Water quality management – General matters

Recommendations in response to submissions on the Proposed Regional Plan for Northland - Section 42A hearing report

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Northland REGIONAL COUNCIL

Table of contents

Purpose and format of the report

1. This report was prepared in accordance with section 42A of the Resource Management Act 1991 (RMA). It addresses submissions made on the following key matters and makes recommendations on changes to the Proposed Plan:

    - Giving effect to the National Policy Statement for Freshwater Management 2017;
    - Managing diffuse discharges of nutrients, sediment and faecal microbes;
    - Including water quality objectives in the Proposed Plan;
    - Setting and meeting water quality standards;
    - Offsetting non-toxic contaminants;
    - Defining the zone of reasonable mixing; and
    - The role of farm environment plans.

2. The report also addresses some other submissions relating to the water quality management provisions in the Proposed Plan.

3. The approach of addressing matters raised in submissions (rather than addressing submissions and/or and submission points individually) is consistent with clause 10, schedule 1 of the RMA.

4. Further submissions are generally not referred to as they are in support or opposition of original submissions (they cannot go beyond the scope of the original submissions).

5. In most cases, the recommended changes to the Proposed Plan are set out verbatim in this report. The specific changes (including scope for changes) are shown in the document *Proposed Regional Plan for Northland – S42A recommended changes*.

6. If there is no recommendation to amend a provision in the proposed plan, then the general presumption is that it should be retained as notified.

Report author

7. My name is Ben Michael Tait and I have overall responsibility for this report. I am employed as a policy analyst by Northland Regional Council (regional council). For further details about my qualifications and experience, refer to the RMA section 42A report titled "General approach".

8. The following people assisted me prepare this report:

- Stuart Savill, Consents Manager, Northland Regional Council
- Justin Murfitt, Policy and Planning Manager, Northland Regional Council
- Richard Griffiths, Marine Research Specialist, Northland Regional Council

9. I have read the Code of Conduct for Expert Witnesses contained in the Practice Note issued by the Environment Court December 2014, and have complied with the code when preparing this report and agree to comply with it at the hearings.

10. The recommendations that I make in this report are not binding on the hearing panel, and I understand that the hearing panel may not agree with my recommendations.

11. It is also important to note that I may change my recommendations in response to evidence presented to the hearing panel. I expect that the hearing panel will ask me to report any changes to my recommendations at the end of the hearing.

Giving effect to the National Policy Statement for Freshwater Management 2017

Background

12. The National Policy Statement for Freshwater Management 2017 (NPS-FM) directs regional councils to make or change regional plans to the extent needed to ensure the plans:[1]

> *a) establish freshwater objectives in accordance with Policies CA1-CA4 and set freshwater quality limits for all freshwater management units in their regions to give effect to the objectives in this national policy statement, having regard to at least the following:*
> *i. the reasonably impacts of climate change;*
> *ii. the connection between water bodies; and*
> *iii. the connection between freshwater bodies and coastal water; and*
> *b) establish methods (including rules) to avoid over-allocation.*

13. Freshwater objectives describe intended environmental outcomes in a freshwater management unit. A limit is broadly defined in the NPS-FM as "the maximum amount of resource use available, which allows a freshwater objective to be met."[2] It is useful to note

[1] NPS-FM, Policy A1.
[2] NPS-FM, Interpretation

that there has been much discussion about the nature of water quality limits, and only recently (March 2018) was draft guidance on limits issued by Ministry for the Environment.[3] Over-allocation is "the situation where the resource: (a) has been allocated to users beyond a limit; or (b) is being used to the point where a freshwater objective is no longer being met."[4]

14. Part CA ("National Objectives Framework") of the NPS-FM sets out the approach that regional councils must follow when establishing freshwater objectives for national values, and any other water quality dependent values, for all freshwater management units. A freshwater management unit "is the water body, multiple water bodies or any part of a water body determined by the regional council as the appropriate scale for setting freshwater objectives and limits and for freshwater accounting and management purposes."[5]

15. Policy E1 of the NPS-FM "applies to the implementation by a regional council of a policy" in the policy statement. It states:

> *b) Every regional council is to implement the policy as **promptly as is reasonable in the circumstances**, and so it is fully completed by no later than 31 December 2025.*
>
> *ba) A regional council may extend the date in Policy E1(b) to 31 December 2030 if it considers that:*
>
> *i. meeting that date **would result in lower quality planning**; or*
>
> *ii. it would be **impracticable** for it to complete implementation of a policy by that date.*
>
> *c) Where a regional council is satisfied that it is impracticable for it to complete implementation of a policy fully by 31 December 2015, the council may implement it by a programme of defined time-limited stages by which it is to be fully implemented by 31 December 2025 or 31 December 2030 if Policy E1(ba) applies.*
>
> *d) Any programme of time-limited stages is to be formally adopted by the council by 31 December 2015 and publicly notified.*
>
> *e) Where a regional council has adopted a programme of staged implementation, it is to publicly report, in every year, on the extent to which the programme has been implemented.*
>
> *f) Any programme adopted under Policy E1 (c) of the National Policy Statement for Freshwater Management 2011 or under E1(c) of the National Policy Statement for Freshwater Management 2014 by a regional council is to be reviewed, revised if*

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[3] Ministry for the Environment. 2018. *A Draft Guide to Limits under the National Policy Statement for Freshwater Management 2014 (as amended in 2017).* Wellington: Ministry for the Environment.
[4] NPS-FM, Interpretation
[5] Ibid

necessary, and formally adopted by the regional council by 31 December 2018, and publicly notified. [My emphasis]

16. While not constituting legal advice, Ministry for the Environment's *Guide to the National Policy Statement for Freshwater Management 2014 (as amended in 2017)* states:[6]

> *Policy E1 outlines the expectations and timeframes for regional councils to implement the policies in the NPS. The policy recognises that each region will have* ***different circumstances*** *in determining when and how to give effect to this national policy statement.*
> *…*
> *Implementation programmes can be* ***flexible****. For example, dates or catchment priorities may change. It is likely to be appropriate for a council to review and revise its PIP regularly; this could also be part of the annual plan or long-term plan process. Similarly, good practice would be to* ***review and revise*** *the PIP following any amendment to the NPS.*
> *…*
> *Engagement with communities and robust durable solutions can take time. This policy recognises the* ***importance of quality rather than quick processes and frameworks****.* [My emphasis]

17. The regional council notified a revised NPS-FM implementation programme in November 2015, following the first amendment to the NPS-FM in 2014. The programme stated that the council intended to largely implement the national policy statement through a regional plan notified in 2017.

18. In August 2017, just prior to public notification of the Proposed Plan (7 September 2017), the previous government amended the NPS-FM. The main changes included:
    - New provisions that clarify requirements about regional councils maintaining or improving overall water quality;
    - New attribute states for *E.coli* (an indicator the presence of faecal pathogens in water).[7]
    - A requirement for regional councils to make or change regional plans to the extent needed to ensure the plans:[8]

[6] Ministry for the Environment. 2017. *A Guide to the National Policy Statement for Freshwater Management 2014 (as amended 2017)*. Wellington: Ministry for the Environment.
[7] NPS-FM, Appendix 2
[8] NPS-FM, Policy A5

- Identify specified rivers and lakes[9], and primary contact sites[10]; and
- State what improvements will be made, and over what timeframes, to specified rivers and lakes, and primary contact sites, so that they are suitable for primary contact more often; or
- State how specified rivers and lakes, and primary contact sites, will be maintained if regional targets established under Policy A6(b) have been achieved.

- A requirement for regional councils to develop regional targets to improve the quality of fresh water in specified rivers and lakes and contribute to achieving the national target in Appendix 6 by 31 December 2018.[11]
- A requirement for regional councils to set instream concentrations and exceedance criteria for dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP) for the purposes of achieving objectives for periphyton biomass, and where there are nutrient sensitive downstream receiving environments, criteria for nitrogen and phosphorus.

19. Rather than significantly delay notification of the plan to address the new policy directives, council chose to reconsider its approach to freshwater quality management generally. Against this backdrop, it is important to note that in 2017 the council did not have sufficient data to be able to establish robust freshwater objectives for periphyton biomass and the relationship between periphyton and nutrient concentrations were appearing increasingly complex. Furthermore, it was proving very difficult to define freshwater management units.[12] The new government had also signalled changes to the NPS-FM, including the inclusion of attributes for fine sediment.

20. The council made the decision to amend its NPS-FM implementation programme by scheduling a plan change for, around, 2021 to give effect to the water quality

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[9] "Specified rivers and lakes" means: (a) rivers that are fourth order or above using the methods outlined in the River Environment Classification system, National Institute of Water and Atmospheric Research, Version 1; and (b) lakes with a perimeter of 1.5 kilometres or more.

[10] "Primary contact site" means: (a) any part of a specified river or lake that a regional council considers is used, or would be used but for existing freshwater quality, for primary contact; and (b) any other site in any other river or lake that a regional council has determined should be managed for primary contact."

[11] NPS-FM, Policy A6

[12] Unlike most other regions in New Zealand it is difficult to develop a river classification that differentiates Northland's rivers according to variation in catchment characteristics and land uses. This has made identifying freshwater quality management units for rivers very challenging. See Snelder, T. 2015. Defining Freshwater Management Units for Northland: A Recommended Approach (LWP Client Report). LWP Ltd, Christchurch, New Zealand. and Snelder, T., Kerr, T. 2017. Options for river water quality management classifications for the Northland region.

management requirements of the national policy statement. The council believes it is important to, in MfE's words, focus on developing a quality plan rather than quick processes and frameworks. Again, it important to keep in mind that the council has until 2025 or, if certain circumstances apply, 2030 to implement the NPS-FM.

21. The council formally adopted a revised NPS-FM implementation programme in March 2018.

22. Lastly, the Proposed Plan contains numeric water quality standards for:
    - Ammonia and nitrate toxicity in rivers; and
    - Chlorophyll a (a measure of phytoplankton biomass), total nitrogen, total phosphorus and ammonia toxicity for two lake management units.

23. The standards are derived from appendix 2 of the NPS-FM. The standards were not termed freshwater quality objectives in the Proposed Plan, mainly because of the regional council's decision to only include one objective for the region in the plan. Also, it was not considered an issue at the time because freshwater objectives under the NPS-FM are in effect water quality standards. They specify in numeric or narrative terms the chemical, physical and biological conditions (characteristics) of water necessary to support particular values. Values are things that community and resource users are concerned about, and are the basis for objectives.

24. I will revisit the freshwater quality standards in the plan and their relationship with the NPS-FM later in this report.

25. It is important to note that the plan does not contain water quality limits. That is because the council has not had the information and tools to be able to derive contaminant load or loss limits at the property or catchment-scale that relate to desired in-stream contaminant concentrations. Another reason for this is the ambiguity around what limits are. It took MfE almost seven years to issue guidance on the nature of limits under the NPS-FM,[13] and even then, the guidance is not that helpful. For example, it states:[14]

> *…a broader view of 'resource use' may be required to set limits for some attributes (and 'allocate' that use as discussed above).*
>
> *…*

[13] Ministry for the Environment. 2018. *A Draft Guide to Limits under the National Policy Statement for Freshwater Management 2014 (as amended I 2017).* Wellington: Ministry for the Environment.
[14] MfE. 2018. p.16

> *A limit could potentially be a total allowable length of unfenced riparian margin, or a maximum stocking rate to meet an E. coli freshwater objective. For the fencing example, if stock access to water is thought of as a 'use of the resource', then by restricting that access we are imposing a 'limit' on stock access to rivers for drinking (to reduce faecal contamination). The limit might be expressed as '50 per cent of stream length in a catchment must be fenced'.* ***Potentially, individual farmers could 'trade' fencing extents****. Conversely a limit might be expressed as a prohibited activity with a zero allocation. For the stocking rate example, if grazing is the 'resource use' and a maximum stocking rate for the catchment is stipulated, that is a 'limit'.*

26. And:[15]

> *Meeting an E. coli freshwater objective by setting a limit which deals with the length of fenced stream in a catchment* ***is therefore unlikely to be supported by verifiable evidence****. This means the degree of confidence in the prescribed limits to meet the objective may be low and the concept of 'precaution' and adaptive management may need to be employed to justify the limit (and where it is set) if challenged.*
>
> *…*
>
> *To a greater or lesser extent this* ***will be the case for all limit setting****.* [My emphasis]

27. It appears to me that MfE have recognised the huge difficulties associated with setting contaminant load or loss limits at property, sub-catchment and catchment scales, particularly for fine sediments, *E.coli* (an indicator of the presence of faecal pathogens in water), and phosphorus. Even setting contaminant load and loss limits for nitrogen is proving difficult. That is because the only modelling tool at our disposal (OVERSEER) is routinely updated, which often results in different estimate nitrogen leaching numbers. It is also challenging to understand how much nitrogen is lost from the root zone to water bodies. For example, recent research suggests that many of Northland's soil types, which are poorly drained, provide good conditions to facilitate the reduction of nitrate (denitrification).[16]

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[15] MfE. 2018. p.19

[16] Rissmann, C., Pearson, L., Lindsay, J., Couldrey, M., and Lovett, A. 2018. Application of Physiographic Science to the Northland Region: Hydrological and Redox Process-Attribute Layers. Land and Water Science, Technical Report (Draft, unpublished).

Submissions and analysis

28. The Minister of Conservation stated in its submission:[17]

> *The staged implementation plan for implementing the NPSFM authorised by the Council at a meeting on 17 November 2015 states that the establishment of freshwater management units will be developed as part of the development of the draft regional plan in 2015 – yet only freshwater management units for water quantity are contained in the NRP as notified. The timetable for implementing the NPSFM as proposed by the Council is not being met and there is potential that the Council will not achieve the complete implementation of the NPSFM by 2025.*

29. Haititaimarangai Marae 339 Trust and the Royal Forest and Bird Society of New Zealand expressed similar concerns.[18]

30. The Minister of Conservation added:

> *The NPSFM has been developed to direct regional councils in how to manage freshwater through their planning documents and other functions to achieve the purpose of the RMA. Where the Council chooses [to] not progressively implement the NPSFM, it does not absolve it from its obligations under s 63 to prepare a regional plan to assist it in achieving the purpose of the RMA in some alternative way.*
>
> *…*
>
> *While progressive implementation of the NPSFM is open to the Council, the NRP must still assist the Council in achieving the purpose of the RMA. If the NPSFM requires that, in order to implement Part 2 of the RMA, the Council needs to establish freshwater objectives, resource limits and methods to control use and development to ensure those objectives and limits are met, then it is inherent that, even without fully giving effect to the NPS,* ***those mechanisms are still required in the interim****. For the NRP to do otherwise requires the Council to demonstrate that the alternative is more appropriate than the NPSFM methodology for achieving the purpose of the RMA. These are the requirements of the evaluation report under s.32.* [My emphasis]

31. The Royal Forest and Bird Society of New Zealand appear convinced that there is a pressing and urgent need for the regional council to give effect to the water quality management requirements of the NPS-FM:[19]

> *Forest & Bird is concerned that the Northland Regional Council lacks an understanding of the status of freshwater quality in its region. This implies that there is also a lack in understanding of*

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[17] Minister of Conservation. p.69
[18] Haititaimarangai Marae 339 Trust. p.7., The Royal Forest and Bird Protection Society of New Zealand. p.15
[19] Royal Forest and Bird Protection Society of New Zealand. p.14

the urgency to deal to issues with water quality. This will have serious and in some cases irreversible implications for the freshwater ecosystems there.

32. I note that the Royal Forest and Bird Protection Society did not provide any evidence to support its bold claims.

33. Haititaimarangai Marae 339 Trust is also concerned, because it considers that the proposed plan as notified:[20]

> *…will not achieve the sustainable management direction of the RMA, the NPS-FM or the NZCPS. The Plan as notified continues to allow contaminants to be discharges into waterbodies at levels that does not ensure ecosystem health, that water quality is suitable for primary contact recreation, or that the values Māori associate with water resources are provided for.*

34. What is more, the Trust considers that:

> *… the Proposed Plan [should] be amended to put in place a management regime that only allows the discharge of contaminants up to a level that ensures the limits and objectives for the individual waterbody/freshwater management unit can be achieved. Where this level of contaminants has already been exceeded, targets needs to be set with clear implementation methods (as detailed above) to ensure that water quality improves over the timeframe set.*
>
> *Where there is insufficient information on what the freshwater objectives and limits are, the Council should adopt a precautionary approach in the Plan to ensure that it does not undermine the direction set in the NPSFM in the interim period until those objectives and limits are established with more certainty.*

35. It is not clear to me what the Trust means by an interim precautionary approach. I infer that it refers regulatory provisions to maintain and improve quality.

36. With respect to the Minister of Conservations submission, I agree that Policy E1 of the NPS-FM does not absolve the council from its obligations under section 63 of the RMA, nor for that matter its functions under section 30 of the Act or the requirement to give effect to national policy statements[21]. However, there is no legal requirement to establish interim freshwater quality objectives, limits/targets and methods (including rules) to avoid/phase out over-allocation.[22] Nor is there a need to for reasons I give below.

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[20] Haititaimarangai Marae 339 Trust. p.9
[21] RMA s55
[22]

37. I believe that the Proposed Plan will at least maintain fresh and coastal water quality. That is, it will not result in a reduction in water quality before the council gives effect to policies A1, A2, A3(a) and A5 of the NPS-FM, which is scheduled to happen soon (approx. 2021). There are three key reasons why I think that this is true:

- The nature of Northland agriculture;
- Water quality trends; and
- New and amended rules to reduce loads of sediment, nutrients and faecal microbes to water, coupled with non-regulatory initiatives.

38. I will briefly expand on these points. First, Northland has not experienced significant agricultural intensification pressures over the last two decades and is unlikely to experience intensification anytime soon.

39. Darryl Jones (Economist, Northland Regional Council) has looked at some of the major trends in Northland agricultural production over the last 15 years (2002-2017). His report (attached as Appendix B) contains the follow key findings:[23]

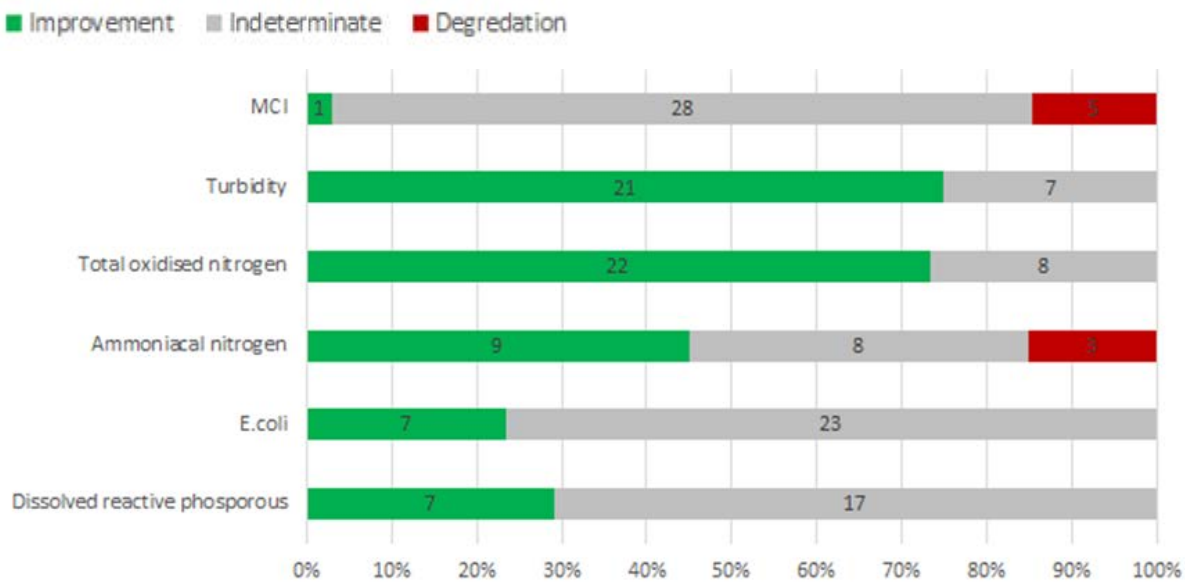
- The number of farms in Northland has fallen from 5808 in 2002 to 4143 in 2017, a drop of 29%.
- While more than half of Northland's land area is used for agricultural production (55%), there is 85,000 hectares (11%) less land used in 2017 compared to 2002.
- The area of land used for commercial plantation forestry and dairy production has fallen by 14% and 15% respectively between 2002 and 2017 while the area planted for avocado production has almost tripled.
- Beef cattle numbers in Northland have fallen by an average of 1.3% per annum over the 15-year period, following a similar trend to the national beef cattle herd.
- The Northland sheep flock has fallen from 0.52 million to 0.32 million between 2002 and 2017, an annual decline of 3.1%, dropping at a faster rate than the national sheep flock.
- The total number of dairy cattle in Northland has fluctuated within the band of 0.35-0.4 million over the 15-year period, while the national dairy herd has grown by 27%.
- While dairy cow numbers have fallen slightly (10%) between 2002 and 2017, there has been a larger drop in the number of herds (35%) and effective area used (15%), and a small rise in milksolids produced.

[23] Darryl Jones. 2018. Recent developments in Northland agriculture. Northland Regional Council.

- The scale of production has increased – with larger farms, bigger herds and greater production per farm. But these increases have been smaller than the expansion in scale seen at the national level.
- Similarly, while production has become more intensive, with a 1.1% increase in milksolids produced per cow over the 15-year period, the level of intensity is lower and increasing at a slower rate than nationally.

40. Second, water quality data shows that over the period January 2007 to December 2016 there were more improving trends in river water quality than decreasing trends, which is summarised in the following figure.

Figure 1: Water quality trends at Northland Regional Council's River Water Quality Monitoring Network sites (January 2007 – December 2016). Reproduced from Northland Regional Council. Rivers water quality and ecology in Northland: State and trends 2012-2016. Unpublished.



41. Similarly, water quality data from the council's Coastal Water Quality Monitoring Network shows that over the five-year period until 2014 water quality improved at most of the sites monitored.[24]

42. Data from the council's Lake Water Quality Monitoring Network indicates that between 2005 and 2015 most of the lakes monitored had an indeterminate trend. That means in

[24] Northland Regional Council. 2015. State of the Environment Report: 2015.

general terms that water quality had not improved or degraded in most of the lakes monitored.[25]

43. Third, the Proposed Plan contains new rules to maintain and improve water quality. These include: rules for the access of livestock to permanently flowing drains, streams and rivers, lakes, wetlands and the coastal marine area; and stronger controls on farm dairy effluent (and other farm wastewater discharges). These new controls should also be viewed alongside sector and industry initiatives to maintain and improve water quality[26] and a significant increase in council's extension and support for landholders to implement good management practices and soil conservation techniques.

44. It is also important to note that defining freshwater management units for water quality and then freshwater quality objectives, associated limits/targets and methods to avoid/phase out over-allocation is not a straightforward or quick task. For example, it requires a reasonably good understanding of:

- sources of contaminants;
- the amounts of contaminants lost, temporally and spatially, from sources;
- pathways and attenuation of contaminants;
- relationships between contaminant loads from properties and catchments and contaminant concentrations in water bodies; and
- the effects of levels of contaminants on water quality dependent values.

45. There is a significant risk to the council, resource users and the wider community if the NPS-FM requirements are rushed. I am convinced that trying to develop an interim limits-based planning framework for nutrients, sediment and faecal pathogens will result in a low-quality planning framework. It would also significant distract from the main task of setting 'final' freshwater quality objectives, limits/targets for the region's freshwater bodies. (I also struggle to see how it could be done.)

46. It is not practicable to go through a process to set interim freshwater quality objectives and limits (including by gathering data, doing analyses, writing provisions and then going through a RMA schedule 1 process), and then undertaking a further process to set 'final' freshwater quality objectives and limits. All before 2025.

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[25] Ibid

[26] For example, the Sustainable Dairying: Water Accord, Good Farming Practice: Action Plan for Water Quality 2018,

47. I also reiterate that an interim framework is not required. Controlling discharges[27] and the use of land for the purposes of maintaining and enhancing the quality of water and ecosystems in water bodies and coastal water[28] or managing discharges does not need to involve the setting of interim freshwater objectives and limits in the next few years.

48. It is also useful to consider policy CA1 of the NPS-FM, which sets out the process for establishing freshwater objectives. It is apparent to me that establishing freshwater objectives, associated limits/targets and methods to avoid/phase out over-allocation is is a detailed and thorough process, which will require meaningful discussions with people and communities. This is yet another reason why I strongly believe that it is not appropriate to develop an 'interim' objectives and limits-bade planning framework at this point in the RMA schedule 1 process. I

49. In this context, it is useful to consider *Royal Forest & Bird Protection Society Inc v Whakatane District Council* [2017] NZEnvC 51 which concerned the appropriate activity classification for the clearance of indigenous vegetation. The Environment Court confirmed at paragraph 59 "that where the purpose of the Act and the objectives of the Plan can be met by a less restrictive regime then that regime should be adopted":

> [59] In considering what rule may be the *most appropriate* in the context of the evaluation under s 32 of the Act, we consider that notwithstanding the amendments that have been made to that section in the meantime, the presumptively correct approach remains as expressed in *Wakatipu Environmental Society Inc v Queenstown Lakes District Council*:[21] that where the purpose of the Act and the objectives of the Plan can be met by a less restrictive regime then that regime should be adopted. Such an approach reflects the requirement in s 32(1)(b)(ii) to examine the efficiency of the provision by identifying, assessing and, if practicable, quantifying all of the benefits and costs anticipated from its implementation. It also promotes the purpose of the Act by enabling people to provide for their well-being while addressing the effects of their activities.

50. In summary, at this time there is no legal or pressing environmental reason to establish freshwater quality objectives, set limits/targets and put in place methods (including rules) to avoid/phase out over-allocation in the Proposed Plan.

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[27] RMA s30(1)(f)
[28] RMA s30(1)(c)

Recommendation

51. I recommend against including interim provisions in the Proposed Plan to give effect to policies A1, A2, A3(b) and A(5) of the NPS-FM.

Managing diffuse discharges of nutrients, sediment and faecal pathogens

Background

52. On a related matter, several people believe that the Proposed Plan should contain provisions for managing diffuse discharges of nutrients, sediment and faecal pathogens to water.

53. The Proposed Plan is generally silent on the management of diffuse discharges and there is a reason for this. That is, the council considers the management of diffuse sources of nutrients, sediment and faecal microbes Northland is best done within an NPS-FM freshwater quality objectives and limits-based planning framework, which, as I documented above, will be developed in the next few years.

54. It is important to reiterate that the management of diffuse discharges is complex relative to the management of point source discharges. That is because it is difficult to accurately account for sources of nutrients and, in particular, fine sediments and faecal microbes at the property or sub-catchment scale. It is also challenging to understand the amount of contaminants that are attenuated within catchments or within waterbodies. In other words, understanding the relationship between contaminant loads at the property scale, catchment loads and, in turn, instream water quality conditions is not straightforward. The other (potential vexed) part of the puzzle is determining, once limits are set, how resources should be allocated (apportioned) between diffuse (non-point source) and point source dischargers.

55. The preamble to the NPS-FM states:

> *Setting enforceable quality and quantity limits is a key purpose of this national policy statement. This is a fundamental step to achieving environmental outcomes and creating the necessary incentives to use fresh water efficiently, while providing certainty for investment. Water quality and quantity limits must reflect local and national values. The process for setting limits should be informed by the best available information and scientific and socio-economic knowledge.*

Once limits are set, ***freshwater resources need to be allocated to users****, while providing the ability to transfer entitlements between users so that we maximise the value we get from water. Where water resources are over-allocated (in terms of quality and quantity) to the point that national and local values are not met, over-allocation must be reduced over agreed timeframes.* [My emphasis]

56. The NPS-FM was issued in large part to address cumulative effects of point source and non-point source of contaminants.

Submissions and analysis

57. Haititaimarangai Marae 339 Trust and the Minister of Conservation stated in their submissions that the council should "[i]nclude policy in the Plan to manage diffuse discharges of nitrogen, phosphorus, sediment and microbial pathogens."[29]

58. Northland Fish and Game also submitted "[t]hat land use and discharge rules for both intensive and extensive land uses" should be included in the plan to "manage sediment, faecal, phosphorus, and nitrogen discharges…which includes standards (limits or targets) in relation to these contaminants".[30]

59. Haititaimarangai Marae 339 Trust submitted that the "necessary requirements of an appropriate freshwater management regime in the Proposed Plan should include, inter alia:[31]

    f. Land use (including "farming") rules that account for and manage ancillary discharges (s9 and s15 RMA);

    g. Land use and ancillary discharge rules for both intensive and extensive land uses [to] manage sediment faecal, phosphorus, and nitrogen discharges, and include standards (designed to achieve freshwater objectives and meet freshwater limits) in relation to these contaminants;

    …

    i. Output based standards, such as nitrogen leaching per ha per annum, which is set to achieve environmental outcomes are an essential component of second generation Natural Resource Plans. Failure to adopt regulation which ensures point and non-point source discharges of contaminants from primary productive land uses are managed to environmental limits (output based standards) will result in failure to sustainably manage

[29] Haititaimarangai Marae 339 Trust. p.32
[30] Northland Fish and Game. p.9
[31] Haititaimarangai Marae 339 Trust. pp.4-6

the land and water resources of the region, and will lead to further declines in the health of freshwater environments and their values;

…

l. Land use and ancillary discharge activities are regulated to ensure that 'good environmental management practices' are achieved at a minimum;

…

o. Nitrogen leaching standards are established and allocated based on the natural capacity of soil using a method such as Land Use Capability or a similar alternative, and that in catchments that are at allocation or over allocated, contaminant losses from farming activities will not increase above current rates and a trajectory of loss reductions is established. That existing farming activities that are discharging contaminants in excess of the flexibility cap (allocation based on natural capital or alternative approach) are required to reduce their leaching overtime [sic].

p. That nitrogen leaching rights are allocated to resource users within catchments in such a way that there is equitable allocation of a total catchment nitrogen load to all users/activities who may wish to use the available resource. The allocation must not be based on existing or historic leaching (grandparenting);

q. That a nutrient transfer or trading regime is established where catchment caps have been established to enable nitrogen leaching reductions to be achieved at least cost and to enable maximum flexibility of resource use to enable economic benefits to be maximised from the available resource;

59. As I pointed out earlier, I strongly believe that specific controls on diffuse sources of nutrients, sediment and faecal microbes should be developed and implemented within an NPS-FM freshwater quality objectives and limits-based framework.

60. Beef and Lamb New Zealand stated in its submission:

> *…that the pRPN could usefully provide direction, should the future allocation of nutirent discharge allowances be considered. These principles could also be applied now to determine the level of environmental risk and potential risk to existing land uses, from the development of new land uses. These [14 nutrient allocation] principles, applied as numerical thresholds, could act as a drafting gate between permitted activities and those requiring consent. This would enable council to consider the impacts that the intended land use could have on the environment and existing farming operations.*

61. It considers that new policy and methods should be included in the plan that "enable [14] nutrient allocation principles".

62. As an aside, it is useful to consider the following statement regarding allocation in the Land and Water Forum's most recent report to the Minister for the Environment and the Minister of Agriculture:[32]

> *Because allocation is an inherent part of our limits-based system,* ***the fact we still lack the necessary tools to account adequately for contaminant sources across catchments is a serious weakness****. It is equally concerning that we are not confident in our systems for monitoring and enforcing compliance with limits.* [My emphasis]

Recommendation

63. I believe that it is not necessary, or indeed appropriate, to include rules or policy for non-point source discharges of nutrients, sediment and faecal microbes. And it would be out of context in the absence of a freshwater quality objectives and limits-based framework.

Including water quality objectives in the plan

Background

59. Section 67(1) of the RMA states that a regional plan must state: (a) the objectives for the region; and (b) the policies to implement the objectives; and (c) the rules (if any) to implement the policies.

60. The Proposed Plan contains one objective for the region. The reasons for this are documented in the section 42A, RMA report titled "General approach". The council received many submissions challenging the decision to include only one objective in the plan. The submissions included requests for additional objectives, including freshwater (quality) objectives which are required to be established by 2025 or, if certain circumstances apply, 2030. I provided an overview above on the council's NPS-FM implementation programme, including why it did not include freshwater quality objectives in the Proposed Plan.

Submissions and analysis

61. Several people want objectives for water quality to be included in the Proposed Plan for the purposes of providing clear direction to applicants and decision-makers on what the

[32] Land and Water Forum. May 2018. Land and Water Forum advice on improving water quality: preventing degradation and addressing sediment and nitrogen. p.23

plan is designed to achieve. For example, Fonterra wants objectives included in the plan that clearly set out the outcomes for, inter alia, water quality. It stated:[33]

> *By providing only one objective (that itself only reflects a part of Part 2 of the RMA), the Proposed Plan fails to set a clear statement of environmental outcomes for the Northland Regional. The objective provides no clear guidance on how the key regional issues are to be managed. For instance, there is no guidance on air quality, water quality, water quantity, the coastal environment or land uses.*

62. GBC Winstone submitted along the same lines. It "considers that objectives should set clear outcomes for air quality, water quality, water quantity, the coastal environment and the land resource, particularly given the lack of issues identified in the PNRP and the need to provide targets that the policies will then seek to achieve."[34] It "also seeks a policy framework that provides clear direction on the effects to be addressed or mitigation measures to be considered rather than including standards to be met."[35]

63. Haititaimarangai Marae 339 Trust wants the plan amended to include objectives which:
    - Safeguard the life supporting capacity and ecosystem health of freshwater and coastal water
    - Safeguards ecosystem health and the health of indigenous species.
    - Describe the outcomes to be achieved for the regions rivers, lakes, wetlands and the coastal environment
    - Ensures that water quality is, at a minimum, maintained and where degraded, is improved
    - That all remaining wetland habitats are recognised as significant and protected from further degradation and loss and protect the values of outstanding wetlands
    - Describe outcomes that are consistent with recognising and providing for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.

64. The Trust also wants an objective based on the Lake Submerged Plant Indicators (Lake SPI).[36] The Minister of Conservation want similar objectives to be included in the plan.

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[33] Fonterra. p.34
[34] GBC Winstone. p.18
[35] Ibid
[36] See https://www.niwa.co.nz/our-science/freshwater-and-estuaries/lakespi-keeping-tabs-on-lake-health/how-lakespi-works

65. Yachting New Zealand want a more comprehensive suite of objectives to be included in the plan which, inter alia, specifically address coastal waters and seek to maintain and where necessary enhance water quality including in coastal waters.

66. K Mahanga-Nisbet wants the maintenance and enhancement of water quality to include 'cultural purposes', which includes the gathering of shellfish for human consumption as a purpose for which quality of water in estuaries and inner harbours, among the purposes for which water quality is to be maintained or enhanced.

67. The utility of including a water quality objective(s) in the Proposed Plan prior to NPS-FM freshwater quality objectives being included in several years is not obvious to me. There is sufficient direction in higher order policy documents and indeed the RMA on for what and how water quality should be managed, including for the purposes raised by submitters.[37] Schedule 4 of the RMA also requires applicants for resource consents to discharge a contaminant into water or into or onto land where it may enter water to provide an assessment of, inter alia:

- An assessment of the actual or potential effect on the environment of the activity, including the following matters:
    - any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects;
    - any physical effect on the locality, including any landscape and visual effects;
    - any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity;
    - any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations;
- The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
- Any possible alternative methods of discharge, including discharge into any other receiving environment.

68. However, I recognise that an objective(s) is required by section 67(1) of the RMA for the purposes of policies and rules in the plan that are specific or relate to the management of:

- discharges of water and contaminants into or onto land and water;[38] and

[38] RMA s30(1)(f)
[38] RMA s30(1)(f)

- the use of land for the maintenance and enhancement of water quality and aquatic ecosystems.[39]

69. On the basis that the plan is to include specific objectives (refer to the recommendation by Ben Lee in the RMA section 42A report titled “General approach”), I recommend including a water quality objective in the plan that provides for a wide range of water quality dependent values. An advice not should be included below the objective that states “Freshwater quality objectives required by Policy A1 of the National Policy Statement for Freshwater Management will be included in this plan at a later date as per the council’s programme for implementing the national policy statement.

70. I considered reproducing the water quality management objective 3.2 (“Region-wide water quality”) from the Regional Policy Statement but concluded that it would not be appropriate. The explanations in the RPS to objective 3.2 and policy 4.2.1 suggest that there is no point mimicking objective 3.2 in the Proposed Plan because it is primarily for the purpose of guiding the establishment of freshwater objectives, which as I pointed out earlier in this report will happen in several years.

71. For context, Objective 3.2 states:

> *Improve the overall quality of Northland’s fresh and coastal water with a particular focus on:*
> *(a) Reducing the overall Trophic Level Index status of the region’s lakes;*
> *(b) Increasing the overall Macroinvertebrate Community Index status of the region’s rivers and streams;*
> *(c) Reducing sedimentation rates in the region’s estuaries and harbours;*
> *(d) Improving microbiological water quality at popular contact recreation sites, recreational and cultural gathering sites, and commercial shellfish growing areas to minimise risks to human health; and*
> *(e) Protecting the quality of registered drinking water supplies and the potable quality of other drinking water sources.*

72. The explanation below objective 3.2 states:

> *On its own the objective does not require that water quality be improved in every water body. It will be implemented primary through regional plans by water of objectives for fresh and coastal water quality and policies and methods to achieve them.*

[39] RMA s30(1)(c)

73. It is also useful to consider policy 4.2.1 of the RPS:

> *Improve the overall quality of Northland's water resources by:*
>
> *(a) Establishing **freshwater objectives** and setting region-wide **water quality limits** in regional plans that give effect to Objective 3.2 of this regional policy statement…*

74. I also note that objective 1 of the NZCPS is not relevant because it the basis for including provisions in regional plans to provide for "…maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity."

75. Policy 21 of the NZCPS states how objective 1 is to be given effect to:

> *Where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems, natural habitats, or water based recreational activities, or is restricting existing uses, such as aquaculture, shellfish gathering, and cultural activities, give priority to improving that quality by:*
>
> *(a) identifying such areas of coastal water and water bodies and including them in plans;*
> *(b) including provisions in plans to address improving water quality in the areas identified above;*
> *(c) where practicable, restoring water quality to at least a state that can support such activities and ecosystems and natural habitats;*
> *(d) requiring that stock are excluded from the coastal marine area, adjoining intertidal areas and other water bodies and riparian margins in the coastal environment, within a prescribed time frame; and*
> *(e) engaging with tangata whenua to identify areas of coastal waters where they have*
> *(f) particular interest, for example in cultural sites, wāhi tapu, other taonga, and values such as mauri, and remedying, or, where remediation is not practicable, mitigating adverse effects on these areas and values.*

76. I do not think any people submitted evidence of areas of coastal water and water bodies in the coastal environment that are having significant adverse effects on the values listed in policy 21. I understand that elevated sediment loads to waters are a key stressor of aquatic ecosystems and associated social and cultural values, particularly in the coastal environment. Also, faecal contamination resulting, largely, from diffuse sources can impact on water based recreational activities, shellfish collection and cultural values. However, the I consider that the rules on discharges and for certain land use activities that can adversely affect water quality are sufficient for 'holding the line' while the council does

research to explore the effectiveness of other interventions, including different water quality limits and methods (including rules) to avoid/phase out over-allocation.

77. It is important to note that recent research suggests that significant land use changes will be required to reduce sediment loads to the extent that this ecologically meaningful at the catchment-scale.[40] Other recent research suggests that good management practices may not have significant positive impacts on water quality.[41]

78. In summary, I believe that there is sufficient direction in RMA s104(1), other provisions in the Act (for example, part 2, s105 and s107, schedule 4), and in relevant policies in policy statements to guide resource consent application processes relating to the discharge of contaminants into water (directly or via land), without including objectives for all water quality dependent values in the Proposed Plan. The direction will be enhanced when freshwater quality objectives required by the NPS-FM will be included in the plan later. I note that the Proposed Plan contains the transitional policy A4 direction in the NPS-FM.

79. However, I am also cognisant of section 67 which states:

> *(1) A regional plan must state–*
> *(a) The objectives of the region; and*
> *(b) The policies to implement the objectives; and*
> *(c) The rules (if any) to implement the policies.*

80. The recommendation to delete the proposed objective in the plan and replace it with objectives for natural resource domains and some other purposes means that an objective(s) for the region's water quality is needed for the purposes of establishing the policies and rules in the plan for water quality management.

Recommendation

64. I recommend that a narrative objective is included in the plan that provides for a range of water quality dependent values, including the values in the NPS-FM (life-supporting capacity of ecosystems… and human health associated with contact with water). I also recommend that a note is added under the objective to advise readers that freshwater

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[40] See Kaipara Harbour Sediment Mitigation Study at http://www.knowledgeauckland.org.nz/search/?Keywords=%22KHSMS%22

[41] For example, see Ministry for the Environment (March 2018). Regional information for setting draft targets for swimmable lakes and rivers. Published by the Ministry for the Environment on behalf of a joint taskforce of central and local government representatives.

quality objectives required by policy A1 of the NPS-FM will be included in the plan at a later date as per the council's programme for implementing the NPS-FM.

Evaluation of recommended changes

65. I consider that the recommended changes have minor effect and are within the scope of a clause 16 in schedule 1 of the RMA.

Setting and achieving water quality standards

Background

66. The Proposed Plan contains water quality standards for fresh and coastal waters, set out in policies D.4.1 – D.4.4. The policies state that a discharge of a contaminant into rivers, lakes and coastal waters **must not** cause any of the standards to be exceeded. [My emphasis] In summary: policy D.4.1 contains standards for nitrate and ammonia toxicity in rivers; policy D.4.2 contains standards for phytoplankton biomass (measured by chlorophyll a), total nitrogen, total phosphorus, and ammonia (toxicity) in lakes; policy D.4.3 contains a range of standards for coastal waters; and D.4.4 contains heavy metal standards for bed sediments in coastal waters.

67. The standards for lakes and rivers were derived from Appendix 2 of the NPS-FM and prior to the most recent amendment to the NPS-FM in August 2017. The standards for coastal waters were recommended by Richard Griffiths (2016)[42].

68. Before I return to the relationship between the NPS-FM and the Proposed Plan, it is important to note section 69 of the Resource Management Act, which states:

> *(1) Where a regional council—*
>
> *(a) provides in a plan that certain waters are to be managed for any purpose described in respect of any of the classes specified in Schedule 3; and*
>
> *(b) includes rules in the plan about the quality of water in those waters,—*
>
> ***the rules shall require the observance of the standards specified in that schedule** in respect of the appropriate class or classes unless, in the council's opinion, those standards are not adequate or appropriate in respect of those waters in which case the **rules may state standards that are more stringent or specific**.*

[42] Richard Griffiths. 2016. Recommended Coastal Water Quality Standards for Northland. Northland Regional Council.

(2) *Where a regional council provides in a plan that certain waters are to be managed for any purpose for which the classes specified in Schedule 3 are not adequate or appropriate, the council may state in the plan new classes and standards about the quality of water in those waters.*

(3) *Subject to the need to allow for reasonable mixing of a discharged contaminant or water, a regional council* ***shall not set standards*** *in a plan which result, or may* ***result, in a reduction of the quality of the water*** *in any waters at the time of the public notification of the proposed plan* ***unless it is consistent with the purpose of this Act to do so****.*

(4) *On and from the commencement of this subsection, Schedule 3* ***ceases to be applicable to fresh water****.* [My emphasis]

69. Sub-section (4) was inserted in the RMA on 19 April 2017 by section 57 of the Resource Legislation Amendment Act 2017. It clarifies that the National Objectives Framework in part CA of the NPS-FM applies to the management of freshwater quality. In my mind, there is no difference between a water quality standard and a numeric freshwater quality objective established in accordance with part CA of the NPS-FM. In other words, both freshwater quality objectives and water quality standards state the maximum and/or minimum conditions (characteristics) of water, including physical, chemical and microbiological properties, which support water quality dependent values. The only major uncertainty is where freshwater quality objectives are to be applied, for example, at the point of discharge or at a downstream node. Whereas water quality standards typically apply at and beyond the zone of reasonable mixing.

70. I explained earlier in this report the reasons why the regional council decided against including freshwater quality objectives for some of the compulsory attributes in the NPS-FM. The council expressed nitrate and ammonia toxicity objectives for rivers and trophic state and ammonia toxicity objectives for lakes as water quality standards in the plan largely because of its decision to only include one objective for the region in the plan. This was not made clear in the RMA section 32 report for the Proposed Plan.

71. Returning to section 69 of the RMA, it states in sub-section (1) that rules must require the observance of any standards included in a plan from schedule 3 of the RMA. On the face of it though the section does not impose the same obligation with respect to standards developed by regional councils under sub-section (2). However, one might infer that the obligation does apply under sub-section (2) if the conditions are read together.

72. What is more, sub-section (4) only clarifies that schedule 3 of the RMA does not apply to fresh water. However, it seems that sub-section (3) does apply to freshwater objectives/standards set for fresh water. The Environment Court commented in *Ngati*

Kahungunu Iwi Inc v The Hawkes Bay Regional Council [2015] NZEnvC 50 about the relationship between RMA s69 and an objective to achieve the maintenance of overall water quality:

> *[57] Nor do we see it as compatible with the requirements of s69, which provides:*
> *…*
> *(3) Subject to the need to allow for reasonable mixing of a discharged contaminant or water, a regional council shall not set standards in a plan which result, or may result, in a reduction of the quality of the water in any waters at the time of the public notification of the proposed plan unless it is consistent with the purpose of this Act to do so.*

73. However, the Court did not address the final proviso in sub-section (3), that is "unless it is consistent with the purpose of this Act to do so."

74. Again, for context, the NPS-FM directs regional councils to "establish methods (including rules) to avoid over-allocation."[43] Over-allocation is defined in the NPS-FM as "the situation where the resource (a) has been allocate to users beyond a limit; or (b) is being used to a point where a freshwater objective is no longer being met."

Submissions and analysis

75. Many submissions were made on policies D.4.1 – D.4.4. Several people raised concerns about the location of the standards (that is, in policy).

76. Bay of Islands Maritime Park Inc., New Zealand Transport Agency, GBC Winstone, the Egg Producers Federation of New Zealand believe that the standards should be relocated as rules to section C.6 of the plan. New Zealand Transport Agency made reference to guidance on the Quality Planning website that states "In writing policies it is good practice to: ... [a]void … policies that incorporate thresholds or standards that change the consent class an activity may sit under (thresholds and standards should be in rules"[44] New Zealand Transport agency added that "[a]ppropriate policies for water quality should be included for rivers, coastal water and coastal sediment quality."[45]

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[43] NPS-FM, Policy A1
[44] http://www.qualityplanning.org.nz/index.php/plan-steps/writing-plans/writing-issues-objectives-and-policies?
[45] New Zealand Transport Agency. p.29

77. GBC Winstone stated in its submission that:[46]

> *[It] accepts that activities can adversely impact on water quality, but suggests that these policies are effectively rules. Policies are the course of action to achieve or implement the objective (i.e. the path to be followed to achieve a certain, specified, environmental outcome). It is not good practice to incorporate in Policies, thresholds or standards that change the consent class an activity may sit under i.e. thresholds and standards should be in rules. Although, at present there is no clear connection between the rules and these standards including for permitted activities.*
>
> *GBC Winstone seeks that Policies D.4.1, D.4.2, D.4.3 and D.4.4 either become rules or appendices that are directly linked to the rules.*

78. The Oil Companies made a similar submission:[47]

> *These policies essentially set contaminant discharge standards (for water quality in lakes and rivers, coastal water quality and coastal sediment). It is inappropriate to set standards in policies. Policies should be able to guide decision making in the event that thresholds (set in rules) are not met. These policies do not guide decision making. In essence, if the standard (cross referenced in a rule) is not met, then there will equally be non-compliance with the policy. How do applications, third parties and or the Council then assess non-compliance? What are the policy outcomes that the standards are intended to achieve? Also, in a practical sense, where are the compliance metrics measured, is reasonably mixing to be allowed for, and to what extent can / should cumulative effects of individual discharges be taken into account? These policies should be deleted. The standards could still have currency and effect (and thereby remain consistent with the NPS Freshwater Management 2014 (Updated August 2017)) if linked to the rules (eg: via reference in the rules to a Schedule containing the Standards).*

79. Top Energy also want the standards in policies D.4.1, D.4.2, D.4.3 and D.4.4 to "either be become rules or appendices that are directly linked to the rules."

80. I agree with the submitters that it is appropriate to move the standards from policy to an appendix.

81. The scope of the standards was the second key matter raised in submissions on policies D.4.1 – D.4.4. Bay of Islands Maritime Park Inc want policy D.4.1 to be expanded "to

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[46] GBC Winstone. p.8
[47] The Oil Companies. p.60

include eutrophication measures including Northland-specific macro-invertebrate measures and standards."[48]

82. Northland Fish and Game submitted that:[49]

> *…it supports the water quality standards to manage the discharge of contaminants however, limiting the attributes to only nitrate and ammonia is rivers is not sufficient to achieve sustainable management. The proposed standard does not safeguard rivers from excessive sediment and phosphorus discharges.*
>
> *NFGC seek that phosphorus and total suspended solids are included as water quality attributes.*

83. It is important to note that the regional council has scheduled a plan change for circa. 2021 to include numeric freshwater quality objectives in the regional plan for periphyton biomass and associated nutrient criteria for dissolved inorganic nitrogen and dissolved reactive phosphorus. For reasons stated earlier in this report it is not practicable or indeed necessary to attempt this now. Ministry for the Environment is also doing work to establish appropriate attributes and states for fine sediment, in the interests of including attributes for sediment in Appendix 2 of the NPS-FM.[50] It is not appropriate at this stage for the council to attempt to determine its own attributes.

84. Haititaimarangai Marae 339 Trust and the Minister of Conservation want the following LakeSPI (lake submerged plant indicator) objective included in the plan:[51]

> *>50% for deep lakes (i.e. high Lake SPI)*
> *20-50% for shallow lakes (moderate Lake SPI)*

85. They also want "targets for macrophyte depth limits in the Plan at >7m for deep lakes and >3m for shallow lakes".[52]

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[48] Bay of Islands Maritime Park Inc. p.4
[49] Northland Fish and Game. p.54
[50] See http://www.mfe.govt.nz/publications/fresh-water/sediment-attributes-stage-1 and https://www.mfe.govt.nz/publications/fresh-water/sediment-attribute-stage-1b-proposed-classification-suspended-sediment
[51] Haititaimarangai Marae 339 Trust. p.42., Minister of Conservation. p.46
[52] Ibid

86. Their submissions were informed by David Kelly, et al. (2016)[53]. The Minister of Conservation points out:

> *This new objective will enable greater understanding by the public due to its visual indicators than a total nitrogen load for example. Lake SPI picks up the condition of things like aquatic plants, which are important for lake ecological health.*
>
> *The Cawthron report also suggests setting targets for macrophyte depth limits. The report outlines that the depth to which macrophytes grow defines the littoral zone of lakes, which are generally the zone of highest productivity and biodiversity values. There is a strong relationship between the depth to which macrophytes grow and water clarity indicating a sensitivity to water clarity. The S32 report does appear to use this measure as a way of justifying the water quality standards selected from the NOF. However, the Plan needs to be more explicit about this requirement. Macrophyte depth limits recommended to be included in the Proposed Plan are >7m for deep lakes and >3m for shallow lakes and the these are appropriate targets for the lakes given present available data ranges and relationships with nutrient status.*

87. It is also important to note that while David Kelly, et al (2016) "identified strong statistical relationships for TP and TN with macrophyte cover and extent and Lake SPI native score"[54] they also stated:[55]

> *Consideration could be given to targets for either LakeSPI index or macrophyte depth limit targets within NRC's Regional Water Plan for protection of aquatic habitat values.*
> *…*
> *However, because the LakeSPI index is controlled by other environmental factors beyond nutrient status (e.g., exotic weed incursion, herbivorous pest fish)* ***a range of additional measures would need to be employed in combination to manage lakes for meeting LakeSPI targets.***

88. I consider that it is not appropriate to frame macrophyte depth limits as water quality standards. The depth at which macrophytes grow is largely a function of euphotic depth, which is influenced by levels of phytoplankton and suspended inorganic and organic matter.

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[53] David Kelly, Lisa Peacock, Weimin Jiang. 2016. Nutrient Management for Northland's Dune Lakes. Prepared for Northland Regional Council. Cawthron Institute. Report NO. 2796.
[54] David Kelly, et al. 2016., p.55
[55] Ibid

89. Haititaimarangai Marae 339 Trust stated in its submission that:[56]

> *There is a lack of identified values for individual water bodies/catchment in the Region means that there is no requirement to protect or even consider these values when evaluating the suitability of a particular activity.*
>
> *In order for the values of freshwater to be protected, these values must first be clearly identified and water quality targets and limits must then be set to ensure that these values are protected, maintained and where appropriate enhanced.*
> *…*
> *Include policies in the plan that support the setting of numerical standards/limits/targets/outcomes for water quality and quantity which safeguard the life supporting capacity and ecosystem processes of freshwater, protect natural character, and provide for recreation, cultural, amenity and intrinsic values.*

90. I disagree with the first statement. A person applying for a resource consent to discharge contaminants into the environment are required to, inter alia, provide an assessment of:[57]

- The activity against the matters set out in part 2 of the RMA;
- The activity against any relevant provisions of a document referred to in section 104(1)(b), which as I highlighted above, encompasses multiple objectives and policies relating to water quality outcomes;
- The activity's effects on the environment, including an assessment of the actual or potential effect on the environment of the activity on;
    - any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects;
    - any physical effect on the locality, including any landscape and visual effects
    - any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity
    - any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations.

91. It is clear to me that there is plenty of direction in the RMA and in national and regional policy statements on how actual and potential adverse effects of discharges on a water

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[56] Haititaimarangai Marae 339 Trust. p.34
[57] RMA, schedule 3

quality dependent values are to be assessed. The only major weakness to date is that many councils have not set numerical water quality objectives/standards for all water bodies.

92. That said, I recommended earlier in this report that a water quality objective[58] should be included in the Proposed Plan that provides for a range of water quality dependent values.

93. The third key matter raised was how the standards should be described. The Minister of Conservation wants all references to 'water quality standards' to be replaced with 'water quality limits' because "[l]imits is terminology consistent with the requirements of the NPSFM and should be used throughout the Plan."[59]

94. The term limit is found in the NPS-FM, where is it defined as "the maximum amount of resource use available, which allows a freshwater objective to be met." There is a great deal of uncertainty about what a limit is in a freshwater management context. It was only recently (March 2018) that the Ministry for the Environment released draft guidance on limits under the NPS-FM. The draft guide has this to say about the relationship between freshwater objectives and limits:[60]

> *Freshwater objectives and limits are two essential components of the Freshwater NPS.* ***They are sometimes thought of as being interchangeable terms; however, the intent of the NPS is that they are about very different things****. A freshwater objective is a description of the intended state of the water and is expressed in relation to specified attribute states (A-C). A limit is a description of the amount of resource use that will allow that state to be achieved; and which ideally can be defined for individual resource users or at a catchment/freshwater management unit (FMU) scale (see discussion below on allocation).* [My emphasis]

95. While the term 'limit' is somewhat ambiguous it should not be conflated with a freshwater objective (in terms of Policy A1 of the NPS-FM) or a water quality standard. The latter describe water quality conditions necessary to support water quality dependent values, whereas limits state the maximum amount of resource use that can occur without compromising the desired water quality conditions.

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[58] To be clear, an objective in terms of RMA s67(1)(a), not an objective in terms of Policy A1 of the NPS-FM.
[59] Minister of Conservation. p.42
[60] Ministry for the Environment. 2018. *A Draft Guide to Limits under the National Policy Statement for Freshwater Management 2014 (as amended 2017).* Wellington: Ministry for the Environment. p.6

96. It is also important to note that the term target is used in the NPS-FM, where it is defined to mean "a limit which must be met at a defined time in the future." This meaning only applies in the context of over-allocation". It is not appropriate to apply the term to a freshwater objective/standard that is not being met at a particular site(s).

97. Horticulture New Zealand stated in its submission that:[61]

> *It is uncertain if [the river water quality standards] are intended as a holding pattern for the National Objectives Framework (NOF) in each of the proposed catchments as all catchments are effectively set at an A Band standard for ammonia and nitrate.*
>
> *An examination of the draft catchment plans shows that several of the sub-catchments already exceed the proposed standards (based on State of Environment (SOE) data).*
>
> *The implication is that these standards are actually desired states [targets], rather than standards.*
>
> *…*
>
> *The standards both in terms of the attributes and the A band NOF levels seem to have been picked randomly.*

98. AFFCO New Zealand submitted that policies D.4.1 should allow greater concentration standards for nitrate and ammonia toxicity for the following reasons:[62]

> *Nitrate: The PNRP is based on Attribute State A from the NPS-Freshwater Management (NPS-FM). The more appropriate attribute State is Attribute B as set out in the amendments above. Attribute State B represents a significant advance over the "National Bottom Line" set out in the NPS-FW, and is considered appropriate to avoid adverse effects in Northland rivers.*
>
> *Ammonia: The PNRP is based on Attribute B from the NPS-Freshwater Management (NPS-FWM). The more appropriate attribute State is Attribute State C as set out in the amendments above. Attribute State C represents a significant advance over the "National Bottom Line" set out in the NPS-FW, and is considered appropriate to avoid adverse effects in Northland rivers.*

99. As documented in the RMA section 32 report, most of the sites in the region's river water quality monitoring network are, with the odd exception, are in the A attribute state for nitrate toxicity and a B attribute state for ammonia toxicity (mainly because of the annual maximum compliance metric). That is why the standards have been largely set at the

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[61] Horticulture New Zealand. p.62
[62] AFFCO New Zealand Ltd. p.12

levels equivalent to the A and B attribute states for ammonia and nitrate toxicity in the Proposed Plan.

100. Horticulture New Zealand also submitted on policy D.4.2:

> *We believe that while the proposal for lake standards is admirable the provisions as notified make all deep lakes A band and all shallow lakes C band. While these may be the current state values for these lakes it seems that the cyanobacteria values are missing.*
> *…*
> *An interim measure may be to call these provisions targets and include the A band and C band levels respectively for cyanobacteria.*
>
> *The quality target attribute levels need to be defined as measured state targets so temporal variability is accounted for by included a new column or adjusting the compliance state narrative.*

101. The water quality standards for lakes were informed by David Kelly, et al. (2018).[63] I agree that it is confusing to use the term standard instead of a freshwater quality objective. However, for all intents and purposes the lake water quality standards define the water quality conditions necessary to support the health of lake ecosystems at a defined level. This is the purpose of a freshwater objective.

102. Horticulture New Zealand also submitted that "a column for temporal period for the compliance state" should be inserted in the coastal water quality standards in policy D.4.3. I do not fully understand the request, but agree that some of the compliance metrics are uncertain as they do not have a temporal aspect. I consider that all references to medians and percentiles should be annual medians and percentiles.

103. It is not clear to me what Horticulture New Zealand means by amending the standards to account for temporal variability.

104. The council has insufficient information on cyanobacteria in Northland's lakes to be able to set freshwater objectives/standards for cyanobacteria biovolume. Note that the council has scheduled a plan change for circa. 2021 to include freshwater quality objectives for

[63] David Kelly, Lisa Peacock, Weimin Jiang. 2016. Nutrient Management for Northland's Dune Lakes. Prepared for Northland Regional Council. Cawthron Institute. Report NO. 2796.

cynobacteria in the plan and give effect to Policy A5, which requires regional councils to ensure that their plans:

> *a) identify specified rivers and lakes, and primary contact sites; and*
> *b) state what improvements will be made, and over what timeframes, to specified rivers and lakes, and primary contact sites, so they are suitable for primary contact more often; or*
> *c) state how specified rivers and lakes, and primary contact sites, will be maintained if regional targets established under Policy A6(b) have been achieved.*

105. Whangarei District Council stated in its submission that:[64]

> *[The standards in policies D.4.1 and D.4.2] will be replaced by national standards under the NPS Freshwater Management. It would be more appropriate to refer to standards or the NPS rather than having a table that will shortly be obsolete within the plan as it is not clear how D.4.1 will change and for how long it will apply. There are no timeframes noted around the transition to the numerical standards.*

106. The district council makes a good point. That is, the advice notes to policies D.4.1 and D.4.2 raise questions about the purpose of the standards with respect to the direction in the NPS-FM to include numerical freshwater objectives for nitrate and ammonia toxicity in the regional plans.

107. The regional council included the standards in the Proposed Plan using the attributes for ammonia and nitrate toxicity in the NPS-FM because nitrate and ammonia water quality is largely consistent across the region. In other words, nitrate and ammonia levels do not vary significant between water quality monitoring sites. Furthermore, it is very unlikely that nitrate concentrations in the region's rivers will increase in the near future. This is also true for ammonia, however, and as pointed out by MfE, the key sources of ammonia are generally point sources.[65] Farm dairy effluent discharges are the predominant point source in Northland. Nitrate comes from diffuse and point sources.

108. Whangarei District Council also stated in its submission that the water quality standards in policies D.4.1 – D.4.3 "do not take into account diffuse discharge [and there] is no mention of mixing zone, or where testing should take place."[66]

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[64] Whangarei District Council. p.37
[65] Ministry for the Environment. 2018. *A Draft Guide to Attributes in Appendix 2 of the National Policy Statement for Freshwater Management (as amended 2017).* Wellington: Ministry for the Environment.
[66] Whangarei District Council. p.37

109. The district council is correct: The Proposed Plan does not contain rules or policy for diffuse source discharges of contaminants and the water quality standards do not provide for mixing zones (that is, where the standards do not apply).

110. There is no pressing need to include rules for diffuse source discharges because it is unlikely that agricultural activities will intensify in the near future and the standards are largely being met. What's more, the regional council considers that diffuse sources of contaminants are best addressed with an NPS-FM freshwater objectives and limits based planning framework.

111. It is important to note that the standards were also included in the Proposed Plan when the 2014 version of the NPS-FM was in effect. Objective A2 of the NPS-FM 2014 stated "[t]he overall quality of fresh water within a region is maintained or improved…". The objective was amended in August 2017 to apply to management units not regions. Policy CA2 was also amended with the inclusion of the following direction:

> *iia. in those cases where a freshwater objective seeks to maintain overall water quality in accordance with Objective A2, by every regional council ensuring:*
>
> *A. where an attribute is listed in Appendix 2, that freshwater objectives are set at least within the same attribute state as existing freshwater quality; and*
>
> *B. where an attribute is not listed in Appendix 2, that freshwater objectives are set so that values identified under Policy CA2(b) will not be worse off when compared to existing freshwater quality; and*

112. This is an important consideration because the ammonia and nitrate toxicity standards in the proposed plan apply to, effectively one, management unit. That is all of the regions rivers and streams (excluding outstanding water bodies, which have a slightly higher level of protection). While nitrate and ammonia (toxicity) water quality patters are generally similar across sites monitored there are 'unders and overs'.

113. For lakes there is more variation in TN, TP and periphyton biomass, but there only two lake management units for all of Northland's lakes. There are more than 200 natural lakes greater than one hectare in size in Northland, with a wide range of trophic state conditions. Legacy nutrient loads and diffuse sources are understood to be the main drivers of water quality conditions. Given the changes to the NPS-FM and the absence of water quality limits and controls on diffuse sources in the Proposed Plan, I consider that the ammonia and nitrate toxicity standards for rivers and TN, TP, chlorophyll a and ammonia toxicity standards for lakes should be deleted.

114. I strongly believe that the council should revisit its approach to defining lake management units and associated freshwater quality objectives as part of the plan change scheduled for circa. 2021. That could involve establishing specific freshwater quality objectives for the region's high value and monitored lakes (approximately 27) and appropriate controls including limits of diffuse and point sources, including through more targeted discussion with local communities, including tangata whenua.

115. The lake water quality standards are largely irrelevant within the context of the Proposed Plan because point source discharges of nutrients to lakes are rare; the plan does not contain water quality limits relating to the objectives or controls on diffuse sources of nutrients.

116. The ammonia and toxicity standards for lakes are also largely irrelevant because the majority of consented farm dairy effluent discharges do not expire until the mid-2020's.

117. However, I consider that the plan should contain standards for coastal waters and which should apply after reasonable mixing. This is consistent with sections 69(3), 70(1), 107(1) and schedule 3 of the RMA.

118. Refining New Zealand submitted that policy D.4.3 ("Coastal water quality standards"):

> *…does not provide recognition for the existing authorised discharges and treatment facilities servicing the Refining NZ Marsden Point Site. It is noted that the mixing zone associated with these discharges is identified as 'Mixing Zone for Major Discharges' in section I.Maps. The Company seeks that the discharge limits from its existing resource consent (AUT.008319.01.03) be included as an additional table to policy D.4.3 (such limits have been set for the relevant location following robust expert analysis).*

119. The policy does apply to an activity that is authorised by a resource consent.

120. Refining New Zealand also stated:

> *The Company has sought expert consultant feedback on the standards, in particular those that are provided for the OCMU. The advice the Company has received is that, as drafted, the standards do not clearly state what the 'natural state' is or in what conditions it is measured. As such, compliance with the standards is unclear and open to conjecture. This represents a sub-optimal situation for both Council and the community. Further clarity is therefore required in the policy to address what the natural state value is, in what conditions such measurements are undertaken, and the percentile value that the standard is applicable to.*

121. I agree with Refining New Zealand that the current narrative standards for open coastal waters are unclear. I think that this could be addressed by replacing the standard “no change from natural state” with “no discernible change”.

122. The Royal Forest and Bird Protection Society of New Zealand want water quality standards to be included in the Proposed Plan for wetlands. However, it did put forward any standards for consideration. I note that there is a lack of information on appropriate nutrient criteria for managing eutrophication issues in wetlands (wetlands are mainly sensitive to excess nutrients).

123. The Society also wants water quality standards for lakes to be included in the plan for cyanobacteria, *E.coli* and MCI. I

124. As mentioned early in this report, the council will include numeric freshwater quality objectives for *E.coli and* cyanobacteria in its regional plan circa. 2021. I do not think that the MCI (macroinvertebrate community index) is an appropriate candidate for water quality standards. That is because it is influenced by multiple variables, as highlighted by Joanne Clapcott and Eric Goodwin (2014):[67]

> *Overall results suggest that site MCI scores are related to land use through a complex chain of causality, which makes isolating the role of specific variables difficult. The impacts of limots placed on one effect pathway will depend on interactions with other pathways and will also be influenced by the local habitat. Catchment scale management may not result in a response in MCI scores without equal consideration of segment scale management and vice versa.*

125. Bay of Islands Planning Ltd. and Carrington Resort Jade LP. Submitted that turbidity should be deleted as a measure for the open coastal management zone because the “use of turbidity as a measure for the open coast areas is considered problematic given that it is so variable, difficult to measure, and can occur as a result of natural events.” [68]

126. A & R LaBonte’ stated that the turbidity standard in policy D.4.3 should be 10 NTU measured at a distance of 150 metres upstream of the point where the confluence of a visible plume enters the receiving water.

127. I stated earlier that the coastal water quality standards should apply beyond the zone of reasonable mixing, rather than at the point of discharge. The zone of reasonable mixing

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[67] Joanne Clapcott, Eric Goodwin. 2014. Relationshup Between Macroinvertebrate Community Index and Environmental Drivers. Prepared for Ministry for the Environment. Cathwron Report No. 2507.
[68] Bay of Islands Planning Ltd. p.23

will be determined on a case-by-case basis taking into account, inter alia, the nature of the discharge and the sensitivity of the receiving environment.

128. Mangawhai Harbour Restoration Society Inc. stated that the standards in policy D.4.3 should be amended to address the following matters:[69]

> *1) Turbidity standards for tidal creeks and estuaries should be based on threshold values above background turbidity levels (as estuaries and tidal creeks are affected by weather events as well as discharge / disturbance activities).*
> *2) The background turbidity levels for tidal creeks and estuaries should be set based on the estuary / tidal creek in which the activity is taken place (as background turbidity levels will vary depending on the estuary and catchment soil type).*
> *3) Past project monitoring results should form the basis for establishing background levels, turbidity limits and mixing zones within a particular estuary / tidal creek.*

129. The society's provided detailed reasons for its request. Rather than summarise the reasons here, I refer the Hearing Panel to the society's submission.

130. I understand that the proposed turbidity standards are based on data collected from many locations in Northland's coastal waters.[70] I also understand the regional council has been collecting water quality data from four sites in the Mangawhai estuary since late 2016 and the median turbidity values are significantly less than the proposed standards for tidal creeks and estuaries.[71]

131. GBC Winstone stated that policies D.4.4 and D.4.5 should be deleted for the following reasons:[72]

> *Policy D.4.4 seeks to introduce coastal sediment quality standards. These standards are based on the Canadian Environmental Quality Guidelines (CCQG). The CCQG provide science-based goals for the quality of aquatic and terrestrial ecosystems. Each jurisdiction within Canada has a discretion to determine which, if any, of the CCQG values apply to their respective areas.*
>
> *Policy D.4.5 provides that resource consent will generally be declined if a CCQG guideline is exceeded or further exceeded.*

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[69] Mangawhai Harbour Restoration Society Inc. p.30
[70] Richard Griffiths. 2016. Recommended Coastal Water Quality Standards for Northland. Northland Regional Council.
[71] Richard Griffiths. Pers. comm. November 2017.
[72] Supplementary submission from GBC Winstone. p.1

The CCQG guidelines are significantly lower and more conservative than the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC), the reference sediment guidelines that are most commonly used in the Northland Region. For example, for zinc, ANZECC adopts a guideline value of 200 and the CCQG adopt a guideline value of 124. Similarly, for copper, ANZECC adopts a guideline value of 65 and the CCQG adopt a guideline value of 18.7.

As currently drafted, Policy D4.4 is absolute. The CCQG values for any of the specified metals must not be exceeded.

It is not appropriate for the CCQG to be used in a regional plan as anything other than guideline values. The inclusion of the CCQG in the Proposed Plan as essentially a "pass/fail" standard will create unjustifiable restrictions on industry operations in the Northland Region, without necessarily resulting in any ecological benefits.

If any of the CCQG values are to be included in the Proposed Plan, they should apply as guideline values only.

132. The issues raised by GBC Winstone can be summarised as follows:
    - That it is not appropriate to apply water quality guidelines as standards;
    - The Canadian Sediment Quality Guidelines for the Protection of Aquatic Life are inappropriate for use in New Zealand;
    - Policies D.4.4 and D.4.5 are absolute. That is, if a discharge will cause a coastal sediment quality standard to be exceeded it should not be granted. It is not appropriate for a policy to direct whether an application for a resource consent should be granted or not.

133. I address these issues in turn. First, the RMA does not preclude regional councils from applying guideline values as standards in plans. Section 69(2) of the Act states: "Where a regional council provides in a plan that certain waters are to be managed for any purpose for which the classes specified in Schedule 3 are not adequate or appropriate, the council may state in the plan new classes and standards about the quality of water in those waters."

134. The Act does not state limitations on how new standards are to be derived. The only restriction is "[s]ubject to the need to allow for reasonable mixing of a discharged contaminant or water, a regional council shall not set standards in a plan which result, or may result, in a reduction of the quality of the water in any waters at the time of the public

notification of the proposed plan **unless it is consistent with the purpose of this Act to do so**."[73] [My emphasis]

135. Second, GBC Winstone did not state why it is inappropriate to use the Canadian Sediment Quality Guidelines. For context, I it is useful to consider Richard Griffiths (2016) reasons for his recommendation to apply the Canadian Sediment Quality Guidelines for six metals:[74]

> *For Northland coastal waters, it is recommended that the Canadian TEL concentartions [sic] be adopted for tidal creek, estuarine and open coast zones (Table 33). Sediment concentartions [sic] in Northland are generally well below these values. If the more relaxed ANZECC ISQG-Low concentartions [sic] were adopted it may in effect permit a deterioration in the quality of Northland's coastal water resources. Section 69 of the RMA states that Regional Councils shall not set a standard in a plan which results, or may result, in a reduction of the quality of the water in any waters at the time of the public notification of the proposed plan.*
>
> *…*
>
> *For the Hātea River, it is recomended [sic] that the ANZECC 2000 ISQG-low trigger values be adopted (Table 33). Several sites in the Hātea River have metal concentrations that already exceed the Canadaian [sic] TEL and at some sites the ANZECC ISQG-low trigger values (Griffiths, 2014a). Metal contaminants are not subject to bacterial attack or breakdown so are essentially permanent additions to the marine environments. The legacy of historical activities therefore means it will be difficult for levels at these sites to reduce significantly in the short-term.*

136. Third, GBC Winstone is correct that policy D.4.5 prevents a decision-maker from granting an application for a resource consent that would allow a water quality standard (in policies D.4.1 – D.4.3) or sediment quality standard to be exceeded (in policy D.4.4). I am uncomfortable with the approach because the standards provide for a very high level of protection for receiving waters and there may be cases where the beneficial effects of the proposal outweigh a breach of a standard particularly in modified receiving environments.

137. What is more, the plan only contains rules for point source discharges; it does not contain rules for diffuse sources of contaminants. Metals like copper and zinc come from point source and diffuse sources. I also consider that it may be difficult for applicants and

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[73] RMA s69(4)
[74] Richard Griffiths. 2016. Recommended Coastal Water Quality Standards for Northland. Northland Regional Council.

decision-makers to determine if a proposed activity will breach a sediment quality standard.

138. The regional council formulated the standards in absolute terms due to the direction in section 69(1) of the RMA, which states:

> *(1) Where a regional council—*
>
> *(a) provides in a plan that certain waters are to be managed for any purpose described in respect of any of the classes specified in* Schedule 3*; and*
>
> *(b) includes rules in the plan about the quality of water in those waters,—*
>
> *the* ***rules shall require the observance of the standards specified in that schedule*** *in respect of the appropriate class or classes* ***unless****, in the council's opinion, those standards are not adequate or appropriate in respect of those waters in which case the rules may state standards that are more stringent or specific.* [My emphasis]

139. On the face of it, paragraph (a) requires regional councils to include rules in regional plans that require the observance of water quality standards, whether they are derived from schedule 3 of the Act or elsewhere. However, on closer reading this interpretation I think that this is not correct. That is, the requirement to include rules in plans that require activities to observe standards appears to only apply to standards from schedule 3, not standards different standards derived by councils.

140. It is also important to note that the setting of coastal water quality standards is not compulsory. It is optional under RMA s69 and there is no policy in national policy statements requiring coastal water quality standards.

141. I consider that policy D.4.5 should be amended so that it is specific to fresh water and new policy included in the plan that directs decision-makers to have particular regard to the coastal sediment quality standards and coastal water quality standards when considering an application for resource consent.

142. The last issue is the appropriateness of using policy, rather than rules, to require observance of standards. Section 69 of the RMA refers to rules, as does the policy A1 of the NPS-FM.

143. However, most of the standards do not lend themselves to conditions of permitted rules because they are not capable of consistent interpretation and implementation by lay

people without reference to council officers and they are not clear and certain[75] (with respect to some of the compliance metrics). For certainty, a prohibited activity rule would be needed to require observance.

144. The Oil Companies identified the issue of requiring discharges permitted by rules to comply with the proposed water quality standards in relation to condition 5 of rule C.6.4.2:[76]

> *…it is too complex to require each and every discharger to carry out [an] analysis for cumulative discharges from the pipe. Given the standards and terms that a discharge permitted under this rule has to meet, it is quite unnecessary and inefficient to apply this standard [that the water quality standards in policies D.4.1 – D.4.4 must be complied with].*

145. Whangarei District Council raised similar concerns with respect to the same condition in the rule:[77]

> *WDC manages over 300 outlets discharging to water bodies. Preventing every exceedance is not reasonably practicable. It is suggested that limits be set for (say) 90% of discharges, …*

146. Given the nature of the water quality standards I consider that it is inappropriate to subject permitted discharges to the water quality standards in policies D.4.1 – D.4.4 because of the challenges associated with being clear about how and when compliance with the standards would be measured (that is, the monitoring period, the number of samples).

147. I consider that it is appropriate to include policy direction to decision-makers on whether to grant or decline a resource consent. An example is policy B5 of the NPS-FM which directs decision-makers to ensure that no decision will likely result in future over-allocation. While over-allocation does not mean the exceedance of a rule, it does mean the exceedance of a freshwater objective or limit. The latter is a measurable quantity of resource.

148. I also note that case law has established that a policy is a course of action that can be either flexible or inflexible or broad or narrow.

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[75] *Carter Holt Harvey vs Waikato Regional Council* A123/08
[76] The Oil Companies. p.13
[77] Whangarei District Council. p.23

149. Several other people made submissions on policy D.4.5. Ravensdown Ltd. stated that it "generally supports the intent of Policy D.4.5 [but] consider the current wording is confusing and could be simplified" as follows:[78]

> *Applications for resource consents to discharge contaminants that may enter water must demonstrate mitigations that will ensure that overall water quality is maintained.*

150. It is not clear what parts of the policy Ravensdown Ltd. find confusing. I believe that the amended policy sought by the company is not appropriate because "overall water quality" is a nebulous term.

151. The New Zealand Transport Agency submitted that "[r]eference to terms such as *minimum acceptable state* and Objective A3(b) within the NPS Freshwater Management may be useful."[79]

152. 'Minimal acceptable state' is a term used in the NPS-FM and refers to the "minimum level at which a freshwater objective may be set in a regional plan in order to provide for the associated national value." Objective A3(b) states: "The quality of fresh water within a freshwater management unit is improved so it is suitable for primary contact more often, unless…naturally occurring processes mean further improvement is not possible. The relevance of the definition and objective with respect to policy D.4.5 is not clear.

153. The New Zealand Transport Agency stated that the term 'existing beneficial water quality dependent values' is unclear and should be defined. Likewise, Haititaimarangai Marae 339 Trust stated:[80]

> *This term is not defined and it is not clear what the plan considers to be beneficial water quality dependent values. Water quality standards are set to ensure that the values of the freshwater body are protected. Exceedance of these standards is likely to result in adverse effects on the identified values, it would therefore seems that the second part of the Policy is unnecessary.*

154. DairyNZ submitted that policy D.4.5 should state that beneficial water quality dependent values include socio-cultural, ecological and economic values of water. Federated Farmers made a similar submission.

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[78] Ravensdown Ltd. p.18
[79] The New Zealand Transport Agency. p.30
[80] Haititaimarangai Marae 339 Trust. p.43

155. Mangawahai Harbour Restoration Society Inc. want policy D.4.5 revised so that it provides for a resource consent to be granted that will exceed a water quality standard but will maintain or enhance existing beneficial qualities and values of the surrounding CMA and coastal environment.

156. The Minister of Conservation stated that there should be no provision for a resource consent to be granted because:[81]

> *Water quality standards are set to ensure that the values of the freshwater body are protected. Exceedance of these standards is likely to result in adverse effects on the identified values, therefore the second part of the Policy is unnecessary.*

157. The term 'beneficial water quality dependent values' is not defined in the plan and I accept that its meaning is unclear. The term was included in the policy as noun for values that do not involve waste assimilation. But I agree with the submitters; the term is confusing and not used in the RMA or NPS-FM and should be deleted from policy D.4.5.

158. It may be useful to note that the intent of the second sentence was to provide for a situation where the in-stream values that the standards are set to protect are not present

159. Far North District Council want policy D.4.5 to be replaced with the following policy:[82]

> *Where the quality of water in a water body (excluding an outstanding freshwater body) or coastal water is within or in a better attribute state than set in a water quality limit, resource consent may only be granted for any activity that will result in a lower attribute state if allowing a lower water quality is necessary for important economic or social development in the area which the water are located.*
>
> *When considering an application for a resource consent to discharge contaminants to a water body or coastal water with water quality in a lower attribute state than set in a water quality limit, resource consent may only*
> *be granted if:*
>
> 1) *the exceedance is caused by any of the following:*
>   a) *naturally occurring processes, or*
>   b) *anthropogenic sources that cannot be remedied, or*
>   c) *any dams or diversions, or regionally significant infrastructure, or District Council infrastructure, lawfully established at the notification date of this plan, and it is not practicable to restore the water body to its original condition, and*

[81] Minister of Conservation. p.48
[82] Far North District Council. p.24

2) discharging to land is prohibitively expensive.

160. The above policy was included in the non-statutory draft version of the plan, which predated the Proposed Plan. Far North District Council stated that the reason it wants the policy included in the Proposed Plan is that it "maintains significant infrastructure that can impact on water quality and this infrastructure should be given priority."[83]

161. Far North District Council did not provide any details on the infrastructure that it referred to or how it affects water quality with respect to the proposed standards. Nor did it elaborate on why the infrastructure should be given priority.

162. AFFCO New Zealand Ltd. want policy D.4.5 to be amended so that it provides for a resource consent to be granted if the adverse effects of the discharge are adequately remedied or mitigated. The reason being:[84]

> *[The words "existing beneficial water quality dependent values of water"] are uncertain … It should be recognised that the exceedance of a standard does not necessarily equate to an adverse effect on the environment, and it is submitted that the broad aim of the resource consent process is not ensure that adverse effects should be avoided remedied or mitigated"*

163. I have addressed submissions on the term 'existing beneficial water quality dependent values of water'. I also agree with AFFCO New Zealand Ltd. that an exceedance of a standard does not equate to an adverse effect on the environment. This is a reason why I recommended earlier that coastal water quality standards should not be absolute environmental bottom lines. However, the NPS-FM does not afford such discretion; it requires over-allocation to be avoided. In other words, it requires regional councils to set water quality standards that must not be breached.

164. Northland Fish and Game stated that policy D.4.5 should "be amended to better align with Objective A2 of the NPS-FWM, in particular, that 'overall' quality of freshwater is maintained 'or' improved." [85] It wants policy D.4.5 be replaced with the following policies:

> ***Maintaining water quality where standards are met:***
> *An application for a resource consent that would allow a water quality standard or sediment quality standard to be met will generally be approved providing:*

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[83] Far North District Council. p.24
[84] AFFCO New Zealand Ltd. p.13
[85] Northland Fish and Game. p. 55

1. *the adverse effects of new discharges are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing, those standards or sediment guidelines will continue to be met; and*
2. *an applicant for the replacement of an expiring discharge permit demonstrates how the adverse effects of the discharge are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing those standards or sediment guidelines will continue to be met.*

Improve water quality where standards are not met:
Where existing water quality does not meet the water quality standards or sediment quality standard, improve water quality by:

1. *avoiding where practicable and otherwise remedying or mitigating any adverse effects of new discharges on water quality or sediment quality that would exacerbate the exceedance of those standards or sediment guidelines beyond the zone of reasonable mixing; and*
2. *requiring any application for replacement of an expiring discharge permit to demonstrate how and by when adverse effects will be avoided where practicable and otherwise remedied or mitigated, so that beyond the zone of reasonable mixing water quality will be improved to assist with meeting those standards or sediment guidelines.*

Maintaining and improving water quality after FMU processes

Following the establishment of freshwater objectives and limits under Freshwater Management Unit processes and through implementation of non-regulatory methods, improve water quality where it is degraded to the point where freshwater objectives are not being met and is otherwise maintain where freshwater objectives are being met.

165. The first two policies requested Northland Fish and Game are, while worded differently, provide for the same outcome as the first part of policy D.4.5. The third policy ("Maintaining and improving water quality after FMU processes") is redundant, because it (a) restates the direction in policy A1(b) and A2 of the NPS-FM, and (b) is not relevant to the management of freshwater resources under the Proposed Plan.

166. Balance Agri-Nutrients Ltd. stated in its submission that policy D.4.5 should provide for a resource consent to be granted that would allow a water quality standard or sediment quality standard to be exceeded or further exceeded if:

- The existing values supported by the water quality dependent values are not adversely affected, or
- Any affects will be temporary and minor, or
- Any adverse effects will be less than minor.

167. Refining New Zealand submitted that policy D.4.5 should be amended so that it states:

> *An application for a resource consent that would allow a water quality standard or sediment quality standard to be exceeded or further exceeded will generally be declined except where:*
>
> *1) The existing values supported by the water quality values are not adversely affected; or*
> *2) The activity is associated with the operation of Regionally Significant Infrastructure; or*
> *3) Any effects will be temporary and minor (or less); or*
> *4) Any adverse effects will be less than minor in which case the activity may be appropriate.*

168. KiwiRail wants policy D.4.5 to be amended so that it provides for exceptions if the nature of the exceedance is temporary.

169. I support the request because the standards are for the purposes of avoiding chronic effects, not acute effects. I also support inserting a clause that provides for a water quality standard to be exceeded if it can be proven water quality dependent values will not be adversely affected. That is because it is reasonable to assume that some water bodies will not contain species that are sensitive to the maximum or minimum water quality conditions set in standards.

170. Horticulture New Zealand believes that a resource consent for a discharge that would result in a water quality standard being exceeded should be able to be granted if water quality standards are achieved through catchment offsetting of non-toxic contaminants beyond the zone of reasonable mixing.

171. Patuharakeke Te Iwi Trust Board Inc. stated in its submission that policy D.4.5 "should be redrafted to achieve enhancement rather than maintenance of water quality."[86] The Trust did not expand on how this should be done with respect to the water quality standards.

Recommendation

59. I recommend that the following changes are made to the Proposed Plan:
    - Delete policies D.4.1 and D.4.2 from the plan;
    - Relocate the standards in D.4.3 and D.4.4 to an appendix;
    - In the appendix, state the values that the standards are set to protect;

[86] Patuharakeke Te Iwi Trust Board Inc. p.15

- Specify that the median and percentile compliance metrics in the coastal water quality standards are annual medians and percentiles;
- Specify that the standards apply after reasonable mixing;
- Replace the narrative standard ("No change from natural state") for open coastal waters with "No discernible change";
- Delete policy D.4.5; and
- Insert a new policy after D.4.5 that directs decision-makers on an application to discharge a contaminant into coastal waters to have particular regard to the coastal water quality standards and coastal sediment quality standards in the appendix.

Evaluation of recommended changes

59. Section 32AA of the RMA requires an evaluation of proposed changes to the Plan. I consider that most of the changes are of minor effect. If anything, they will make the plan easier to apply. The last change (including a new policy on how to apply coastal water quality standards) will allow a level of tolerance around water quality standards.

60. I also consider that it is appropriate to provide decision-makers with some discretion in how they apply the coastal water quality standards. That is because I consider that the direction in section 69(1) of the RMA to require observance of water quality standards does not apply to standards that are not derived from schedule 3 of the RMA. A 'loosening' of how coastal water quality standards are to be applied is, in my opinion, justified because the standards provide a very high level of protection with potential unintended costs. I consider that requiring decision-makers to have particular regard to the coastal water quality standards, rather than apply them without discretion, is consistent with the purpose of the Act.

61. Regarding the first change (deleting the freshwater quality standards) I consider that this will also be of minor effect for reasons documented earlier. That is, they are largely irrelevant. It is also far more appropriate for the council to establish a full suite of freshwater quality objectives for lakes and rivers, along with limits/targets and methods to avoid/phase out over-allocation in several years, using robust analyses and in way prescribed in the 2017 version of the NPS-FM.

62. I believe that the recommended amendments are the most appropriate way to achieve the high-level objectives and also the new water quality objectives to be included in the Proposed Plan.

Offsetting non-toxic contaminants

Background

63. Policy D.4.6 of the Proposed Plan is about offsetting residual non-toxic contaminants.

> *Regardless of the quality of the receiving waters, ensure that non-toxic contaminants that cannot be removed from a discharge are offset to the fullest extent practicable in the catchment of the water body or coastal water, such as by way of re-vegetating riparian margins and restoring or constructing wetlands.*

64. The policy stems from method 4.2.2(1)(j) of the RPS which states that "[t]he regional council will amend its regional plans to the extent required to implement Policy 4.1.1 and Policy 4.2.1, including by: … Providing for the use of contaminant offsetting for direct and diffuse discharges of sediments and non-toxic forms of nitrogen and phosphorus."

65. The explanation to the method states:

> *Method 4.2.2(1)(g) [sic] recognises that the cost of managing the same contaminant can vary between different sources in a catchment. For example, the cost of reducing nitrogen levels from a wastewater treatment plant may greatly exceed the cost of reducing nitrogen from elsewhere in the catchment and vice versa. Water quality offsetting initiatives allow resource users facing high regulatory costs to meet rules by mitigating contaminant loads from another source or sources at a lower cost. However it is recognised that there are limitations to the practicality of implementing offsetting.*

Submissions and analysis

66. AFFCO New Zealand Ltd. submitted in relation to policy D.4.6:[87]

> *The RMA defines "contaminants" very broadly, so that the existing wording would potentially impose unreasonable obligations on resource users. The broad aim of the RMA resource consent process is to ensure that adverse environmental effects are avoided remedied or mitigated, hence the inserted wording. The focus should be on effects, not on "non-toxic" contaminants per se.*

[87] AFFCO New Zealand Ltd. p.14

67. Fonterra submitted along similar lines, insofar that it:[88]

> *…considers that the policy requiring the offsetting of toxic contaminants is unjustified. The RMA is not a no-effects statute, residual effects may often result and it is unrealistic to expect them to be offset in every circumstance, particularly where there is a significant cost of doing so. Fonterra seeks that the policy is deleted.*

68. AFFCO and Fonterra make valid points: the policy is so broad in application that it may prove difficult to implement and it is not effects-based. It also goes beyond the direction in the RPS, which is specific to sediment and non-toxic forms of nitrogen and phosphorus. The way the policy is worded implies that contaminant losses to water should be mitigated to the fullest extent possible on the basis that any increase in contaminant loads is detrimental to water quality dependent values. This is factually incorrect.

69. A definition of a 'non-toxic contaminant' was sought by Far North District Council and Ravensdown Ltd. The Minister of Conservation and Haititaimarangai Marae 339 Trust also stated that it is not clear what is meant by 'non-toxic contaminants.

70. Haititaimarangai Marae 339 Trust also submitted:[89]

> *That the policy be deleted or amended to ensure that the effects of the discharge of contaminants to the environment are appropriately avoided, remedied or mitigated. Offsetting should only be used as a last resort option where avoiding, remedying or mitigation is not an available option or is not appropriate and that offsetting only be used in instances where clear guidelines are set in the Plan.*

71. I consider that offsetting contaminants is a form of mitigation. That is because it involves reducing an equal or near-equal amount of a contaminant to a water body from another source(s) in the catchment – effectively mitigating the amount of contaminant from the discharge.

72. Horticulture New Zealand supports the provision for offsetting contaminants, but stated that:[90]

> *…the approach to offsetting needs to target the catchment where the discharge occurs and to ensure that the contaminants are linked to stream chemistry toxicity.*

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[88] Fonterra. p.29
[89] Haititaimarangai Marae 339 Trust. p.44
[90] Horticulture New Zealand. p.65

HortNZ also believes that the offsetting should target discharges which won't cause legacy effects on the catchment.

73. It wants policy D.4.6 to be replaced with the following:

Offsetting residual contaminants
Regardless of the quality of the receiving waters, ensure that contaminants that:
a) are not causing coastal sediment standards to be exceeded; and
b) are not causing toxic changes in stream chemistry; and
c) cannot be removed from the discharge
are offset to the fullest extent practicable in the catchment of the water body or coastal water where the discharge occur.

This will be achieved by way of re-vegetating riparian margins and restoring or constructing wetlands.

74. The New Zealand Transport Agency stated that it "supports offsetting as a method of mitigation [but it] would be helpful if the policy was reworded to enable offsetting to be available for all types of (residue) effect rather than limited to non-toxic contaminants."[91]

75. Ravensdown requested "criteria or reference to best practice or Codes of Practice that will be used to determine if off-setting is the fullest extent practicable."[92]

76. The Royal Forest and Bird Protection Society of New Zealand queried the relationship between policy D.4.6 and the direction in policies A1, A2 and A3 of the NPS-FM:

The NPS-FM 2014 Policy A3 part a) requires councils to impose conditions of discharge permits to ensure the limits and targets specified pursuant to Policy A1 and Policy A2 can be met. As the NRC Plan does not include provisions to deliver Policies A1 and A2 of the NPS-FM 2014, it is then not possible to know if NRC Plan policies on discharge, D.4.6 – D.4.12, can properly deliver the requirements of NPSFM 2014 Policy A3.

Further the NPS-FM Policy A3 part b) says where permissible, making rules requiring adoption of best practicable option to prevent or minimise any actual or likely adverse effect on the environment of any discharge into water or onto land, causing a contaminant to enter fresh water. As the NRC Plan does not include provisions to deliver Policies A1 and A2 of the NPS-FM 2014, it is then not possible to know if NRC Plan policies on discharge, D.4.6 – D.4.12, can properly deliver the requirements of NPSFM 2014 Policy A3.

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[91] New Zealand Transport Agency. p.30
[92] Ravensdown Ltd. 18

This seems to encourage 'offsetting non-toxic contaminants' by way of riparian planting or wetlands. The policy should require the treatment of contaminants to avoid breaching the standards.

77. The Proposed Plan does contain numeric freshwater quality objectives (termed freshwater quality standards) for ammonia and nitrate toxicity in rivers and TN, TP, chlorophyll a and ammonia toxicity in lakes. However, it does not contain water quality limits for several reasons including, but limited to:

- There is insufficient scientific evidence and a lack of tools to be able to link desired in-stream water quality conditions (freshwater objectives/standards) with sources and loads of contaminants. For example, we do not have the tools to be able to set property scale loss limits for sediment, *E.coli* or phosphorus, and using OVERSEER for nitrogen is problematic for some of our soil types;
- Changes to estimated catchment contaminant loads in response to mitigations for changes in land uses cannot currently be accurately predicted;
- The scale of the challenge. That is, Northland contains more than 200 natural lakes greater than one hectare in size and around 1,500 source-to-sea catchments.

78. With respect to the Royal Forest and Bird Protection Society, policy D.4.6 was not included in the plan for the purposes of imposing conditions on discharge permits to ensure the limits can be met, because the plan does not contain limits. It was included for the purposes of ensuring the contaminants loads in discharges can be mitigated to the fullest extent practicable by way of offsetting residual loads.

79. Having considered the submission points, I consider that policy D.4.6 should be deleted from the plan for the following reasons:

- It is not effects-based because it be not be necessary in all instances to mitigate contaminant losses to water due to 'head-room' (under water quality standards) or the in-stream values may not be adversely effected by the contaminant load; and
- The policy will be likely be difficult to apply in practice, for example it will be challenging to accurately account for the equivalency of contaminants E.g. TN vs DIN), the effectiveness of substitute mitigations and the distance between the discharge and the substitute mitigations. It will also be difficult to monitor the effectiveness of substitute mitigations under a contaminant offset regime; and

80. Furthermore, it would be more appropriate to consider developing a contaminant offsetting framework when setting limits for inclusion in the plan. This is more consistent with what is

contemplated by the relationship between method 4.2.2(1)(j) and policy 4.2.1(a) of the RPS.

Recommendation

81. I recommend that policy D.4.6 of the Proposed Plan be deleted.

Evaluation of recommended changes

82. Section 32AA of the RMA requires an evaluation of proposed changes to the Plan. I consider that deleting policy will eliminate the uncertainty that the policy has created (and will create) but not at the expense of the environment.

Defining the zone of reasonable mixing

Background

83. The RMA uses the term “reasonable mixing” in several places. It states that any discharge permitted by a rule in a plan or by a resource consent must not cause certain effects after reasonable mixing (sections 70 and 107). Schedule 3 of the Act also states that water quality standards in the schedule are to apply after reasonable mixing of any contaminant with the receiving water. The Act does not however provide direction on the zone of reasonable mixing and it has been determined differently by regional councils. Generally, for consents the zone has been determined on a case-by-case basis having regard to, inter alia, the nature of the discharge and the sensitivity of the receiving waters. For permitted activities, the zone is generally specified as an arbitrary distance (for example, a 10 or 20 metre radius from the point of discharge.

84. Policy D.4.8 directs decision-makers, when determining what constitutes the zone of reasonable mixing, to use the smallest zone necessary to achieve the required water quality in the receiving water and ensure that the mixing zone is free from contaminant concentrations and levels of dissolved oxygen that cause acute toxicity. Most of the rules in the plan that permit discharges to water specify that the zone of reasonable mixing is a 20 metre radius from the point of discharge. General condition C.2.3(1) for permitted rules for sediment discharges associated with the disturbance of the bed or a river or lake, or wetland applies more nuanced criteria for the zone of reasonable mixing, which is based on the type and size of the receiving water body.

Submissions and analysis

85. Far North District Council oppose the policy because it believes that:[93]

> *s107 of the RMA states that discharges to water, if after reasonable mixing, contaminants must not have any significant adverse effects on aquatic life. S69(3) RMA (rules in a regional plan relating to water quality) specifically allows the mixing zone. This policy appears more restrictive than s107 and s69 of the RMA?*

86. I do not understand Far North District Council's point. The RMA does not preclude region councils from defining the zone of reasonable mixing.

87. First Gas Ltd. wants a definition of 'reasonable mixing' to be included in the plan and the policy amended by clarifying the zone of reasonable mixing will be determined on a case-by-case basis. It also stated that the policy should require decision-makers to have particular regard to requiring the smallest mixing zone and ensuring that within the mixing zone contaminant concentrations and levels of dissolved oxygen will not cause acute toxicity effects.

88. Fonterra and GBC Winstone raised concerns about the way the zone of reasonable mixing is applied in the Proposed Plan. GBC Winstone also "considers that Policy D.4.8 does not provide clear direction or assist applicants in determining what is a zone of reasonable mixing for both freshwater and coastal waters."[94]

89. The companies stated that the zone of reasonable mixing should be defined in the Proposed Plan as follows:[95]

> *The lesser of:*
>
> *1) a distance 200 metres downstream of the point of discharge if the bed width of the surface water body is greater than 30 metres at the point of discharge, or*
> *2) a distance equal to seven times the bed width of the surface water body, but which shall not be less than 50 metres, or*
> *3) the distance downstream at which mixing of contaminants has occurred across the full width of the surface water body, but which must be less than 50 metres, or*
> *4) in relation to lakes, a distance 20 metres from the point of discharge.*

[93] Far North District Council. p.25
[94] GBC Winstone. p.10
[95] Fonterra. p.7., GBC Winstone. p.10

90. Haititaimarangai Marae 339 Trust and Minister of Conservation also requested a similar definition to be included in the plan:

> *Reasonable mixing in relation to the discharge of contaminants into a river or an artificial watercourse, means either:*
>
> *a. a distance downstream of the discharge that is the least of:*
>
> *i. the distance that equals seven times the width of the river at the point of discharge when the flow is at half the median flow, or*
>
> *ii. 200 metres from the point of discharge or, for discharges to artificial watercourses, 200 metres from the point of discharge or the property boundary, whichever is the greater, or*
>
> *iii. the point at which mixing of the particular contaminant concerned has occurred across the full width of the body of water in the river, artificial watercourse, or*
>
> *b. a distance for reasonable mixing determined as appropriate for a resource consent application where special circumstances apply.*

91. Whangarei District Council and Kaipara District Council raised concerns about the how the zone of reasonable mixing is applied in the Proposed Plan. Whangarei District Council stated:[96]

> *The zone of reasonable mixing is referred to in permitted activity rules however the policy does not provide enough clarity for this purpose or application. This policy should not seek to define a mixing zone that will be reasonable in all cases, because management objectives and environmental characteristics vary considerably between waterbodies. What is a reasonable mixing zone will be a question of fact and degree in each particular case.*

92. The district councils' concerns were echoed by the Mangawhai Harbour Restoration Society Inc:[97]

> *[Policy D.4.9] does not define the parameters of "reasonable mixing", which is a vague and subjective term. There is no quantification of the dimensions of defined limits in determining the appropriate 'mixing zone' in the Plan.*
>
> *Failure to properly defined the parameters of "reasonable mixing" may make compliance problematic and vulnerable to the subjective interpretation of monitoring staff.*

[96] Whangarei District Council. p.38
[97] Mangawhai Harbour Restoration Society Inc. p.32

Reference to the "smallest zone necessary" fails to reflect that the zone will vary from location to location, and also vary from time to time (e.g. depending on the seasons, weather or climate events) in the same location.

93. I do not think that the requirement to apply the smallest zone necessary is unnecessarily restrictive. However, First Gas Ltd.'s request to caveat the requirement with "have particular regard to" would be useful to prevent any unnecessary arguments during consent processes about what is meant by the 'smallest zone necessary."

94. Refining New Zealand "considers that the policy represents a practical means of determining a mixing zone, based on site specific considerations [however] the term 'acute toxicity' within the policy is not defined and as a result creates uncertainty in its application."[98]

95. The Royal Forest and Bird Protection Society also considers that it is not clear what is meant by acute toxicity and wants the policy amended:[99]

…by setting out:

- *what can be mixed into the receiving water*
- *the contaminant concentrations*
- *whether it applies to all contaminants or only certain ones*
- *how toxicity is to be avoided*
- *appropriate levels of dissolved oxygen.*

96. I do not think that it is necessary to define acute toxicity within the plan. Its meaning is obvious: adverse effects resulting from brief exposure a contaminant or multiple exposures over a short period of time. I also disagree with the Royal Forest and Bird Protection Society that it is necessary to define what contaminants and their concentrations that can be discharged into water and how toxicity is to be avoided. That is best left consenting processes when the nature of the discharge and sensitivity of the receiving waters can be considered on a case-by-case basis with respect to relevant guidelines.

[98] Refining New Zealand. p.32
[99] Royal Forest and Bird Protection Society of New Zealand. p.66

Recommendation

97. Having considered the submission points, I consider that the plan should contain a definition for the zone of reasonable mixing similar to what was requested by Haititaimarangai Marae 339 Trust, Minister of Conservation, Fonterra and GBC Winstone. Furthermore, the definition should apply to all rules that permit discharges to water and which current specify a mixing zone (for example, a 20 metre radius from the point of discharge). The definition should also state that for the purpose of activities that require resource consent, the zone of reasonable mixing will be determined on a case-by-case basis in accordance with policy D.4.8.

98. I also recommend that policy D.4.8 should be amended as per First Gas Ltd.'s request.

Evaluation of recommended changes

99. Section 32AA of the RMA requires an evaluation of proposed changes to the Plan. I consider that proposed changes are unlikely to result in any increase in adverse effects on the environment or increase costs to resource users of complying with the plan.

The role of farm environment plans

Background

100. Farm environment plans are an increasingly popular tool to assist farmers identify critical source areas of contaminants and put in place good management practices and other interventions that are tailored to the farm system and the water quality issues in the catchment. Their main purpose is to address diffuse sources of contamination. Some regional councils require farm plans others do not. The industry and sector groups also offer or require farm plans, for example Dairy NZ's Sustainable Milk Plans and Beef and Lamb's Land and Environment Plans.

101. The regional council also provides farm plans as part of its non-regulatory extension and support programme. The council's plans are mainly focussed on erosion and sediment control, rather than nutrient management. This reflects the nature of the water quality issues in Northland – elevated suspended and deposited fine sediment being a major issue.

102. The Proposed Plan does not require farm environment plans, with the exception of erosion and sediment control plans in some priority catchments.

103. Lastly, in June 2018 the Good Farming Practice Action Plan for Water Quality was launched by farming sector leaders.[100] The purpose of the voluntary Action Plan is to accelerate uptake of good farming practices for water quality (primarily) and quantity outcomes, to measure and demonstrate this uptake, to assess the impact and benefit of those farming practices, and to communicate progress to the wider public. The Action Plan has four main components. One of the components is every "[e]very farmer and grower being supported to have a Farm Environment Plan to help them identify and implement the relevant good farming practices for their farm and catchment."

Submissions and analysis

104. Beef and Lamb New Zealand stated it its submission that:[101]

> *Sheep and Beef farmers are actively implementing Farm Environment Plans (FEP) and Land Environment Plans (LEP) voluntarily throughout the region. LEP/FEPs provide a targeted approach to identify and manage environmental risks associated with their specific farms and operations. This approach works proactively and positively with farmers to build their capability and understanding, while incentivising ownership of the solutions. The industry LEP/FEP approach is more enduring and will be far more effective in addressing environmental issues than blanket activity specific and input standard based methods such as:*
>
> - *policies D.4.31, and D.4.32; and*
> - *rules C.8.1.1, C.8.1.2, C.8.2.1, C.8.2.2, C.8.3.1, C.8.3.2, C.8.4.1, C.8.4.2, C.8.4.3, E.0.1, E.0.6, E.0.7, E.0.8, E.0.9, and E.0.10.*

105. Beef and Lamb New Zealand added that:[102]

> *[It] seeks amendments to existing provisions or the inclusion of new provisions to provide for farming land based activities undertaken in accordance with an industry farm environment plan (such as B+LNZ Land and Environment Plan). This route should also provide an alternative gateway to the activity based and more prescriptive input standard type regulatory approaches provisions, such as [the provisions referenced above].*

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[100] See http://www.fedfarm.org.nz/FFPublic/Policy2/National/Good_Farming_Practice-Action_Plan_for_Water_Quality_2018.aspx
[101] Beef and Lamb New Zealand. p.3
[102] Beef and Lamb New Zealand. p.4

106. Ravensdown Ltd. submitted that the Proposed Plan should promote the use of farm environment plans "in the management of farm systems to gain water quality improvements."[103] It wants:[104]

> *…Farm Environment Plans (FEPs) to be included in the PRP as follows:*
>
> *1) The inclusion of a new policy into D.4 Land and Water that encourages the preparation of FEPs as a mechanism for farmers to manage their land uses and discharges to reduce nutrient losses;*
> *2) The inclusion of FEPs in the relevant rules in C.8 Land Use and Disturbance Activities as a matter of control or discretion;*
> *3) The inclusion of a schedule in the PRP that identifies the matters to be included in a FEP.*

107. I consider that farm plans should not be required at this point as a regulatory tool to maintain and enhance water quality. Nor is it appropriate for farm environment plans to be alternative pathway to compliance with regional rules for discharges of contaminants into water. Besides, it is not clear to me how the approach suggested by Beef and Lamb New Zealand would work, particularly regarding permitted activity rules.

Recommendation

108. I recommend that, except for the provision for erosion and sediment control plans in some priority catchments, the Proposed Plan should not require farm environment plans elsewhere or provide for them as an alternative to rules.

Other matters

109. Refer to Appendix A for the summary of submission points, analysis and recommendations made on the water quality provisions not addressed in the key matters sections of this report or in other section 42A reports.

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[103] Ravensdown Ltd. p.4
[104] Ravensdown ltd. p.21

Appendix A - Response to other matters raised in submissions

Note – this table does not include the summary of submission points, analysis and recommendations made on the <topic> provisions addressed in the key matters sections of the report.

Provision	Summary of main submission points	Discussion	Recommendation
Other	Beef and Lamb NZ submitted that the Proposed Plan should be amended "to enable and incentivise community approaches to managing land and water resources."[105]	It is not clear to me what the submitter wants included in the plan.	To not grant the relief sought.
Other	Beef and Lamb NZ want "policies [including the Proposed Plan] which incentivise collaborative endeavours between the regional council, industry, and farmers to: • support the identification of targeted research programs to fully investigate the causal linkages between land uses and water quality; and • the adoption of farm specific environment plans."[106]	It appears to me that the policies that the submitter requests are non-regulatory in nature. The regional council made the decision to only include regulatory policies.	To not grant the relief sought.
D.4	Minister of Conservation submitted that the plan should contain policies "which seek to provide for the involvement of tangata whenua in the management of freshwater and	This matter is covered by policy D1 of the NPS-FM, which states: *Local authorities shall take reasonable steps to:*	To not grant the relief sought.

[105] Beef and Lamb New Zealand. p.6
[106] Ibid.

Provision	Summary of main submission points	Discussion	Recommendation
	tangata whenua values and interests are reflected in the management of freshwater."[107]	*(a) involve iwi and hapu in the management of fresh water and freshwater ecosystems in the region;* *(b) work with iwi and hapu to identify tangata whenua values and interests in fresh water and freshwater ecosystems in the region; and* *(c) reflect tangata whenua values and interests in the management of, and decision-making regarding, fresh water and freshwater ecosystems in the region.*	
D.4	Minister of Conservation submitted that the plan should be amended to include "appropriately worded policy to protect the high quality of groundwater."[108]	I consider that this could be addressed by including the following in the new water quality objective: "Protect the potable quality of drinking water sources, including aquifers used for potable supplies."	To amend the new objective for water quality in the plan (Objective 2)

[107] Minister of Conservation. p.41
[108] Minister of Conservation. p.43

Appendix B – Recent developments in Northland agriculture

Recent developments in Northland agriculture

Report prepared by Darryl Jones, Economist
5 June 2018

Introduction

The purpose of this report is to summarise some of the major trends in Northland agricultural production to inform the development of the new Regional Plan. The analysis covers the 15-year period 2002-2017. This period was used because there was a significant break in the Statistics New Zealand agricultural survey data between 1996 and 2002. References to earlier data is made where relevant.

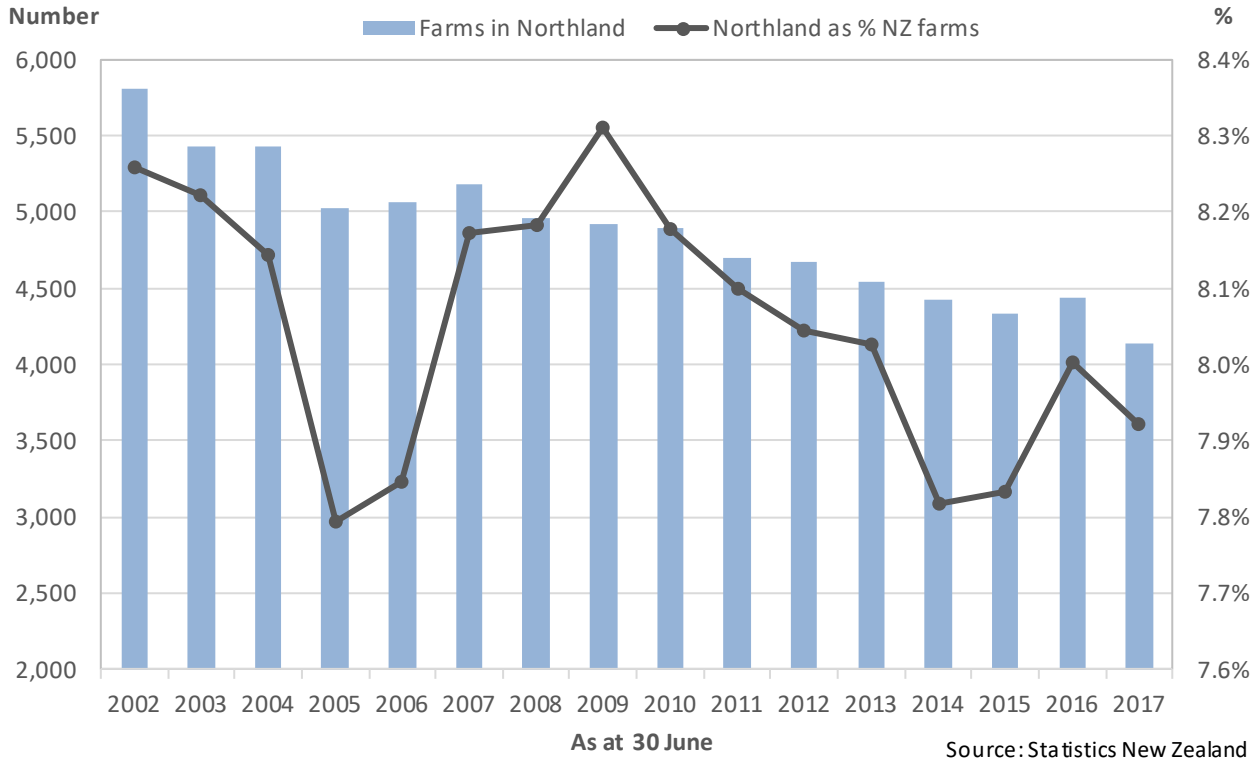
The report considers changes in the number of farms, the land area used for agricultural production, and stock numbers for beef, sheep and dairy in Northland. Some industry specific data is assessed to provide more detail around land use change and to describe developments in the Northland dairy industry. Each section includes a graph of recent developments. This is followed by a bullet point list of comments relating to the information. These include comment on how Northland compares to the national average and likely future trends.

The main findings of the report are listed below:

- The number of farms in Northland has fallen from 5808 in 2002 to 4143 in 2017, a drop of 29%.
- While more than half of Northland's land area is used for agricultural production (55%), there is 85,000 hectares (11%) less land used in 2017 compared to 2002.
- The area of land used for commercial plantation forestry and dairy production has fallen by 14% and 15% respectively between 2002 and 2017 while the area planted for avocado production has almost tripled.
- Beef cattle numbers in Northland have fallen by an average of 1.3% per annum over the 15-year period, following a similar trend to the national beef cattle herd.
- The Northland sheep flock has fallen from 0.52 million to 0.32 million between 2002 and 2017, an annual decline of 3.1%, dropping at a faster rate than the national sheep flock.
- The total number of dairy cattle in Northland has fluctuated within the band of 0.35-0.4 million over the 15-year period, while the national dairy herd has grown by 27%.
- While dairy cow numbers have fallen slightly (10%) between 2002 and 2017, there has been a larger drop in the number of herds (35%)and effective area used (15%), and a small rise in milksolids produced.
- The scale of production has increased – with larger farms, bigger herds and greater production per farm. But these increases have been smaller than the expansion in scale seen at the national level.
- Similarly, while production has become more intensive, with a 1.1% increase in milksolids produced per cow over the 15-year period, the level of intensity is lower and increasing at a slower rate than nationally.

Number of businesses engaged in agricultural activity in Northland

Figure 1. Number of farms in Northland, 2002-2017



Source: Statistics New Zealand

- According to Statistics New Zealand's agricultural production survey and census data, there were 4143 businesses engaged in 'agricultural production activity' ("farms") in Northland as a 30 June 2017.[109] This is 29% fewer than the 5808 farms recorded in 2002. Almost 30 years ago, on 30 June 1990, there were 8419 farms in Northland, twice as many as there are today.

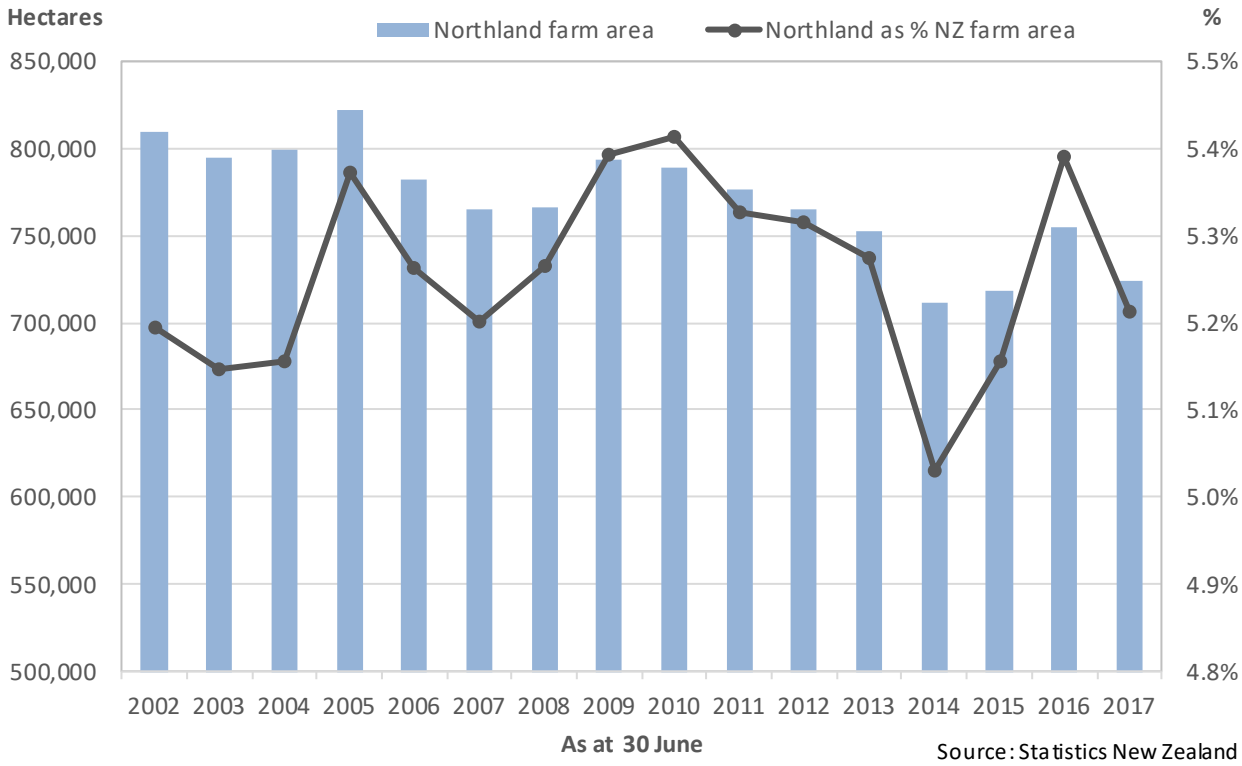
- The fall in the number of farms in Northland mirrors the national trend. The latest agricultural census indicates that there are 52,295 farms in New Zealand on 30 June 2017, 26% fewer than in 2002 when there were 70,336 farms.

- Northland accounts for just under 8% of total farms in New Zealand. The region's share of total farms is falling. In 2002 Northland was home to 8.3% of all farms in New Zealand; in 1990 the region accounted for 10.4%.

[109] The survey population for the Statistic New Zealand agricultural production surveys and censuses is all businesses engaged in 'agricultural production activity' (including livestock, cropping, horticulture, and forestry), or which own land intended for agricultural activity. The survey population includes businesses engaged in agriculture or forestry production as a secondary activity.

Area used for agricultural activity in Northland

Figure 2. Total area of farms in Northland, 2002-2017



Source: Statistics New Zealand

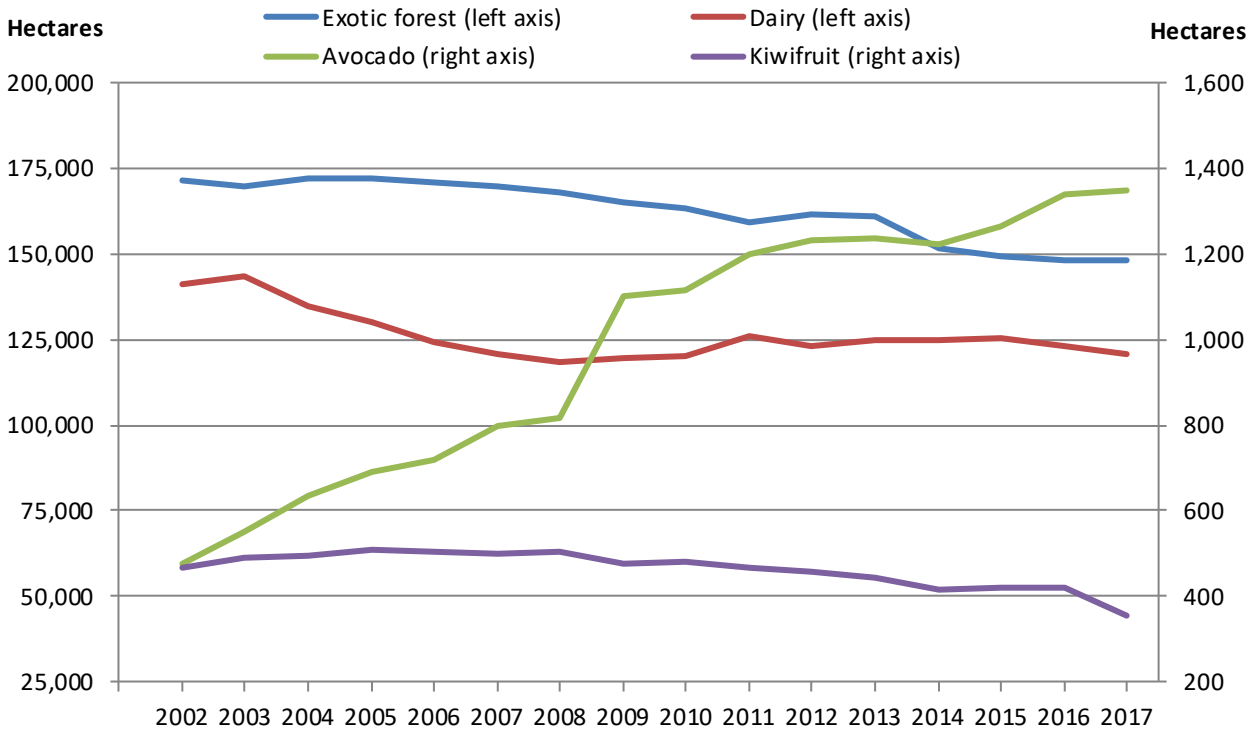
- The total area of land recorded as being used for agricultural production activity in Northland on 30 June 2017 was 724,564 hectares. This represents 55% of the total Northland land area of 1.3 million hectares.

- In 2002 almost 810,000 hectares was used for agricultural production in Northland. Since then the total area of farms in the region has fallen by 85,000 hectares, equivalent to a drop of 11%. Northland agricultural production took place on just over one million hectares in 1990 – an area 30% greater than that used for farming today.

- Northland's share of the total area used for agricultural production in New Zealand has ranged between 5.0% and 5.4% over the 15-year period with no discernible change over this time. In 1990, the region accounted for 5.9% of the total New Zealand farm area.

Change in land use for selected commodities in Northland

Figure 3. Land used for selected agricultural commodities in Northland, 2002-2017



Sources: MPI, Dairy NZ, NZ Avocado Growers' Association and Zespri

- Data from industry sources can be used to analyse changes in land use by various commodities.[110]

- Since 2002 there has been a fall in both the area under commercial plantation forest and that used for dairy farming in Northland. The exotic forest area in Northland has fallen by 14% from 171,392 hectares in 2012 to 148,054 hectares in 2017. Similarly, the effective area used for dairy farming has fallen by 15% from 141,266 hectares to 120,661 hectares in 2017. However, the area used for dairy farming has remained relatively stable over the past six years while the area used for plantation forestry has displayed a much more regular decline over the period. Just under 9% of the national exotic forest area is located in Northland, with the region accounting for 7% of the area used for dairying in New Zealand.

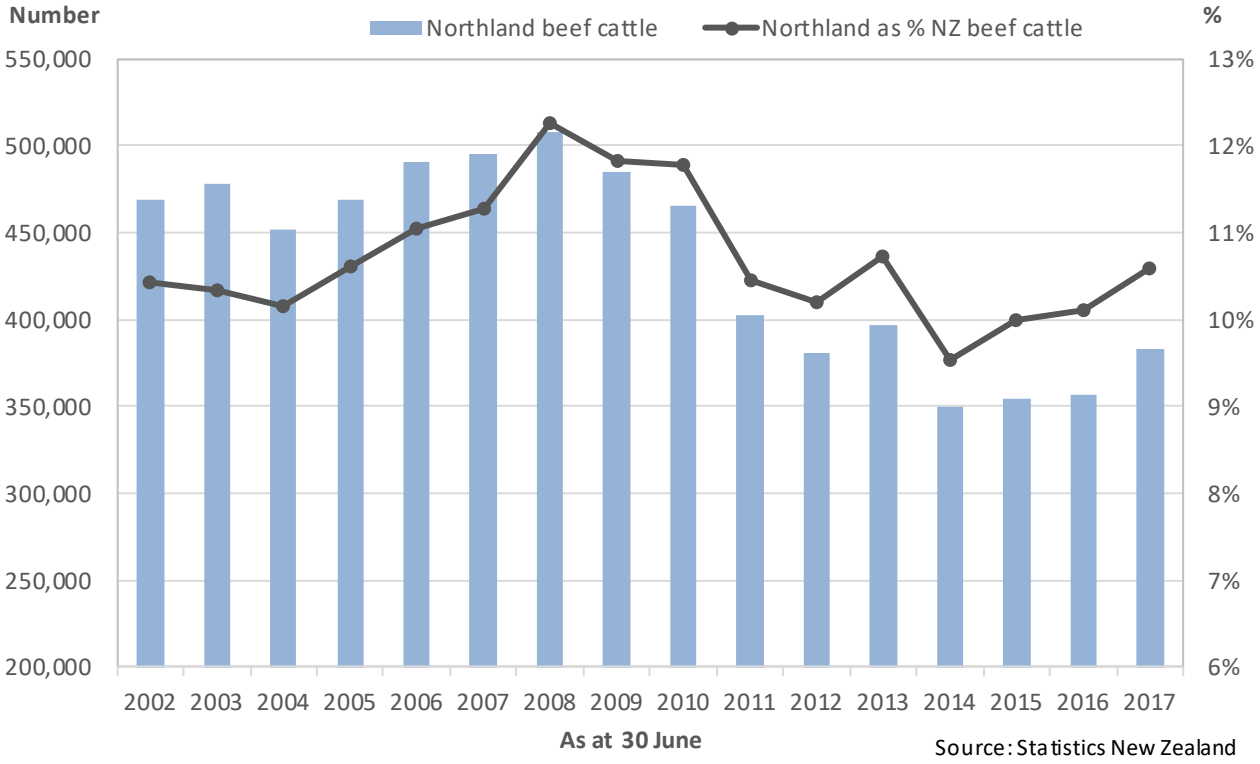
- There has been a rapid rise in the area under avocado production in Northland. In 2002 approximately 480 hectares of land in the region was planted with avocado trees aged 5 years and older. By 2017 this had risen by 182% to 1350 hectares. Northland accounts for 36% of the national avocado crop area.

[110] The figures from these other sources, such as the National Exotic Forestry Description Survey produced by the Ministry for Primary Industries and Dairy Statistics from Livestock Improvement Corporation Limited, may differ from the Statistics New Zealand numbers because they use different survey frames and designs.

- The area in commercial kiwifruit production in Northland has slowly fallen over the period, dropping from 465 hectares in 2002 to 354 hectares in 2017. The region accounts for just 3% of the area used for kiwifruit production in New Zealand, down from 5% in the early 2000s.

Beef cattle numbers in Northland

Figure 4. Total beef cattle in Northland, 2002-2017



- The total number of beef cattle in Northland has fallen from 468,432 as at 30 June 2002 to 382,957 in 2017. This represents a decrease of 18% over the 15-year period, equivalent to an average annual fall of 1.3%. Over the same period the national beef herd has fallen by 19%.

- The decrease in the number of beef cattle has not been consistent over this 15-year period, with the Northland beef cattle herd rising during the first six years to reach a height of 507,540 in 2008. However, this is some 100,000 animals below the peak level of 609,552 recorded in June 1991. There has been a slight rise in beef cattle numbers over the past three years, reversing the downward trend that occurred from 2008 to 2014. This follows several years of strong beef prices and attempts to increase stock numbers following severe droughts at the start of the decade.

- Northland's share of the national beef herd has ranged between 12.3% in 2008 to a low of 9.5% in 2014. In the year ended June 2017, 10.6% of the national beef cattle herd was found in Northland.

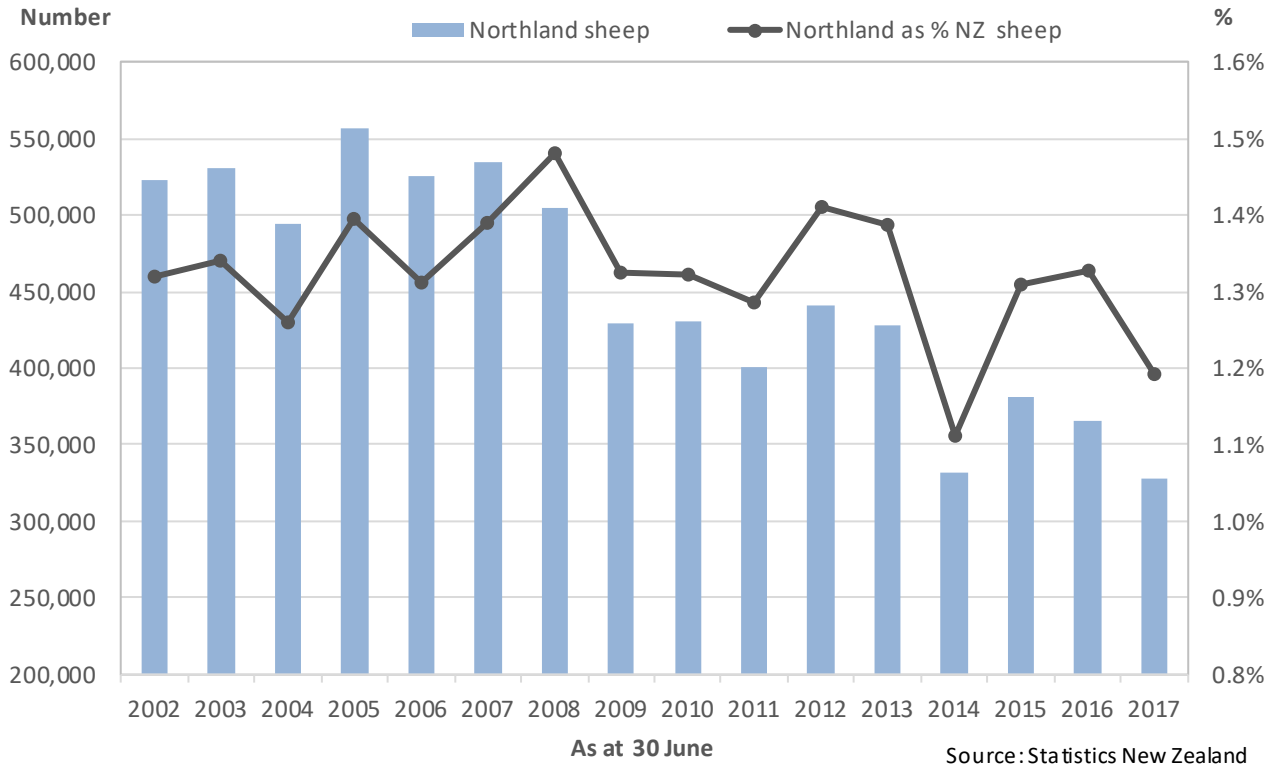
- According to the latest projections by the Ministry for Primary Industries, the volume of beef & veal exports from New Zealand will remain at current levels out to 2022 with export prices expected to slightly ease from current levels.[111] Assuming there is only a marginal increase in output per animal, this suggests that beef animal numbers in Northland will remain at around current levels.

[111] Situation and Outlook for Primary Industries data. Information as of 14 March 2018. Downloaded on 28 May 2018 from https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/situation-and-outlook-for-primary-industries-data/.

- Using a logarithmic model based on the data for the 15-year period suggests that total beef cattle numbers in Northland will lie in the range of 370,000 to 390,000 over the next ten years.

Sheep numbers in Northland

Figure 5. Total sheep in Northland, 2002-2017



- The total number of sheep in Northland has fallen from 522,189 as at 30 June 2002 to 328,033 in 2017. This represents a decrease of 37% over the 15-year period, equivalent to an average annual fall of 3.1%. Over the same period the national sheep flock has fallen by 30%.

- The decrease in sheep numbers has not been consistent over this 15-year period, with the Northland sheep flock rising during the first few years to reach 507,540 in 2005. However, this is 1.8 million fewer sheep than the peak level of 2.3 million recorded in Northland in June 1982. Since 2005, there has been a steady downward trend in sheep numbers reflecting the long-term decline in prices for sheepmeat and wool relative to beef.

- Northland's share of the national sheep flock has fallen from 1.5% in 2008 to a low of 1.1% in 2014. In the year ended June 2017, 1.2% of the national sheep flock was found in the region.

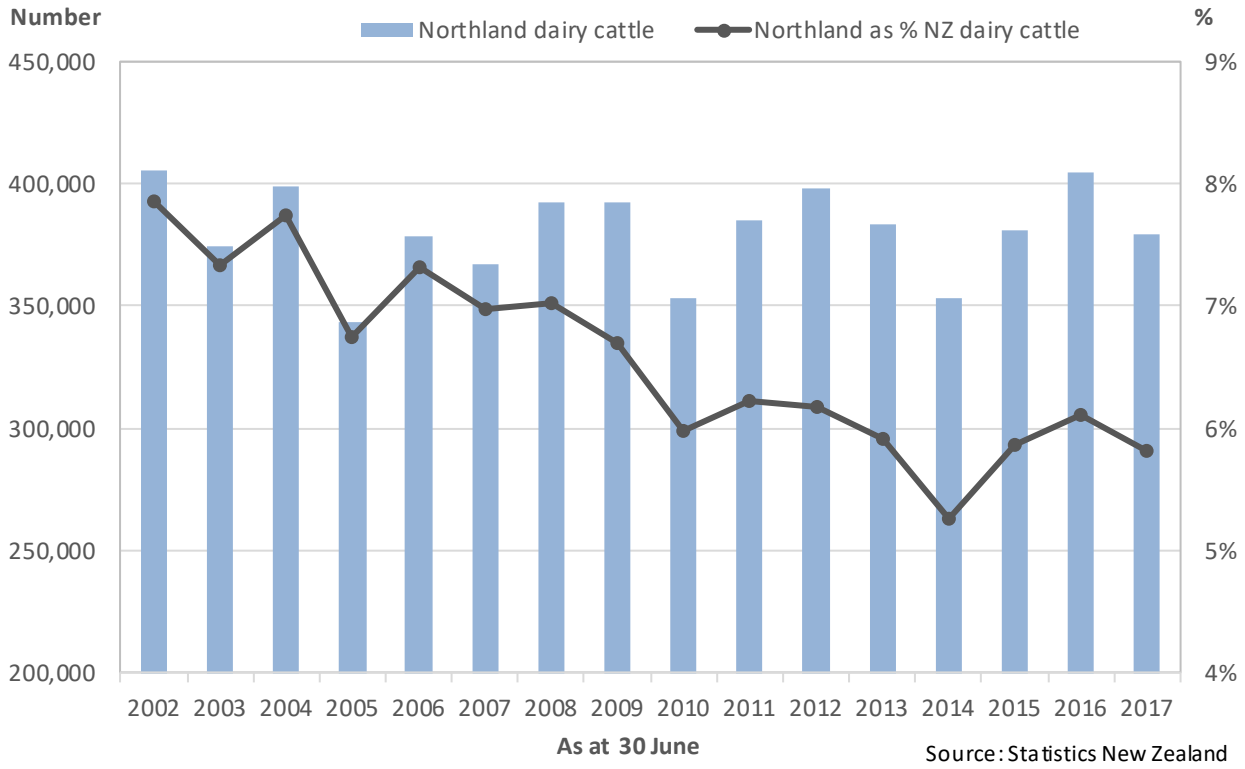
- According to the latest projections by the Ministry for Primary Industries, the volume of lamb exports from New Zealand will remain at current levels out to 2022 while the volume of wool is forecast to decrease.[112] Assuming there is only a marginal increase in output per animal, this suggests that sheep numbers in Northland will remain at around current levels.

[112] Situation and Outlook for Primary Industries data. Information as of 14 March 2018. Downloaded on 28 May 2018 from https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/situation-and-outlook-for-primary-industries-data/.

- Using a logarithmic model based on the data for the 15-year period suggests that total sheep flock in Northland will stabilise at around 350,000 over the next ten years.

Dairy cattle numbers in Northland

Figure 5. Total dairy cattle in Northland, 2002-2017



- The total number of dairy cattle in Northland (including cows in calf, heifers, bulls, calves, etc.) has ranged between 350,000 to 400,000 over the past 15 years. The current number of dairy cattle in Northland – 379,401 as at 30 June 2017 – is very similar to the 15-year average of 380,488. The peak total of dairy cattle in Northland is just over 400,000 animals recorded in 1996, 2002 and 2016.

- Between 2002 and 2017 the national dairy cattle herd rose by 27%, from 5.2 million to 6.5 million. Consequently, Northland's share of the total dairy cattle in New Zealand has fallen from 8% in 2002 to a low of 5.3% in 2014. There has been a slight rise in dairy cattle numbers in recent years, but less than 6% of the national dairy cattle herd can be found in the region.

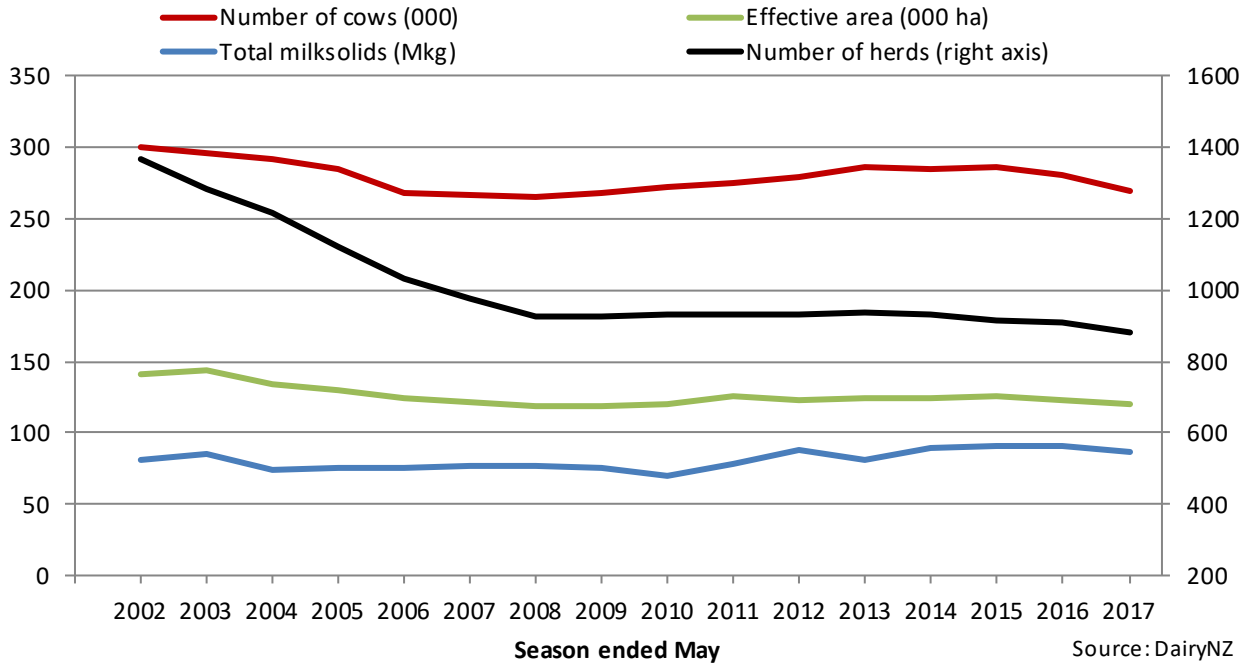
- According to the latest projections by the Ministry for Primary Industries, the volume of dairy exports from New Zealand will remain at current levels out to 2022 for most products, but falling for butter and rising for infant formula.[113] Assuming there is only a marginal increase in output per animal, this suggests that dairy cattle number in Northland will remain at around current levels.

[113] Situation and Outlook for Primary Industries data. Information as of 14 March 2018. Downloaded on 28 May 2018 from https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/situation-and-outlook-for-primary-industries-data/.

- Using a logarithmic model based on the data for the 15-year period suggests that total dairy cattle numbers in Northland will stabilise at current levels over the next ten years.

Size of dairy farming in Northland

Figure 6. Size of dairy farming in Northland, 2002-2017



Source: DairyNZ

- After falling from 300,000 to 265,000 (12%) between 2002 and 2006, the total number of **dairy cows** in milk in Northland increased slowly over the next seven years to reach 286,000 in 2013. Since then, the number of dairy cows in milk has fallen slightly to 269,123 in the season ended May 2017. There are 10% fewer dairy cows in Northland in 2017 than in 2002. Between 2002 and 2017, the number of dairy cows in milk in New Zealand increased by 32%, with region's share of the national milking herd falling from 8.1% to 5.5%.

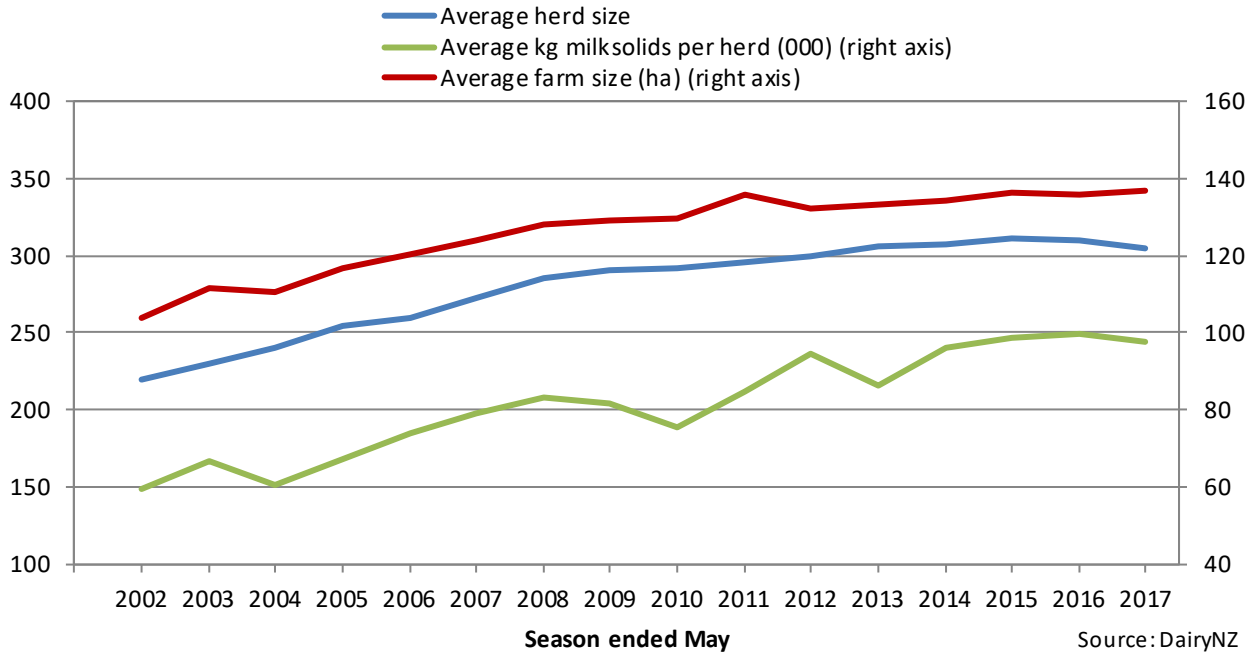
- Between 2002 and 2008 there was a sharp drop in the number of **dairy herds** in Northland. Herd numbers fell by almost one-third from 1364 to 928 – an average annual reduction of 6%. The number of dairy herds in the region stabilised at around this level until 2014 after which they began falling again. There were 882 herds in Northland in the season ended May 2017, 35% less than in 2002. The total number of dairy herds in New Zealand also dropped between 2002 and 2017 but by only 14%. Northland now accounts for 7.5% of all dairy herds in New Zealand compared to 10% in 2002.

- The **effective area** used for dairy production in Northland in the season ended May 2017 was 120,661 hectares. The area used for dairying in the region has been very constant at this level since 2006; ranging between 119,000 and 126,000 hectares. Around 140,000 hectares of land in the region was used for dairy production in the early 2000s. The current area used for dairy farming in Northland has fallen by 15% over the 15-year period. Nationally, the land area used for dairy production has increased by 23% since 2002, with Northland's share falling from 10% to 7%.

- The volume of **milksolids produced** in Northland slowly decreased from 85.5 million kg in 2003 to a low of 70.1 million kg in 2010 due to both falling cow numbers and the impact of various climatic events. Since 2010 there has been a steady upward trend in production, rising to a record level of 90.4 million kg milksolds in 2016. This is slightly higher than the 90.3 million kg milksolids produced in the season ended May 2001. Nationally, the volume of milksolids produced has risen by 60% since 2002, with Northland producing just 4.7% of total milksolids in 2017 compared to 7.1% in 2002.

Scale of dairy farming in Northland

Figure 7. Scale of dairy farming in Northland, 2002-2017



Source: DairyNZ

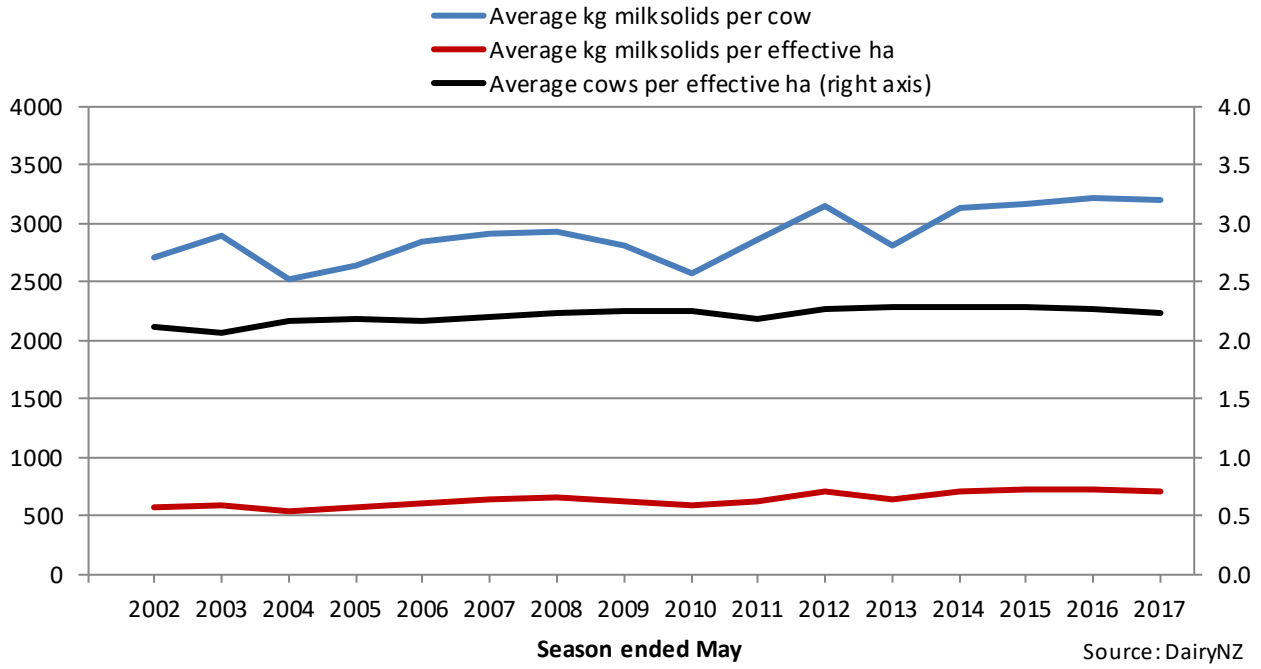
- There has been a steady increase in the **average farm size** of a Northland dairy unit, rising from 104 hectares in 2002 to 137 hectares in 2017. In 2002 the average Northland dairy farm was roughly the same size as the national average (103 ha). Today, the national average dairy farm size is 147 hectares, 8% larger than the Northland average.

- The **average herd size** in Northland has risen from 220 milking cows in the season ended May 2002 to a peak of 311 milking cows in 2015. There has been a slight fall in the average number of cows per herd over the past two years (305 in 2017), but the current level is 40% higher than in 2002. The current national average herd size is 414 dairy cows, up 53% on the 2002 average of 271. The average dairy herd in New Zealand is one-third larger than the Northland average.

- In the season ending May 2002 in Northland, the **average dairy herd produced** just under 60,000 kg milksolids. In the 2017 season, the average herd produced just under 100,000 kg milksolids – representing an average increase in production of almost 64% per farm. Over the same time, the national average production per herd has risen from 84,000 to 158,000 kg milksolids. The average New Zealand dairy herd produces 61% more milksolids per annum than the Northland average.

Intensity of dairy farming in Northland

Figure 8. Intensity of dairy farming in Northland, 2002-2017



Source: DairyNZ

- While there are season fluctuations caused by climatic conditions, there has been a rise in the average production of **milksolids per cow** in Northland since 2002 of 1.1 % per annum. In the 2001/02 season, the average Northland dairy cow produced 2712 kg milksolids; in the 2016/17 season it produced 3204 kg milksolids, an 18% increase over the period. This rise in intensity has been slower than the national average, which has increased by 22% over the 15-year period from 3120 kg milksolids in 2002 to 3807 kg milksolids in 2017 – equivalent an average annual increase of 1.3%. The average dairy cow in Northland produces 16% less milk than the national average, compared to 13% less in 2002. Looking ahead, production per cow is likely to increase further due to improved genetics and better feeding regimes. However, this increase will be moderated by a greater industry emphasis on profitability over production and the growing interest in once-a-day milking.

- There is on average 2.3 dairy **cows per effective hectare** on a Northland dairy farm, up 5% from an average of around 2.1 dairy cows in 2002. Nationally, there is on average 2.8 dairy cows per effective hectare in 2017, up 7% from 2.6 in 2002. The number of dairy cows per hectare has been very stable in Northland over the past six years and is unlikely to increase much beyond the current extent.

- With an increase in both the number of cows per hectare and the production per cow, the quantity of **milksolids produced per hectare** of land used for dairy production has also increased. In 2002 the average hectare of land used for dairy production in Northland produced 576 kg milksolids, about 70% of the national average of 820 kg milksolids. In the season ended May 2017, the quantity of milksolids produced per effective hectare on a Northland dairy farm was 715 kg milksolids, about two-thirds of the national average of 1070.