IN THE ENVIRONMENT COURT AT CHRISTCHURCH

I MUA I TE KOOTI TAIAO O AOTEAROA

IN THE MATTER	**of an appeal under Clause 14 of Schedule 1 of the Resource Management Act 1991**
AND IN THE MATTER	**of the proposed Southland Regional Water and Land Plan**
BETWEEN	**Royal Forest and Bird Protection Society of New Zealand Inc**
	Appellant
AND	**Southland Regional Council**
	Respondent

STATEMENT OF REBUTTAL EVIDENCE OF KATHRYN JANE MCARTHUR ON BEHALF OF THE ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INC

15 May 2019

Judicial officer: Judge Borthwick

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Introduction

1. My full name is Kathryn Jane McArthur

2. My qualifications and experience are set out in my evidence in chief for Topic A dated 15 February 2019.

3. I have been asked by the Royal Forest and Bird Protection Society of New Zealand Inc (**Forest & Bird**) to provide rebuttal evidence in relation to Topic A matters arising from the evidence of other parties to the appeal of the proposed Southland Water and Land Plan (**pSWLP**).

Code of Conduct

4. I confirm that I have read the Code of Conduct for expert witnesses as contained in the Environment Court Practice Note 2014. I have complied with it in preparing my written statement of evidence and will do so when giving oral evidence. The information I have relied on in forming my opinions is set out in my evidence. The reasons for the opinions I have expressed are also set out in the evidence. Other than where I state I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of Evidence

5. My rebuttal evidence covers matters arising from the evidence of:

    a. Mr Kitto for DairyNZ and Fonterra;

    b. Dr James for Meridian;

c. Mr Sycamore for Federated Farmers;

d. Mr Willis for DairyNZ and Fonterra; and

e. Ms Bennett for the Territorial Authorities.

6. It also responds to matters set out in the Joint Witness Statement where further clarification is warranted, or there is residual disagreement.

Evidence in Chief

7. I participated in expert witness conferencing on 7-9 May 2019 and emailed my agreement with the signed Joint Witness Statement (JWS) on 10 May. I confirm that I have not changed any of the opinions set out in my evidence in chief as a result of expert witness conferencing unless specifically detailed below.

Executive Summary

8. Matters arising from the evidence of Mr Kitto, Ms Bennett and Dr James are largely addressed in the joint witness statement (JWS) on water quality and ecology.

9. Whilst there is still some disagreement between the experts[1] with respect to my presentation of Southland water quality data in my evidence in chief compared to quartiles of water quality (based on elevation and dominant land use class at each site) from national data in LAWA, this issue is adequately explored within the JWS and further rebuttal is not needed in my view.

[1] JWS for water quality and ecology paragraphs 39 and 40.

10. The water quality and ecology experts developed criteria in the JWS to determine whether sites in Southland were degraded with respect to the compulsory national values of ecosystem and human health or at-risk with respect to ecosystem health[2] values. The experts chose to address these two values specifically as they are compulsory national values under the NPS-FM and cannot be discounted in any future FMU process (so they can be considered now).

11. One area of residual disagreement on the criteria for assessing degradation remains. Mr Kitto and Ms Bennett were not comfortable with the use of the 'A band' threshold for nitrate toxicity to denote degradation[3]. Dr James notes[4] he considers this threshold "*appropriate for avoiding enrichment due to nitrogen but not necessarily toxicity*". The experts used this threshold to denote a 'no-effects' level of toxicity and also to identify concentrations of nitrogen that were likely to cause ecosystem health effects.

12. Issues relating to the presentation of water quality trends were also discussed in the JWS[5]. The experts agreed to let the trends speak for themselves as there are a range of degrading, improving and indeterminant trends across Southland.

13. Dr James' evidence on the issues related to Didymo are also explored further in the JWS with general agreement between the experts[6] and further rebuttal is not needed in my view.

14. Mr Sycamore raises issues (in his section 274 evidence in opposition) with which I disagree regarding:

[2] JWS for water quality and ecology paragraphs 44 to 47.
[3] JWS for water quality and ecology paragraph 44.
[4] In his email attached to the JWS for water quality and ecology.
[5] JWS for water quality and ecology paragraphs 27 to 29.
[6] JWS for water quality and ecology paragraphs 66 and 67.

a. use of the term ‘overall’ in Objective 6;

b. the influence of rain events on ‘overall’ water quality;

c. national compulsory values and the NPS-FM approach;

d. the specific identification of the effects of dairy farming and intensive winter grazing in the Plan; and

e. the appropriateness of the inclusion of Waituna Lagoon within freshwater considerations.

15. Compulsory national values are identified in the NPS-FM as ecosystem health and human health for recreation. In my view it is necessary (and feasible) to address the effects of water quality on these values in the interim (i.e., prior to an FMU process), given their compulsory national status in the NPS-FM and the state of water quality in some parts of Southland. This focus was taken by the experts in identifying degraded and at-risk sites in the JWS.

16. The evidence of Mr Rodway supports specific identification of dairy farming and intensive winter grazing in the pSWLP because of the significant contribution these activities make to poor water quality in parts of Southland. In order to address degraded and degrading water quality in some parts of Southland it is appropriate for the Plan to specifically address these high risk activities to manage their effects on water quality with more certainty. This issue is was discussed by the experts in conferencing[7]. While there are undoubtably multiple activities which can affect water quality and ecosystem health, I understand the activities discussed by Mr Rodway as ‘high risk’ (i.e.,

[7] JWS for water quality and ecology paragraph 80.

dairy farming and intensive winter grazing) contribute disproportionately to diffuse water quality issues in Southland.

17. Although Waituna Lagoon is at times brackish and is influenced by coastal water, intermittently closed or open lagoons and lakes (ICOLLS) are still considered freshwater bodies that can be considered under the NPS-FM framework.

18. In-stream criteria, numeric thresholds or interim thresholds are important to define parts of Southland that are degraded or at risk of degradation with respect to water quality and the compulsory national values of ecosystem and human health for recreation. Once defined, methods in the plan to control high risk activities which contribute a disproportionately large amount to degradation can be included. For example, dairy farming, intensive winter grazing or large point source discharges that cause water quality to exceed appropriate thresholds.

Joint Witness Statement (JWS) and Remaining Areas of Disagreement

19. Whilst there is still some disagreement between the experts[8] with respect to my presentation of Southland water quality compared to quartiles of water quality (based on elevation and dominant land use classes at each site) from the national data in LAWA in my evidence in chief, this issue is adequately explored within the JWS and further rebuttal is not needed in my view.

20. The experts developed criteria to determine whether sites in Southland were degraded with respect to the compulsory national values of ecosystem and human health, or at risk with respect to ecosystem health[9] values. The

[8] JWS for water quality and ecology paragraphs 39 and 40.
[9] JWS for water quality and ecology paragraphs 44 to 47.

experts chose to address these two values specifically as they are compulsory national values under the NPS-FM and cannot be discounted in any future FMU process (so they can be considered now).

21. One area of residual disagreement on the criteria for assessing degradation remains. Mr Kitto and Ms Bennett were not comfortable with the use of the 'A band' threshold for nitrate toxicity to denote degradation[10]. Dr James considers[11] this threshold "*appropriate for avoiding enrichment due to nitrogen but not necessarily toxicity*". This threshold was considered by me and Dr Kitson as a 'no toxic effects' level of nitrate nitrogen[12]. In my opinion, exceedance of the threshold A band for nitrate identifies a site which is likely to have ecosystem level (enrichment) effects (for example, effects on periphyton growth and macroinvertebrates) *and* an increased risk of some toxic effects beginning to occur on sensitive organisms such as fish. The experts used this threshold to denote both a 'no-effects' level of toxicity and also to identify concentrations of nitrogen that were likely to cause ecosystem health effects. Table 1 of the JWS states with respect to nitrate and ammonia toxicity that "*the experts agree that other ecosystem health effects are manifested at lower concentrations than toxic effects. In general managing for ecosystem health will address toxic effects however there are local circumstances where toxic effects must be considered*". For those reasons, I consider the 'A band' threshold is appropriate.

22. Issues relating to the presentation of water quality trends were also discussed in the JWS[13]. The experts agreed to let the trends speak for themselves as there are a range of degrading, improving and indeterminant

[10] JWS for water quality and ecology paragraph 44.
[11] In his email attached to the JWS for water quality and ecology.
[12] JWS for water quality and ecology Table 1.
[13] JWS for water quality and ecology paragraphs 27 to 29.

trends across Southland. For degraded sites[14] the trend direction is shown for water quality attributes that are contributing to degradation. Trends are also shown for attributes agreed by the experts to identify at-risk sites[15]. A degrading trend in MCI was used as a criterion to identify an at-risk site, consistent with the requirement for action by councils in the NPS-FM where MCI is degrading.

23. Dr James' evidence on the issues related to Didymo are also explored further in the JWS with general agreement between the experts[16] and further rebuttal is not needed in my view.

Overall Water Quality

24. The issue of 'overall' water quality is dealt with by the experts in the JWS[17]. Mr Kitto and Ms Bennett have residual concerns with respect to the removal of 'overall' from Objective 6.

25. Mr Kitto's concerns are set out in his evidence as[18] "by using the word "overall", experts have the ability to consider all information as opposed to relying on one single metric to describe water quality." I contend that an expert view of 'overall' water quality is subjective in the absence of a repeatable methodology, as discussed in the JWS[19]. A subjective assessment of water quality will not assist decision makers in determining whether an activity is consistent with Objective 6, as experts may have

[14] Appendix 1 of the JWS for water quality and ecology.
[15] Appendix 2 of the JWS for water quality and ecology.
[16] JWS for water quality and ecology paragraphs 66 and 67.
[17] JWS for water quality and ecology paragraphs 22 to 24.
[18] Paragraph 5.4 of s274 evidence in opposition of Mr Kitto.
[19] JWS for water quality and ecology paragraph 23(b).

differing views on 'overall' water quality in the absence of a repeatable methodology which defines its meaning.

26. Ms Bennett's concerns are set out in her evidence[20] in relation to stormwater and wastewater discharges. Ms Bennett suggests that without inclusion of the term 'overall', changes in water quality will be assessed in an absolute sense, e.g., no reduction in water quality. In my opinion, compliance statistics are one method of ensuring water quality is maintained within an acceptable degree of variability. For example, a median or 95th percentile of the data is assessed against a threshold. In my experience, water quality thresholds or standards are rarely expressed in absolute terms and usually allow for some acceptable variability around a threshold, with the possible exception of an ammonia toxicity maximum, such as that set out in the NOF, which is defined to ensure toxic effects on aquatic life do not occur beyond an acceptable level. This issue is discussed further with respect to Mr Sycamore's evidence below.

27. With respect to the influence of rain events on water quality raised by Mr Sycamore[21], it is my expert view that these matters can also be dealt with adequately through the adoption of appropriate compliance statistics for any interim thresholds of water quality. For example, use of the 95th percentile or median statistic over a defined time-period or number of samples allows for a level of acceptable variability around a water quality threshold. Determining the compliance statistic is standard practice when considering thresholds for water quality.

28. In the JWS, the experts have agreed to address matters relating to interim thresholds prior to the Topic B hearings. It is usual practice to assign a

[20] Paragraph 23 of s274 evidence in opposition of Ms Bennett.
[21] Paragraphs 39 and 40 of his s274 evidence in opposition.

compliance statistic of variability to any water quality threshold, limit or standard and in my view it is highly likely (and appropriate) that this will be addressed by the experts when interim water quality thresholds are discussed. I expect this will be a subject of further discussion for the water quality experts to address as described in the JWS.

Compulsory National Values: Ecosystem Health and Human Health for Recreation

29. Mr Sycamore identifies that ecosystem health and human health for recreation are compulsory national attributes in the NPS-FM. However, in his opinion these values should be dealt with through the future FMU process and not through the pSWLP[22]. Because of their compulsory nature at the national level it is my view that they can, and should, be considered now.

30. The water quality experts have identified in the JWS that there is a need (based on the current state of water quality in parts of Southland) to consider interim thresholds for the national compulsory values[23]. The experts largely confined their discussion of water quality and ecology to the consideration of these values because of their compulsory national status. In my view, this is an appropriate approach for any interim water quality process and the experts agreed there was a risk to water quality and ecosystem health if nothing was done prior to the FMU process[24].

31. Mr Sycamore notes[25] that "*Objective A3 of the NPSFM relates to water quality in relation to primary contact as a measure of addressing human health rather than in a recreational context.*" I disagree with this statement

[22] At paragraph 49 of his s274 evidence in opposition.
[23] JWS for water quality and ecology paragraph 41.
[24] JWS for water quality and ecology paragraphs 83 and 84.
[25] At paragraph 56 of his s274 evidence in opposition.

because the name of the nationally compulsory value in the NPS-FM is 'Human health for recreation' [emphasis added] and it is appropriate for the pSWLP to take a broader view of recreation, given that the NPS-FM definition[26] of this value is:

"Human health for recreation – In a healthy waterbody, people are able to connect with the water through a range of activities such as swimming, waka, boating, fishing, mahinga kai and water-skiing, in a range of different flows.

Matters to take into account for a healthy waterbody for human use include pathogens, clarity, deposited sediment, plant growth (from macrophytes to periphyton to phytoplankton), cyanobacteria and other toxicants." [emphasis added]

Identification of Dairy Farming and Intensive Winter Grazing in the pSWLP

32. Mr Sycamore says[27] that "*Isolating only dairy farming and intensive winter grazing as part of a directive policy to the exclusion of all other activities is not good resource management practice. Other activities such as mining, forestry, or additional urban development could equally result in adverse effects to freshwater over the life of the pSWLP*." Whilst I agree the other activities identified can have adverse effects on water quality, I do not agree that they could 'equally' result in adverse effects in Southland. The evidence of Mr Rodway supports the specific identification of dairy farming and intensive winter grazing in the pSWLP because of the disproportionate

[26] Appendix 1 of the NPS-FM.
[27] At paragraph 168 of his s274 evidence in opposition.

contribution these activities make to poor water quality in parts of Southland[28].

33. The evidence of Mr Rodway, which I find technically compelling, supports the specific identification of dairy farming and intensive winter grazing in the pSWLP because of the disproportionate contribution these activities make to poor water quality in parts of Southland. In order to address degraded and degrading water quality in some parts of Southland it is appropriate for the Plan to specifically address these high risk activities to manage their effects on water quality with more certainty. This issue is was discussed by the experts in conferencing[29]. While there are undoubtably multiple activities which can affect water quality and ecosystem health, I understand the activities discussed by Mr Rodway as 'high risk' (i.e., dairy farming and intensive winter grazing) contribute disproportionately to diffuse water quality issues in Southland.

Inclusion of Waituna Lagoon in Freshwater Considerations

34. Mr Sycamore identifies[30] that Waituna Lagoon is brackish, and therefore falls outside the definition of an FMU. I disagree with this statement. Waituna Lagoon is not within the coastal marine area (CMA). Although Waituna Lagoon is at times brackish and is influenced by coastal water, intermittently closed or open lagoons and lakes (ICOLLS) are still considered freshwater bodies that can be considered under the NPS-FM framework. This same situation applies to the lower reaches of rivers, many of which are often

[28] Paragraphs 97-110 of the evidence in chief of Mr Rodway.
[29] JWS for water quality and ecology paragraph 80.
[30] At paragraph 183 of his s274 evidence in opposition.

influenced by coastal water some distance inland and has been applied to other ICOLLs such as Te Waihora in Canterbury.

35. Thus, I consider from a technical point of view that Waituna Lagoon could be considered as a separate FMU under the NPS-FM framework and that consideration of the water quality and ecology of Waituna Lagoon is not outside the scope of the FMU process or any interim discussion of water quality thresholds to provide for ecosystem health or human health for recreation.

The Role of In-Stream Thresholds of Degradation

36. Mr Willis[31] raises the issue of the role of in-stream thresholds for degradation (referred to as in-stream numeric standards in his evidence). Mr Willis, in discussing Mr Farrell's assertion[32] that without instream numeric standards/thresholds water quality will not improve, states "*In my opinion, that significantly overstates the role and effectiveness of setting in-stream numeric standards as a means of managing cumulative effects in the interim period.*"

37. In my view, setting in-stream criteria or thresholds for assessing degradation is critical to ensuring the plan addresses water quality at least on an interim basis. The experts have agreed[33] that "*there are already degraded sites in Southland, and until such time as appropriate thresholds are established and changes made to stressors affecting ecosystem health, water quality may not be maintained or improved as required by Objective 6.*"

[31] At section 13 of his s274 evidence in opposition.
[32] At paragraph 172 of the evidence in chief of mr Farrell.
[33] JWS for water quality and ecology paragraph 83.

38. Once sites have been identified as degraded or at risk of degradation, high risk activities can be controlled in the Plan to prevent further degradation and to maintain or improve water quality. Activities which contribute disproportionate amounts of contaminants which cause a site to be degraded could include the high risk practices identified by Mr Rodway (discussed above) and/or large point-source discharges which cause instream thresholds to be exceeded. Therefore, the identification of degraded sites, using instream criteria or thresholds is the critical first step which then allows the plan to address the causes of degraded water quality relevant to each site, whether these are individual point sources or cumulative effects from a combination of point sources and/or land use activities.

39. This approach has been used in other regions (e.g., Manawatū-Whanganui Region, Proposed Plan Change 1 for the Waikato and Waipā Rivers, Greater Wellington Proposed Natural Resources Plan) and is an approach that I am very familiar with. If the approach of the pSWLP is to "hold the line", the line must be clearly drawn in some way. In my opinion, setting instream thresholds or numeric standards is the appropriate way to draw this line.

Dated this 15th day of May 2019

Kathryn Jane McArthur