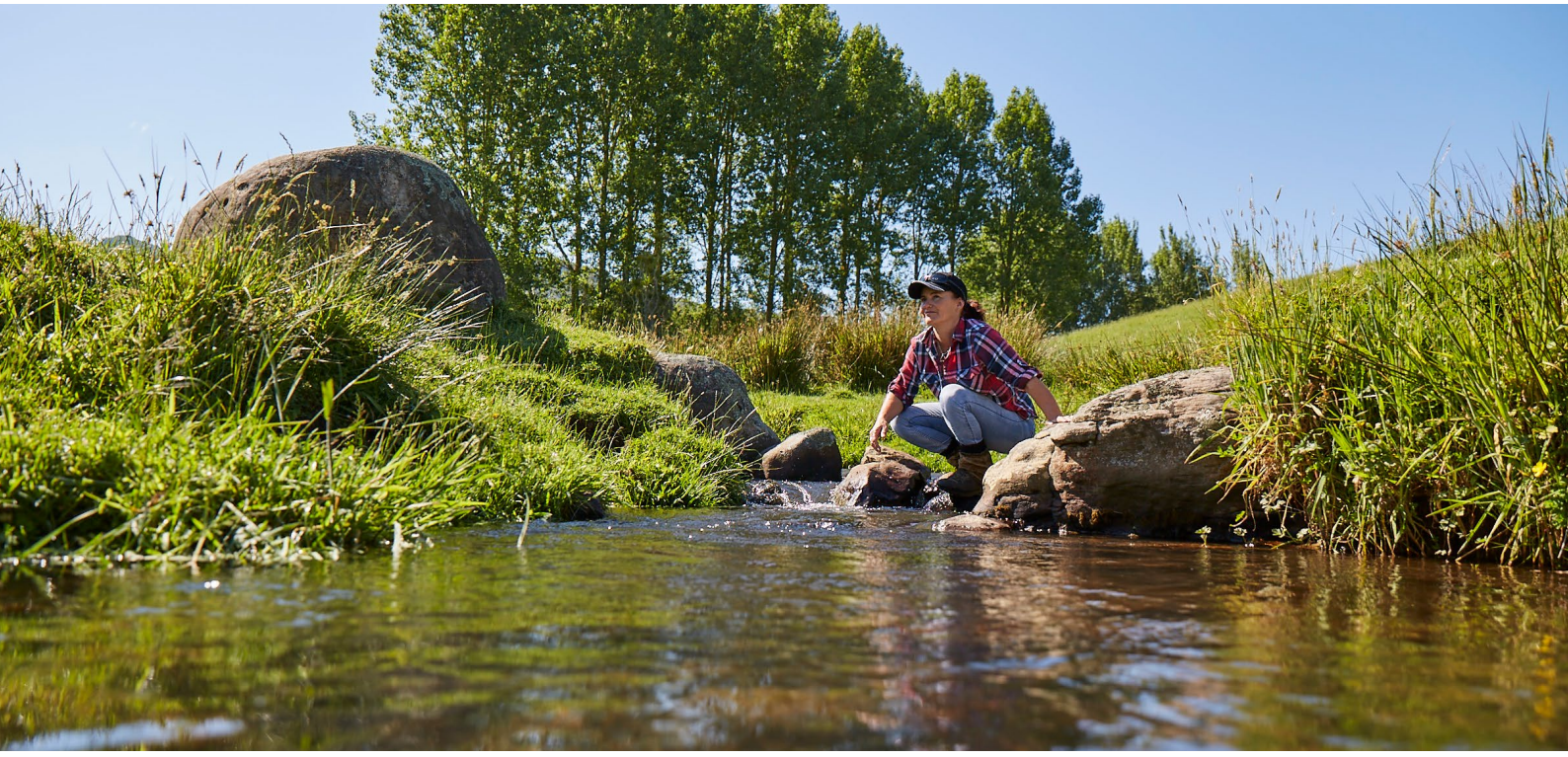
We support **further practical on-farm research** to identify and develop clear solutions for reductions in sediment loss from farms. We have recently developed a Contaminant Loss to Water Series[18] of educational factsheets. These will help farmers understand the risks to freshwater from their farming operation and actions they can put in place to mitigate, minimise or eliminate those risks.

B+LNZ is committed to working alongside farmers, as well as with scientists, catchment groups, other industry bodies and government to collectively build an enduring, robust framework for managing water quality impacts – and ensuring that social, and financial implications are considered.

In the short-term the suspended fine sediment attribute (Table 8) and *E. coli* 95th percentile (Table 9) in the NPS-FM need to be removed so that **regional councils can stop applying these targets and developing associated rules** until an effective framework is in place that will achieve positive environmental outcomes that can be achieved without decimating rural communities.

Alongside this **the Government must review and replace the wider NPS-FM by working with relevant stakeholders** to put in place an enduring framework to make New Zealand's freshwater management system fit for purpose, enabling and empowering communities to make fully informed decisions about what freshwater outcomes are best for them.





[18] https://beeflambnz.com/knowledge-hub/environmental-management/managing-stock-near-water

Appendix 1

The below tables are examples of attribute bands for suspended fine sediment and *E. coli* attributes, taken from the *National Policy Statement for Freshwater Management 2020 Appendix 2A - Attributes requiring limits on resource use and Appendix 2B - Attributes requiring action plans*[19].

Suspended fine sediment attribute bands:

Table 8 – Suspended fine sediment

Value (and component)	Ecosystem health (Water quality)			
Freshwater body type	Rivers			
Attribute unit	Visual clarity (metres)			
Attribute band and description	**Numeric attribute state by suspended sediment class**			
	Median			
	1	2	3	4
A Minimal impact of suspended sediment on instream biota. Ecological communities are similar to those observed in natural reference conditions.	≥1.78	≥0.93	≥2.95	≥1.38
B Low to moderate impact of suspended sediment on instream biota. Abundance of sensitive fish species may be reduced.	<1.78 and ≥1.55	<0.93 and ≥0.76	<2.95 and ≥2.57	<1.38 and ≥1.17
C Moderate to high impact of suspended sediment on instream biota. Sensitive fish species may be lost.	<1.55 and >1.34	<0.76 and >0.61	<2.57 and >2.22	<1.17 and >0.98
National bottom line	**1.34**	**0.61**	**2.22**	**0.98**
D High impact of suspended sediment on instream biota. Ecological communities are significantly altered and sensitive fish and macroinvertebrate species are lost or at high risk of being lost.	<1.34	<0.61	<2.22	<0.98

Based on a monthly monitoring regime where sites are visited on a regular basis regardless of weather and flow conditions. Record length for grading a site based on 5 years.

Councils may monitor turbidity and convert the measures to visual clarity.

See Appendix 2C Tables 23 and 26 for the definition of suspended sediment classes and their composition.

The following are examples of **naturally occurring processes** relevant for suspended sediment:

- naturally highly coloured brown-water streams
- glacial flour affected streams and rivers
- selected lake-fed REC classes (particularly warm climate classes) where low visual clarity may reflect autochthonous phytoplankton production.

[19]National Policy Statement for Freshwater Management 2020 https://environment.govt.nz/assets/publications/National-Policy-Statement-for-Freshwater-Management-2020.pdf

E. coli attribute bands. Applies to all rivers, all year round.

Table 9 – *Escherichia coli* (*E. coli*)

Value	Human contact			
Freshwater body type	Lakes and rivers			
Attribute unit	*E. coli*/100 mL (number of *E. coli* per hundred millilitres)			
Attribute band and description	**Numeric attribute state**			
Description of risk of *Campylobacter* infection (based on *E. coli* indicator)	% exceedances over 540/100 mL	% exceedances over 260/100 mL	Median concentration /100 mL	95th percentile of *E. coli*/100 mL
A (Blue) For at least half the time, the estimated risk is <1 in 1,000 (0.1% risk). The predicted average infection risk is 1%.	<5%	<20%	≤130	≤540
B (Green) For at least half the time, the estimated risk is <1 in 1,000 (0.1% risk). The predicted average infection risk is 2%.	5-10%	20-30%	≤130	≤1000
C (Yellow) For at least half the time, the estimated risk is <1 in 1,000 (0.1% risk). The predicted average infection risk is 3%.	10-20%	20-34%	≤130	≤1200
D (Orange) 20-30% of the time the estimated risk is ≥50 in 1,000 (>5% risk). The predicted average infection risk is >3%.	20-30%	>34%	>130	>1200
E (Red) For more than 30% of the time the estimated risk is ≥50 in 1,000 (>5% risk). The predicted average infection risk is >7%.	>30%	>50%	>260	>1200

Based on a monthly monitoring regime where sites are visited on a regular basis regardless of weather and flow conditions. Record length for grading a site based on 5 years.

Attribute band must be determined by satisfying all four numeric attribute states (ie, all four columns in any one row) or, if that is not possible, according to the worst numeric attribute state.

The predicted average infection risk is the overall average infection to swimmers based on a random exposure on a random day, ignoring any possibility of not swimming during high flows or when a surveillance advisory is in place (assuming that the *E. coli* concentration follows a lognormal distribution). Actual risk will generally be less if a person does not swim during high flows.

E.coli attribute bands. Applies to primary contact sites, during the bathing season (November to March). Please note B+LNZ is not suggesting any changes to Table 22 of the NPS-FM.

Table 22 – *Escherichia coli* (*E. coli*) (primary contact sites)

Value	Human contact
Freshwater body Type	Primary contact sites in lakes and rivers (during the bathing season)
Attribute unit	95th percentile of *E. coli*/100 mL (number of *E. coli* per hundred millilitres)
Attribute band and description	**Numeric attribute state**
Excellent Estimated risk of *Campylobacter* infection has a < 0.1% occurrence, 95% of the time.	≤ 130
Good Estimated risk of *Campylobacter* infection has a 0.1 – 1.0% occurrence, 95% of the time.	> 130 and ≤ 260
Fair Estimated risk of *Campylobacter* infection has a 1 – 5% occurrence, 95% of the time.	> 260 and ≤ 540
National bottom line	**540**
Poor Estimated risk of *Campylobacter* infection has a > 5% occurrence, at least 5% of the time.	> 540
The narrative attribute state description assumes "% of time" equals "% of samples".	