



Forest & Bird

TE REO O TE TAIAO | *Giving Nature a Voice*

National Office
205 Victoria Street
PO Box 631, Wellington 6140
New Zealand

P: +64 4 385 7374
www.forestandbird.org.nz

NPS-FM Clean Water Consultation April 2017
Ministry for the Environment
PO Box 10362
Wellington 6143

watercomments@mfe.govt.nz

Submission by:
Forest & Bird
205 Victoria Street
Wellington 6011

SUBMISSION ON CLEAN WATER DISCUSSION DOCUMENT INCLUDING TO NATIONAL POLICY STATEMENT ON FRESHWATER MANAGEMENT

1. New Zealand's freshwater ecosystems are in crisis. The primary cause is intensification of land use associated with dairy farming. This is a critical issue for all New Zealanders.
2. Over a prolonged period, the Government has failed to take the steps necessary to avert the freshwater crisis, instead actively promoting dairy farming and subsidising land use intensification through irrigation. This has resulted in deteriorating water quality throughout New Zealand and the loss of native species.
3. The situation is reflected in the National Policy Statement on Freshwater Management (NPS-FM), which sets bottom lines at levels toxic to aquatic life. These bottom lines have been incorporated into regional plans, notably on the Canterbury Plains, leaving little prospect that water quality in rivers like the Selwyn will ever return to ecological health.
4. These issues were brought into sharp focus by the recent report from the Prime Minister's Chief Science Advisor, Professor Sir Peter Gluckman, titled "*New Zealand's fresh waters: Values, state, trends and human impacts*". Forest & Bird agrees with Sir Peter that rivers are under stress, and changes are required that will not be cost-free. As Sir Peter puts it "*potentially contentious and very challenging decisions will be needed*".
5. Unfortunately, the Government has shied away from making the challenging decisions needed to avert the freshwater crisis. Instead, it has chosen to lower

swimmability standards, and the background report¹ to the “Clean Water” package expressly refers to “*lowering expectations of improvement*” in freshwater. The Government’s unwillingness to make the very challenging decisions needed is evident from its ongoing \$480 million package² to support the irrigation schemes that allow for land use intensification, particularly dairy farming - the primary cause of the current freshwater crisis.

6. The Clean Water package sets the goal of having “90% of “*large rivers and lakes*” swimmable by 2040”. While this sounds laudable, it misrepresents what is proposed. The goal relates only to “large rivers and lakes”, and is not incorporated in the NPS-FM, which seeks only to have “*water in large rivers and lakes suitable for immersion more often.*” This is hardly a lofty objective given, the current degraded state of our freshwater. The “90% swimmable by 2040” goal must be incorporated into the NPS-FM, and therefore into law. It is critical that legal standing is utilised to impress the urgency and significance of implementation at a regional level.
7. Another key issue for Forest & Bird is the Government’s failure to:
 - a. keep promises made in relation to dissolved inorganic nitrogen (DIN) and the macroinvertebrate community index (MCI);
 - b. follow the consensus recommendations by the Land and Water Forum (LAWF). This failure was the key reason that Forest & Bird left LAWF.
8. Forest & Bird seeks that the Government keep the promises it has made and, at the very least, follow the LAWF recommendations in relation to DIN and MCI. Accepting recommendations made by consensus under the LAWF process is hardly contentious or challenging.
9. It is critical that the NPS-FM provide for both human and ecological health. Simply providing for swimmability measured by *E.coli*, does not ensure our freshwater ecosystems will also be healthy.

SUMMARY OF KEY POINTS OF CONCERN

10. Forest & Bird’s key issues of concern, and desired outcomes regarding the Clean Water consultation document, including the proposed amendments to the NPS-FM (the consultation document) are set out below.
 - a. The LAWF recommended MCI should be made a mandatory monitoring measure of water quality with a bottom line of more than 80, with clear requirements for actions to be taken when waterways were below the bottom line, or monitoring showed a declining trend in MCI, regardless of whether the MCI was above the aforementioned threshold. Forest & Bird acknowledge this recommendation but consider more should be done and that it would be appropriate for MCI to be a NOF attribute with a bottom line of at least 90.

¹ Prepared under section 32 of the RMA

² Irrigation Acceleration Fund

- b. The NPS-FM does not appropriately provide for ecological health, as recommended by the LAWF. We seek that the LAWF recommendations regarding DIN and DRP (dissolved reactive phosphorus) are incorporated as attributes into the NPS-FM Appendix 2, with bottom lines.
- c. Forest & Bird has other concerns with the swimmable target:
 - i. It is not part of the NPS-FM (we seek it be incorporated into the NPS-FM);
 - ii. it only applies to “large rivers and lakes” (we seek it be applied to all water bodies); and
 - iii. the target is applied nationally, not regionally (we seek it be applied regionally);
- d. the proposed threshold for *E.coli* (the swimmability targets) in Appendix 2 is inadequate.
- e. Forest & Bird opposes the inclusion of all additional provisions for “economic well-being.”

CONTEXT

New Zealand’s freshwater ecosystems are in crisis.

10. The OECD’s country report on the state of New Zealand’s environment, released in March, states that “New Zealand species extinction rate is among the highest in the world” and, more specifically, that New Zealand “has some of the highest levels of threatened freshwater species in the world” and that “deteriorating water quality remains one of [its] biggest threats to native freshwater species.”³ With 90% of wetlands lost, and surface and ground water volumes being rapidly depleted, the habitat of these freshwater ecosystems is seriously under threat.⁴

New Zealand water quality has been declining for decades.

11. The National Institute of Water and Atmospheric Research (NIWA) stated in 1993 that “agriculturally developed catchments” were in “poor condition,”⁵ and the Parliamentary Commission for the Environment (PCE) said it again in both 2013 and 2017, stating in the most recent report that quantity and quality of water bodies in New Zealand are generally in decline especially in lowland areas.⁶

³ http://www.keepeek.com/Digital-Asset-Management/oecd/environment/oecd-environmental-performance-reviews-new-zealand-2017_9789264268203-en#page38

⁴ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf>

⁵ Smith, CM; Wilcock, RL; Vant, WN; Smith, DG; Cooper, AB (April 1993). "Freshwater quality in New Zealand and the influence of forestry, population driven land subdivision horticulture and large scale pastoral land uses such as agriculture". *Consultancy Report No. MAF056*. National Institute of Water and Atmospheric Research.

⁶ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf> (xxix, Table 1)

12. Furthermore, the time span that water quality has been in decline is evident by “lag effects ... such that in some areas we are now seeing effects of inputs into waterways that occurred years and even decades ago.”⁷
13. A 2015 study by GNS found that the state of groundwater had not improved in the previous two decades, and that most monitored sites (62%) don’t meet the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) values for ecosystem health, and 9% exceeded toxicity levels.⁸ Despite these findings, the Government lacks any sense of urgency to address the root causes of decline, and has done little to mitigate any of the damage caused.

BOTTOM LINES FOR MCI NEEDED

14. Ecological health measured with MCI would take into account the species present, their available habitat and, by effect, the impact of surrounding land uses.
15. At the request of the Ministers Hon Dr Nick Smith and Hon Nathan Guy, the LAWF carefully considered whether MCI should be included as an attribute. In relation to MCI the LAWF made a number of recommendations to ensure ecological health is achieved, including:
 - a. The adoption of MCI as a mandatory measure of water quality;
 - b. the value of MCI=80 as the national bottom line threshold; and
 - c. the MCI guidance table confirmed and clarified the actions required if:
 - i. an MCI was below 80 due to human impacts, and
 - ii. when monitoring shows there is a downwards trend in the MCI while still above 80.
16. This recommendation was not adopted by the Government. Instead the government has proposed a minor amendment to the NPS-FM that only requires regional councils to monitor MCI and provides no guidance for action.⁹
17. Forest & Bird considers that the minor amendment is inadequate.
18. Forest & Bird acknowledge the LAWF recommendation but consider that more should be done and it would be appropriate for MCI to be incorporated into the NOF as a full attribute with associated A/B, B/C and C/D threshold values of 119, 100, and

⁷ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf>

⁸ <http://www.stats.govt.nz/~media/Statistics/Sub-sites/EnvironmentalIndicators/PDFs/Update%20of%20National%20GW%20Quality%20State%20and%20Trends.pdf>

⁹ Policy CB1(aa)(ii)

80 respectively. Scientific findings that have been validated over the past 25 years in both New Zealand and the United States have adopted the following categories:¹⁰

- a. >119 excellent or clean water;
- b. 100- 119 good or possible mild pollution;
- c. 80-99 fair or probably moderate pollution;
- d. <80 is poor or probable severe pollution.

19. According to Death et al., once a river hits the MCI=80 value, which represents the threshold between severe and moderate pollution:

“the ecological health is at the bottom line condition” [and] is relatively unaffected no matter how many more nutrients are added. This suggests the bottom line for MCI ... may be better at a slightly higher level (e.g. 90).”¹¹

20. In that regard, Forest & Bird finds MCI=80 an inappropriate threshold for ecosystem health. Forest & Bird recommends that the bottom-line threshold for MCI is set at 90.

ECOLOGICAL HEALTH – NITRATE, DIN AND DRP

21. Forest & Bird has long been concerned that some bottom lines, particularly nitrate, have been set at levels which are toxic to fish. These levels reflect ecological collapse as a threshold for acceptable water quality. Of particular concern is that regional plans have been setting limits at the bottom lines, most notably in spring-fed rivers on the Canterbury Plains. The affect of this is that these rivers have no chance of ever providing healthy ecosystems.

22. Forest & Bird had understood that the NPS-FM provided for ecological health. This seemed to be confirmed in correspondence with the Environment Minister, Dr Nick Smith, when he advised Forest & Bird in a letter dated 26 November 2015 that:

The purpose of the NOF is to provide for human and ecosystem health or life supporting capacity in accordance with the NPS.

I reiterate that the purpose of the regime is to achieve life supporting capacity by limiting dissolved inorganic nitrogen (DIN) as a nutrient.

23. In relation to DIN and DRP, LAWF recommended that the NPS-FM include:

- a. mandatory adoption of a decision support tool based on one developed by LAWF; and

¹⁰ Stark JD, Maxted JR 2007. A user guide for macroinvertebrate Community Index. Prepared for the Ministry for the Environment. Cawthron Report No. 1166. page 11 of 58.

¹¹ Death, Russell G., Corina J. Jordan, Regina Magierowski, Jonathan D. Tonkin, and Adam Canning. Clean but Not Green: A Weight of Evidence Approach or Setting Nutrient Criteria in New Zealand Rivers. Rep. N.p.: Massey U, n.d. Print. Page 16.

- b. the development of a multi-variate look-up table for DIN and DRP concentrations.¹²
24. These recommendations were not adopted in the government's current proposals.
25. The only change appears in a 'note' to the periphyton attribute table. This is unclear in its meaning and, on the face of it, appears inconsistent with the LAWF recommendation. A clear direction has not been sent to councils on how to set DIN and DRP limits to achieve ecological health.
26. Forest & Bird considers that the note does not go far enough and seeks that:
- a. LAWF recommendations are adopted for DIN and DRP; and
 - b. changes be made to the thresholds for nitrate to ensure that ecological health is provided for.
27. In relation to nitrate, leading scientist Professor Russell G. Death recommends nitrate levels for ecological health an order of magnitude less than what is considered acceptable in the current NPS-FM 2014. The A/B, B/C, and C/D threshold values associated with the NPS-FM 2014 attribute nitrate (mg/l) (annual median) are 1.0, 2.4, and 6.9. It has been recommended by Death et al. that the following values of nitrate 0.08, 0.39 and 1.33 are more appropriate for achieving ecological health using a weight-of-evidence approach.¹³ The lower threshold C/D is more than 5-times greater than what is recommended by top freshwater scientists in New Zealand.
28. Forest & Bird asks that the existing threshold values be amended to provide for ecological health. Without bold steps such as this, there is little hope that the water quality crisis will be resolved.

SWIMMABILITY AND STOCK EXCLUSION TIMEFRAMES

29. The target for swimmability is "90% of New Zealand rivers and lakes swimmable by 2040".¹⁴ The target for stock exclusion on page 25 of the same document is making "compulsory stock exclusion ... on a staggered basis through to 2030".
30. Forest & Bird considers these timeframes are too long.

Swimmability

31. Forest & Bird seeks that the final target for swimmability is brought forward to 2030.

¹² Logan, Hugh, Chair of the Land and Water Forum. "Requested Advice for the NPS-FM." Letter to Minister for the Environment Hon Dr Nick Smith and Minister for Primary Industries Hon Nathan Guy. 19 Aug. 2016. MS. Wellington, New Zealand. pages 4-5.

¹³ Dr Russell Death et al. "Clean not green: a weight-of-evidence approach for setting nutrient criteria in New Zealand rivers"

¹⁴ Page 8

32. The consultation document claims that currently, 72% of New Zealand rivers are already of a calibre that is 'swimmable,' in which case reducing *E. coli* levels on an additional 18% nationally on a small sample of the country's total rivers and lakes should be easily obtainable by 2030. This would show the Government is serious about prioritising improvements in freshwater quality and it would send a message of urgency to regional councils.

Stock Exclusion

33. Forest & Bird would like to see more ambitious deadlines for stock exclusion from streams, rivers, lakes and wetlands that are more than 1 metre wide. Forest & Bird seeks that the 2022 deadlines be brought forward to 2020 and the 2030 deadlines to 2025.

34. Forest & Bird also recommends creating zones of urgency, where the Freshwater Management Units (FMU), that are in a poor state due to stock intrusion, are prioritised and therefore fenced first.

OTHER CONCERNS ABOUT SWIMMABILITY TARGET

35. Forest & Bird has three other concerns about the swimmability target, namely that it:

- a. is non-regulatory;
- b. applies only to "large rivers and lakes"; and
- c. is national not regional.

Non-regulatory nature of swimmability target

36. The swimmability target is outside the NPS-FM and is not legally binding. It is proposed that the NPS-FM is amended to include provisions that "large rivers and lakes" are suitable for immersion more often. This is a low bar, given the current degraded state of our freshwater.

37. When compared to the 90% of large rivers and lakes swimmable by 2040, the much lower standard proposed for the NPS-FM signals that the Government does not think the swimmability targets will be met, and has provided for a much lower regulatory target. This leads to the suspicion that the swimmability target is simply an attempt to look like something is being done to address the freshwater crisis, but in fact "business as usual" can carry on. This implies an unwillingness to face the very challenging decisions that need to be made.

38. Creating an aspirational target does not provide the necessary mechanisms for change that a legally binding target would. A legally binding target would institute a

mechanism for real accountability, and create a mechanism with which to address non-compliance.¹⁵

39. Forest & Bird seeks that the swimmability targets discussed on pages 8-11 of the consultation document be incorporated into the NPS-FM Policy E1.

Swimmability target applies only to “large rivers and lakes”

40. The swimmability target applies only to “large rivers and lakes”. Only about 10% of New Zealand’s rivers will be the subject of this target. There are many rivers and lakes that are not “large”, which people swim in.

41. Forest & Bird does not support the target being applied only to “large rivers and lakes”.

42. Forest & Bird seeks that the swimmability target applies to all rivers and lakes.

Swimmable target national not regional

43. Currently, 72% of order-4 rivers are swimmable.¹⁶ However 6 regions fall below this national average, notably two regions¹⁷, Northland and Auckland with 29% and 38% respectively. If a target for swimmability is calculated and tracked nationally, then there is no incentive for low-performing regions to individually make large improvements.

44. The target of “90% by 2040” should be regionally applied, not nationally. If the target is to really improve water quality across the country and will be reported by each region, then all regions should individually meet the 90%. If a target for swimmability is calculated and tracked nationally, there is no indication where land-use practices are contributing to poor water quality.

E. COLI ATTRIBUTE

45. There has been a considerable amount of confusion about the *E.coli* attribute.

46. In the consultation document as first notified, the *E.coli* attribute in Appendix 2 referred to an excess level of 540 *E.coli* per 100 ml. This was consistent with the non-regulatory “90% of rivers and lakes swimmable by 2040” goal as set out on page 11 of the consultation document.

47. After the initial notification, the consultation document was amended to include reference to the MFE website,¹⁸ particularly Table 1, which purports to provide

¹⁵ In relation to stock exclusion, Forest & Bird supports the use of regulations to provide legal basis to the stock exclusion target.

¹⁶ as per outlined on page 11 of the Clean Water consultation document

¹⁷ Note that together Northland and Auckland contain more than one-third of total population.

¹⁸ A readers’ note was added which said: Further detail on the *E. coli* numeric attribute states can be found at www.mfe.govt.nz/fresh-water/freshwater-management-reforms/water-qualityswimming-maps/developing-water-quality.

detail as to the attribute state. However, no change was made to page 11 relating to the swimmability target that is not part of the NPS-FM.

48. The post notification amendment causes considerable confusion. It is not clear if the Table 1 details are intended to amend the attribute table.
49. If so (and we understand this was the intention), Table 1 should be incorporated into the *E.coli* attribute table in Appendix 2.
50. It is also not clear if the post-notification amendment to the NPS-FM is intended to apply to the non-statutory 90%-of-rivers-and-lakes-swimmable target. Presumably it is, but this should be expressed on page 11.
51. Forest & Bird:
 - a. opposes the idea that a body of water with 540 E. coli would be deemed swimmable. Even if the sampling guideline stipulates that 540 E. coli is swimmable in 5 out of 100 samples or fewer over 10-years, it is still unacceptable;
 - b. supports daily sampling once levels have increased above 260 E. coli per 100ml;
 - c. supports a median value of E. Coli at 130 per 100 ml;
 - d. recommends that the attribute thresholds should be 260 E. coli per 100 ml in replacement of 540 E. coli per 100 ml. The “Numeric Attribute State” on page 39 of Appendix 2 of the NPS-FM should read as follows: “Exceedance of the E. coli threshold 260 E. coli/100 ml.”
 - e. is concerned about the lack of clarity about sampling frequency. Forest & Bird notes that 100 samples are to be collected over a 10-year period with a minimum frequency of one month. Forest & Bird notes that this sampling policy excludes specifications on a maximum sample frequency. Forest & Bird recommends that the maximum sampling frequency is set at once per day, and if multiple samples are taken in a single day, that the sample of poorest quality is used; and
 - f. is also concerned about the lack of clarity about sampling duration. Forest & Bird notes that 100 samples are to be collected over a 10-year period, with a minimum frequency of one month. Forest & Bird recommends that the sample period for establishing swimmability reference points is reduced to five years. Swimmability should be evaluated in a shorter timeframe to ensure that improvements and degradations are notified and acted upon rapidly.

ADDITION OF “ECONOMIC WELL-BEING” OPPOSED

52. Forest & Bird opposes the proposal to insert new provisions which provide for the concept of “economic well-being” having superiority to ecological or human health and well-being. The NPS-FM anticipates that limits and targets are set such that economic well-being would be provided within those target and limits proposed.

53. Forest and Bird recommends that these references to “economic well-being” be removed from the NPS-FM.

54. If the concept of “economic well-being” is to remain in the NPS-FM Objective A2, Forest & Bird recommends that the word “may” is used such that it reads:

*(a) “... then **may** provide for economic well-being, including productive economic opportunities, within environmental limits.”*

55. A similar formulation could be used in Objective B1, which makes it clear that economic well-being may be provided for only after inflow allocation limits ensure ecosystem needs can be met and there is no over-allocation of water quantity.

56. Finally, Forest & Bird cautions the continuation of public funding to irrigation schemes. The stress of increased agriculture intensification is linked as a leading contributor to the environmental degradation of the nation’s freshwater, therefore future provisions for or prioritisation of new irrigation schemes is a step in the wrong direction with regards to water quality management.

57. In this regard, Forest & Bird acknowledges the \$100 million put forward in the Freshwater Improvement Fund, however asks that any funding earmarked for irrigation schemes (and in association with the \$480 million earmarked for the Irrigation Acceleration Fund) be used instead for remediation of freshwater quality.

CONCLUSION

58. The consultation document fails to accept the challenge that the state of New Zealand’s freshwater presents, particularly addressing the way in which irrigation and dairy expansion have had such damaging effects on the water quality in many areas.

59. Fundamental changes are needed to the ways in which we manage land uses and associated activities that have an impact on our freshwater ecosystems. The consultation document gives no indication that any attempt is being made to confront the very challenging decisions that are needed to protect ecosystem health.

60. It is evident that the consultation document is an attempt to look as if something is being done, but in fact, what is proposed is little more than ‘business as usual.’ This conclusion is drawn from the following:

a. despite contrary recommendations by LAWF, the NPS-FM:

i. does not include the MCI as a mandatory monitoring requirement with a bottom line; and

- ii. fails to adopt recommendations with respect to DIN and DRP;
 - b. the “90% of large rivers and lakes swimmable by 2040” is not regulated or rigorous, exemplified in its limitation to include only “large rivers and lakes”, the target being achieved as a national average not per region and the failure to incorporate the target legally into the NPS-FM;
 - c. the insertion of provisions providing for economic well-being;
 - d. the on-going Government support of irrigation schemes when the associated intensification is the primary cause of the water quality crisis in New Zealand.
61. The stock exclusion regulation is supported, but is not comprehensive and does not address the fundamental issues associated the intensification of land use for dairy.
62. In order to show that it is serious about water quality, we seek that the Government:
- a. include MCI as an attribute with a bottom line of 90;
 - b. adopt the LAWF recommendations regarding DIN and DRP;
 - c. make the “90% of rivers and lakes swimmable” a legally binding goal, not a slogan, by making it apply to all rivers and lakes on a regional, not national, basis, and incorporate it into the NPS-FM;
 - d. stop supporting the irrigation schemes that provide for the land intensification that is so damaging to freshwater.
63. Forest & Bird asks that a further review of the NPS-FM be undertaken by the end of 2019 to further populate the NOF. Forest & Bird outlines some recommendations in the Appendix 1 which supports the need for future review of the NPS-FM.

Yours faithfully,



Kevin Hague
Chief Executive/ Kaiwhakahaere Matua

APPENDIX 1 -FUTURE RECOMMENDATIONS

Forest & Bird would like to see the next revision of the NPS-FM include:

- comprehensive stock exclusion regulation.
- provisions for groundwater protection.
- provisions to take into account the implications of climate change for freshwater.

Comprehensive stock exclusion.

64. Forest & Bird acknowledges the regulatory efforts to exclude stock from streams, rivers, lakes and wetlands, but is concerned, however, that there are limitations to the effectiveness of the regulation in its current state.
65. While stock exclusion is important for decreasing *E. coli* from entering waterways, it is not a silver bullet. Pathogens and nutrients will not respect fencing boundaries, nor will fences reduce the amount of pathogens and nutrients leaching into surface water during a flood or extreme rain events, or groundwater when the soil is overloaded.
66. Furthermore, the target applies only to streams and rivers that are larger than 1 metre wide. Given that 77% of instream *E. coli* pollution originates at streams that are order-1¹⁹, this indicates that the large majority of vulnerable waterways will not be addressed in this regulation.
67. Forest & Bird would like to see a stock exclusion regulation that is comprehensive.
68. Forest & Bird recommends the Government make provisions for including order-1 streams and detail stock exclusion regulation to include stream-to-fencing distance requirements, effective riparian planting guidelines, stocking density stipulations based on soil type and local hydrogeology, incentives on wetland restoration and more. Putting forward a target is non-comprehensive, and Forest & Bird considers this to be only a start.

Provisions for groundwater protection

69. Groundwater is not addressed in the NPS-FM. Groundwater needs attributes with bottom lines, monitoring and enforcement, just as much as surface water does. Chief Science Advisor to the Prime Minister, Professor Sir Peter Gluckman, points out that “unconfined aquifers [are] not much safer than surface waters and should be treated for contaminations in the same way that surface water supplies are.”²⁰

¹⁹ <http://www.ourlandandwater.nz/assets/Uploads/Richard-Muirhead-Sources-and-Flows-OLW-Symposium-April-2017.pdf>

²⁰ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf> (xiii)

70. It is clear that the NPS-FM 2014 doesn't contain meaningful provisions for groundwater protection, as the NPS-FM 2014 itself barely contains the words 'groundwater' or 'aquifer.' Combined, the words appear a total of only 3 times, compared to the words 'river' and 'lake,' which are mentioned 31 and 53 times respectively. 'Aquifer' appears twice, once in the preamble and once as a reference to what a 'freshwater body type' can be, and finally 'ground' is listed in the 'Interpretation' section defining where a 'freshwater take' can originate. There are no provisions for the protection of groundwater quality in the attributes of Appendix 2 or the protection of groundwater quantity beyond regional councils reporting on 'freshwater takes.'
71. Scientifically, it is recognised that there is a direct and dependent relationship that exist between surface water and groundwater, in that surface water quality and quantity are largely dependent on groundwater, and vice versa. None of the current freshwater attributes in Appendix 2 address groundwater. Without proper guidance, regional councils will struggle to properly manage this freshwater resource.
72. Monitoring in the past two decades has seen a decline in groundwater quality in New Zealand. An initial study by GNS scientists in 2009 found that groundwater quality trends for the preceding decade had shown 39% of monitored groundwater sites had an increase in nitrate levels, and 21% showed pathogen levels that exceeded human drinking standards.²¹ A follow-up study was conducted in 2015, confirming that the state of groundwater had not improved in the decade following the original report. It was also found that 62% of sites failed to meet the ANZECC 2000 Guidelines for ecosystem health, and 9% exceeded toxicity levels.^{22,23} Forest & Bird anticipates that the quality and quantity of groundwater will not get any better if the status quo continues.
73. The Ministry for the Environment must prioritise setting standards for groundwater quality and quantity at the aquifer level.
74. Furthermore, the Government must prioritise monitoring groundwater quantity and quality. In New Zealand there are more than 200 aquifers, for which there exists 1000 wells to monitor groundwater quantity and or quality.^{24, 25} This indicates that there is ample capacity for monitoring.
75. Illness caused by the 2016 contamination of groundwater-sourced water in Havelock North and the consequences of a once popular swimming and fishing area, Coe's

²¹ Daughney, C.J.; Randall, M. 2009 National groundwater quality indicators update : state and trends 1995-2008. GNS Science consultancy report 2009/145. 55 p. + 1 CD
<http://www.mfe.govt.nz/sites/default/files/media/Environmental%20reporting/National%20groundwater%20quality%20indicators%20update%20state%20and%20trends%201995-2008.pdf>

²² <http://www.stats.govt.nz/~media/Statistics/Sub-sites/EnvironmentalIndicators/PDFs/Update%20of%20National%20GW%20Quality%20State%20and%20Trends.pdf>

²³ ANZECC the Australian and New Zealand Guidelines for Fresh and Marine Water Quality document

²⁴ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf> (page 14)

²⁵ http://www.stats.govt.nz/browse_for_stats/environment/environmental-reporting-series/environmental-indicators/Home/Fresh%20water/area-nz-aquifers.aspx

Ford, drying up are only two examples of the problems already being felt by communities and ecosystems across Aotearoa. If we are not monitoring, then we can't promptly mitigate issues as they arise.

76. We know that groundwater and surface water have a direct relationship. We know that pollutants present on land and in surface water can, and generally do, pollute groundwater. We also know that increasing water extraction for irrigation, land use conversions to dairy and an increase in nutrients in waterways means that remediation of pollution to or natural recharge of groundwater will be imperative.
77. The urgency to protect groundwater is present and real. Forest & Bird acknowledges the regulatory recommendations on groundwater by the LAWF. Forest & Bird finds the Government's current lack of regulatory vision on groundwater a gross negligence in the Ministry's responsibilities to current and future generations and their drinking water.
78. Forest & Bird asks that monitoring and regulation of groundwater quality and quantity be a priority for the next iteration of the NPS-FM, such that attributes for groundwater management are included in Appendix 2.

Provisions that take into account the implications of climate change for freshwater

79. Forest & Bird is concerned that climate change is not properly considered in the NPS-FM.
80. Climate change is expected to lead to decreasing rainfall in the north and east of both islands and increasing rainfall in west and south. These changes, combined with a retreating snowline and increased rates of evaporation, will affect New Zealand's hydrological cycle.²⁶
81. Already this year, New Zealand has experienced record weather events, including drought in Northland and near-record-low rainfall in eastern districts²⁷, followed by massive rainfall events and storms that caused severe flooding in the eastern Bay of Plenty and other areas²⁸.
82. These events are in line with scientists' predictions, and Victoria University's Professor of Physical Geography, James Renwick, has said they are at least partially due to climate change.²⁹
83. In April, the Prime Minister's Chief Science Adviser, Professor Sir Peter Gluckman, warned in his report *New Zealand's Fresh Waters: Values, state, trends and human impacts*³⁰, that changes to water temperatures and flows as a result of climate change will affect many species, including trout, salmon and glass eels, and could

²⁶ <http://www.mfe.govt.nz/climate-change/how-climate-change-affects-nz/climate-change-impacts>

²⁷ https://www.niwa.co.nz/sites/niwa.co.nz/files/Climate_Summary_Summer_2017_Final.pdf

²⁸ https://www.niwa.co.nz/files/Climate_Summary_March_2017.pdf

²⁹ <http://www.radionz.co.nz/news/national/326356/northern-storm-due-in-part-to-climate-change-professor>

³⁰ <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf>

lead to an increase in periphyton growth, toxic cyanobacteria blooms and invasion by exotic species like koi carp and catfish.

84. Last year, the Royal Society of New Zealand warned in its report *Climate Change Implications for New Zealand* that it is critical to factor climate change into strategic planning to ensure sustainable water use. “New Zealand society will need to balance competing demands for economic gains, to sustain other societal and cultural goals and values, and to maintain its freshwater ecosystems (including at-risk native freshwater fauna),” it said.³¹
85. The OECD has also said, in its 10-yearly review of the state of New Zealand’s environment, that climate, freshwater and primary production policies need to be linked, recommending New Zealand should: “Foster coherence between water, climate and primary industry policies; develop a whole-of-government long-term strategy to increase the added value of export products within climate and freshwater quality and quantity objectives.”³²
86. It is concerning that the current proposed NPS-FM mentions climate change only three times, in the preamble and under objective A3 and B4, and does not address in any meaningful way the impacts climate change will have on New Zealand’s waterways and aquatic biota.
87. Forest & Bird asks that the next iteration of the NPS-FM includes more robust provisions for how freshwater management legislation may allow for the expected impacts of climate change.

³¹ <http://royalsociety.org.nz/assets/Uploads/Climate-change-implications-for-NZ-2016-report-web.pdf> (page 40).

³² <http://www.oecd.org/newzealand/oecd-environmental-performance-reviews-new-zealand-2017-9789264268203-en.htm> (page 194).