This is a submission regarding the "Clean Water" document suggested by MfE in February 2017.

Dated 20th day of March 2017, in [redacted] by Matthew McGill-Brown (Personal submission).

Employed by the [redacted]. None of the information stated below are the views of the [redacted]---these are my personal views and my employment is only offered as a sign of good faith.

I consent to having my name and submission published online (with the request that my personal details and place of work are blanked out).

[redacted]

I work as a water quality scientist at [redacted] and acknowledge that water quality issues are not *just* the cause of dairy cattle. In our region we only have four producing dairy farms but still have many water quality issues. These issues are caused by intensive land use (incl industry, cropping, horticulture and agriculture). As I was raised on a sheep farm in rural Southland with a mixed variety of land uses (cropping, deer, sheep, beef cattle) surrounding our farm and waterways, I feel that my position can offer a balanced and fair view of farming economically while being environmentally responsible. I make a plea to MfE and central government to assist agricultural practitioners (a term to encompass all type of stock farmers and crop farmers) with fencing and planting. There is no incentive for farmers to fence, why should they change practices of multiple years? Many agricultural practitioners do not even acknowledge the water quality issues that exist, let alone want to help ameliorate them.

This section is in regard to page 11 and reporting water quality against "kilometers of river length"

1) Reporting water quality results and swimability against a per-kilometer measure is not appropriate. Perhaps swimability goals to 2030 and 2040 should be against incidence of time (solely) rather than the "length of stream kilometers". Reasoning for this:
    a. People aren't going to swim in the high alpine catchments. These alpine catchments are represented primarily in Canterbury, Tasman and West Coast---skewing the reality of their bacterial monitoring issues. These alpine catchments are steep and do have great water quality---but they are 1) incredibly inaccessible, 2) cold temperature 3) hundreds to thousands of meters above sea level. People are not going to swim here, so reporting the water quality in kilometers is a purely an attempt to drown out the poor water quality in lowland and impacted areas.
    b. The streams that are red are in lowland and highly impacted areas that cross intensive agriculture, horticulture, cropping and urban land uses. These streams are the ones that are accessible to people, are warm and are deep and easy to swim in (generally). Rather than looking at water quality per km length we should be focusing on the areas where people are <u>actually</u> swimming---which are these lowland, warm (and polluted) streams.
    c. This is incredibly difficult to calculate. We discussed with three other councils and had a cohort of about 10 scientists attempt to calculate our graph based on the new limits (i.e. replicate our regions WQ as set out on pg 9 of the Clean

Water Document). It is impossible to do and at time of writing this document, we did not manage to actually get a tangible result.

This section is in regard to page 19 and the comment: "it is currently unclear how regional councils can demonstrate the water quality will be at least maintained"

1) We have reported in our annual State of the Environment Report how our water quality is tracking against the attribute bands as defined in our regional plan. We have seen that most sites are actually improving or static. Perhaps there could be some guidance or requirement for councils to produce these data sets to prove that they are at least maintaining water quality. This will not be difficult to do. This statement is a cop out.

This section is in regard to page 19 and the requirements to monitor DIN and DRP

1) I agree that there should be some in-stream objectives for DIN and DRP since the NOF Bands include parameters on periphyton and phytoplankton. It makes sense.

This section is in regard to page 20: "economic well-being"

1) This section is a little "fluffy"---what does this actually mean? Is this saying that we can continue to allow industry to discharge and contaminate watercourses because it is economically beneficial? It should be in the best interest of industry to improve water quality as a wise business decision. We should be enforcing this.

This section is in regard to page 20 and the "…set FWO below national bottom line for attributes that are currently below national bottom line and only in the physical area where the infrastructure contributes to the degraded water quality"

1) There should be no allowance for any industry or infrastructure to continue to allow water quality to be compromised or degraded. Improvements to infrastructure should be made if water quality is below the bottom line. There should be no exceptions.
2) Councils will not always use this liberty to their advantage. This can be used as leverage to exclude particular impacted streams from reports or to avoid attempting to improve water quality.

This section is in regard to page 21 and the" coastal lakes and lagoons"

1) There should be more guidance on the brackish/intermittently open sites. I agree that the footnote should be removed.

This section is in regard to page 25, 26 and 27 regarding "keeping stock out of our waterways"

1) It is ignorant to not legislate intensive sheep farming or include it from the stock exclusion list. Intensive cropping must also be managed in an efficient way. Sheep farming is far more prevalent throughout New Zealand than deer and pigs, it is a disappointment to see sheep farming excluded from these measures.
2) To have such low requirements on the exclusion is an embarrassment. Tourists are carted up and down the country, over some large and small streams that have cows and sheep in the river bed. This is a filthy and embarrassing sight that we persist to allow to continue. We get money from tourism and our exports of dairy, wool, lamb etc---which is more sustainable in the long run? The National Government and the Ministry for the Environment need to act as leaders and put more stringent requirements to exclude stock, and quicker.
    a. It takes time for water quality to be ameliorated---having a stock exclusion plan that really gets dairy cows out of streams from July 1 2022 will not allow the water quality targets to be reached by 2030 and 2040.
    b. Fencing excludes direct input of waste to waterways and overland flow runoff, and a fence will not act as a buffer. There should be more guidance on riparian exclusion zones and planting a variety of native shrubs and trees should be mandatory.
    c. 1m is a very small exclusion zone. Mainstream academic research provides evidence showing 1m is ineffective to reducing runoff and absorbing nutrients, and impacts of exclusion are best seen from 3 meters and above. It is understood that some fencing (under Fonterras accord) has already been established, however, there should be a caveat for new fencing as of July 1 2017 to be at a wider exclusion distance. Any fences that need replacing that are currently established at this 1m limit should be replaced to a wider exclusion distance. It is unlikely that there will be any major improvement of water quality from this minimal distance and with no riparian planting noted.
3) There are controls on direct overland flow attempting to be made (i.e. from stock exclusion) but there are also indirect inputs of contaminants and nutrients to our waterways. There should be an attempt for bacteria (depending on the aquifer composition) and nutrients to have limits set on them for surface distribution. The quantity of nutrients that are distributed over the land, as well as the amount of effluent that can be dispersed over pasture for fertiliser should be controlled. If there is easy draining geology underlain the application zone, then perhaps a limit should be set on what quantity of superphosphates, lime, fertilisers and effluent can be applied. This will reduce the bacteria and nutrients reaching the waterways from the subsurface.
4) For streams to be fenced with the caveat of it being "over 1m wide" is a shortsighted comment. The amount of first, second and third order streams that are in steep land that have varying land uses is huge. If a stream is permanently flowing, it should be fenced. This is what the rule should be, not if it is "over 1m wide".
5) Break feeding should be kept well away from waterways, upward of 3m is most effective.

6) Sheep farming should be kept well away from waterways, upward of 3m is most effective.
7) Intensive cropping needs to be included. There should be exclusion of intensive cropping on flood plains and near freshwater environments, upwards of 3m is most effective.

This section is in regard to page 28 and 29 regarding "Stock crossings, water bodies and enforcement"

1) The provisions of stock crossings once a week only for one continuous movement is a step in the right direction but 100% unmanageable. This is a self-policing exercise and perhaps stock crossing should be reconsidered.
    i. Research completed by Lincoln University proved that a cow is 70 times more likely (than any other animal) to urinate and defecate (as a physiological response) when their hoofs touch water. Cows must be excluded from crossing even if it is only once a week. Competent and appropriate culverts must be put in place.
2) There needs to be the inclusion of sheep here too.
3) As previously stated dairy cows on milking platforms and pigs should be excluded before July 1 2020.
4) Although there is a comment about the regional council discretion: there should be more guidance and a requirement to plant this riparian buffer.

This section is in regard to Page 10 of the NPS: Interpretation.

1) I agree with the removal of the term "Secondary Contact"
2) The term "suitable for immersion more often" is a bit "fluffy" Perhaps MfE should consider that people want to swim at their leisure. Especially when reading Policy A5 (a) just say "…whether they are suitable for swimming or not".

This section is in regard to Page 38 and 39 of the NPS: E.Coli limits for recreation in rivers and lakes.

1) Inconsistencies in NOF bandings. Nitrate toxicity, Ammonia toxicity, Periphyton, Nitrogen, Phosphorous, Phytoplankton, Dissolved Oxygen all have consisted A-D grade water attribute states. The addition of an E band for bacterial limits as well as the extension of degradation to 30% of the time is a clear allowance for further pollution. By changing the A-D attribute states from tangible numeric attribute values and changing against a target of 540 E.Coli/100 mL a proportion of time changes the goalposts. Since all other attributes (listed above) are against one numeric value and not a proportion of time, bacteria should be the same. Having inconsistencies between all of these attribute tables shows that this revised document is allowing more degradation in regards to bacterial limits.

   It is to my understanding that there were discussions between MfE and Horizons Regional Council, who managed to sway some change and the extension of these parameters from the A-D to an A-E to make their waters look less red on the maps once they were released. I understand there were also discussions between Auckland Council and MfE as the majority of streams are 3rd order and suffer from

Urban Stream Syndrome. This is nearing collusion and the removal of this band should occur. In no way to I agree with the addition of an extra band, and in no way do I agree with the shifting of the numeric state to be reported to 540 E.Coli/100 mL against a proportion of time. Just because it is "in line with European standards" doesn't make it correct. This is not a "one size fits all" or a "let's just copy the work of other countries" exercise. We need to be realistic about what is achievable by not copying other "standards".

2) The removal of the national bottom line in this attribute table shows further inconsistencies with the other NOF bands. We should be reporting against this bottom line and having a value that we consider unacceptable. By removing this bottom line in the proposed new table shows that we are happy to continue to degrade water quality to a point where it is red, and where the "river or lake is not safe to swim in".

3) I disagree with the shifting of "A" grade water from <260 E.Coli/100 mL to 540 E.Coli 100 mL 5% of the time **as well as** all other subsequent bands. We should retain the numeric attributes that are reported against the A-D range bands, especially working to the Annual Median value. We should retain a minimum bottom line for bacteria.

4) Where the Narrative Attribute states notes "The estimated risk is less than 50 cases in every 1,000 exposures" there should be more definitive numbers placed against the C, D, and E bands. It is clear that in the B grade it states "likely higher than 50 cases in every 1,000 exposures" but it is very non-specific in how high the likelihood of getting sick is, especially when it gets to the E band and it does not actually give an example of how many cases in 1,000. By not stating what the predicted case exposure is, shows that MfE is hiding something. By using and disclosing a "predicted" number of exposures will show that it is not a confirmed sickness level, and shows that there is some attempt at informing the public.

5) It is not acceptable for us to be say "the river or lake is not safe to swim in" (pg 39, "Red Band: E). We should be aiming for a higher standard of swimability. This needs some defined risk i.e. how many cases in 1,000 exposures will get sick---if this band is to remain.

6) I approve of the Note at the bottom of the E.Coli table that says it should be 100 samples at a minimum and at a 10 year maximum range. This is an achievable and realistic goal. There could even be a reduction of the 10 year time frame to 5 years. Most SOE and Recreational monitoring sites will be monitored more than this anyway.

This section is in regard to page 43 of the NPS, Appendix 5: Monitoring methodologies for Policy CB1.

1) "At least weekly" is pretty clear---a sample per week. What happens if there is a sample taken on Monday of Week 1 and Friday of Week 2. This is technically 11 days between samples. Perhaps a numeric value of "at least weekly but no more than 7 days apart" would be helpful. By being perhaps 11 days apart could introduce sampling bias towards good weather to improve the WQ results.

2) Daily sample after an exceedance is prudent. I think this is a good rule for recreational sites that are defined in the Regional Plan. However, there are some sites that are likely to exceed 260 E.Coli/100 mL on a regular basis. In our region there are sites with permanent signage that constantly exceed the current recreation limits.

3) "…Notify the public that the site is unsuitable for recreation": more guidance is needed. Is it acceptable for the authority to publish data on LAWA or their website that shows there is an exceedance? Or is it expected that a sign would be put up at a site when it exceeds recreational guidelines? What happens with sites that have current permanent signage---must we put an exceedance sign next to the permeant sign?

4) There needs to be definition of how often sampling is undertaken. It is not clear if monthly samples are adequate or if it is weekly sampling that is required. More guidance will be required. At this rate we will need to add an extra 8 sites that we do not currently monitor to our (potentially) weekly regime. This is a very time consuming and resource-heavy requirement.

5) In Appendix 5 there is the reference to <260 E.Coli/100mL ---but the NOF Bands on page 39 refers to 540 E.Coli/100mL. These inconsistencies are confusing and need revised. It is clear from my submission that the 540 E.Coli/100mL limit should be ignored and that the <260 E.Coli/100mL value should be retained.