

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF resource consent applications lodged for the water take consents in relation to the Waitaki Basin under the Resource Management Act 1991

SUPPLEMENTARY STATEMENT OF MELISSA CLARE ROBSON

INTRODUCTION

1. The purpose of this supplementary statement is to address some matters that were raised during the closing of the MWRL and individual applicant cases.
2. My qualifications and experience were outlined in my evidence in chief.
3. I have read the Code of Conduct for Expert Witnesses in the current (2006) Environment Court Practice Note. I agree to comply with this Code of Conduct. The evidence I am giving is within my area of expertise.

EXPLANATION OF "NEEDS PLUS BUFFER" TABLE FOR AHURIRI ARM

4. I have provided a working version of the excel spreadsheet used to calculate the needs plus buffer allocation approach. I have given a column by column description of the table.
5. The purpose of this table is to:
 - (a) provides basis for reallocation among applicants in the Ahuriri Arm; and
 - (b) illustrate the relationship between current loads, thresholds and proposed loads once mitigated.
6. Column A is a list of all the farms that are either wholly or partly in the catchment that drains to the Ahuriri Arm of Lake Benmore. As these columns contain stations with areas not draining to the Ahuriri Arm, the figures exceed the actual loads proposed to enter the Lake.
7. Columns B and C are estimations of losses derived in the WQS. These losses were derived using the LandCoverDatabase and a generation rate based model, where N and P losses were associated with each land cover. Losses from agricultural land covers were derived from AgResearch's original modelling in the Mackenzie Basin on 7 farms. Other non-agricultural losses were derived from local and NZ literature, however where NZ literature was not available, figures from international literature were used, such as urban diffuse pollution losses.
8. The benchmarking exercise proposed in the pre-irrigation monitoring year will confirm these current loss figures through OVERSEER modelling of typical farm activities.

9. Columns D and E are estimations of proposed losses when all aspirations of applicant and renewal farmers have been modelled. These figures do not include any mitigation.
10. Columns F and G are the on farm thresholds. ie the required reduction in Lake Benmore has been divided equally among the aspirant and renewal irrigators on a per hectare basis and apportioned to each farm based on the number of new or renewing hectares are proposed, and then subtracted from the respective cells in columns D and E. Cell F34 shows the threshold in Lake Benmore. The reason for the permissible difference between the permitted threshold in F34 and the current losses in B34 is the acceptable load increase (0.5 t N) and the additional denitrification occurring between the farm boundary and the lake.
11. Columns H and I are OVERSEER modelled losses of proposed farm systems already including mitigation. This column represents the farms' needs.
12. Columns J and K are the differences between the thresholds in columns F and G and the OVERSEER modelled losses of proposed systems with mitigation in columns H and I. In cells J34 and K34 are the totals of the buffer between the threshold and the modelled proposed with mitigations for the catchment. This is the 'pot' that is redistributed among the aspirant and renewal irrigators.
13. Columns L and M are the needs (columns H and I) plus a buffer. The magnitude of the allowable buffer is calculated by multiplying all those aspirant and renewal farms' needs by cell M1 and totalling up to new losses in cells L34 and M34.
14. In cells L35 and M35 the totals in cells L34 and M34 are subtracted from the threshold totals in F34 and G34. While the figures in cells L35 and M35 remain positive, then the 'needs plus buffer' losses do not exceed the threshold (F34 and G34).
15. The 'buffer' factor is shown in cell M1 and can be manipulated to see the effect on totals in L35 and M35. Currently the 'Buffer' factor shows 1.095 which equates to the need plus a buffer of 9.5 %.
16. Several stations have had their 'buffer' calculated in a different way. WHL Killermont, Killermont Station and Glen Eyrie Downs have had their 'buffer' assigned as their additional losses under a 'Highly Developed' setting of OVERSEER. In these cases, no additional buffer was assigned on top of highly developed
17. Columns N and O are tranching and other losses. The tranching losses refer to additional nutrients that have been assigned to the as yet unallocated water remaining in the Ahuriri Arm catchment. This column also includes additional nutrients associated with a subdivision and conversion to dairy of a farm in the Ahuriri Arm subcatchment that occurred in the course of the project.
18. The losses in this column have also been given the same 'buffer' and included in the calculations in cells M34, L34 and M35, L35.
19. The figures as indicated on the table do not include any denitrification. Any denitrification that is modelled to occur will do so between the N leaving the farm and the receiving environment. This denitrification factor accounts for the remaining difference between the total current loss in cell B34 and the total threshold loss in cell F34 (approximately 6 %) after mitigation thereby illustrating numerically how we get to the virtually no change in the proposed scenario through comparison with current.

CASE STUDY EXAMPLE USING TWIN PEAKS STATION.

20. The current WQS estimated losses are 11299 kg N and 242 kg P (column B). These values will be confirmed in the pre-irrigation monitoring year. An additional 72 hectares of irrigation is planned on the station (column D). Proposed unmitigated losses for Twin Peaks are 11708 kg N and 276 kg P (column C).
21. As the station is in the Ahuriri Arm subcatchment, the 'Lake' mitigation requirements are the most stringent (column E). The mitigation requirement/ha is multiplied with the number of new ha of irrigation, e.g. 72 ha x 10.7 kg N/ha = 770 kg N to be mitigated (column F). This mitigation requirement is subtracted from the proposed unmitigated to give the threshold (column G).
22. Column H shows the OVERSEER outputs modelled for the farm for the proposed scenario with mitigations. These are termed the farm's 'needs' for N and P.
23. The difference between the farm's needs and the farm's threshold (column I) is put into the 'pot' for redistribution. Column J shows the farm needs plus buffer, using a 9.5 % buffer on top of the needs (Column H x 1.095 or 9685 x 1.095).
24. A comparison of Columns B and J show that the needs plus buffer losses are lower than current but with mitigations, are sufficient to cover the proposed needs.

A	B	C	D	E	F	G	H	I	J
	Current (to be confirmed)	Proposed unmitigated	Ha new or renewing irrigation	mitigation requirement/ha	Total mitigation required	Threshold	Modelled proposed losses with mitigation - 'needs'	Difference from threshold	Needs plus buffer
N	11299	11708	72	10.7	770	10937	9685	1252	10605
P	242	276	72	1.1	76	200	193	7	211

EVIDENTIARY BASIS FOR CUMULATIVE MITIGATION OF N AND P BALANCES

Key mitigation measures for on farm reduction of N

25. I have been asked to provide an explanation of the mitigations that show how each farm will achieve their thresholds. I have outlined some key mitigations for the Glen Eyrie, Killermont and WHL Killermont farms, with reference to the relevant section of those farms FEMPs. These lists are not exhaustive and serve to illustrate one or two key mitigations. I have then provided the total mitigation that OVERSEER has calculated for that farm as calculated from the originally proposed farm system. For ease of use I have provided this information in a statement, rather than in the table itself.

Glen Eyrie

26. Some key mitigation measures modelled in OVERSEER associated with the different scenarios proposed for Glen Eyrie are:
 - (a) Scenario 1 - Reduced losses associated with urine patches through nil and restricted grazing through use of cubicle stables and reduced

effluent losses through collection, storage and careful reapplication (section 5).

- (b) Scenario 2 - Reduced losses through no stock being grazed (section 7.3). All grass will be harvested and removed of site (section 7).
- (c) Scenario 3 - Reduced stocking numbers over winter (section 9.3). Approximately 43% of property under cut and carry with no stock grazing (section 9).
- (d) Scenario 4 - Reduced stocking numbers over winter (section 11.3). Approximately 43% of property under cut and carry with no stock grazing (section 11).
- (e) Scenario 5 - Stock wintered off the property (section 13.3). Approximately 31% of property under cut and carry with no stock grazing (section 13)

27. The total mitigation for Glen Eyrie draining to the Ahuriri Arm, as calculated by OVERSEER is: 19,661 kg N/yr (Cell D18 - H18) from the original scenario of 3.5 dairy cows /ha wintered out and on farm that was used to generate the proposed unmitigated scenario.

Killermont

28. Reduced losses associated with no grazing stock on Pebbly block (Section 5). No stock into watercourse (Section 5.2). Nitrification inhibitor use on beef grazing (Section 5.2). Reduction of total farm size by selling off WHL KMT.
29. The total mitigation for Killermont Station, as calculated by OVERSEER is: 5035 kg N/yr (Cell D19 - H19) from the original scenario of intensive beef/sheep and deer and fodder cropping that was used to generate the proposed unmitigated scenario.

WHL Killermont

30. Some mitigation measures associated modelled in OVERSEER with the different scenarios proposed for WHL Killermont are:
- (a) Scenario 1 - Reduced losses associated with urine patches through nil and restricted grazing through use of cubicle stables (Section 5) and reduced effluent losses through collection, storage and careful reapplication (section 5.5).
 - (b) Scenario 2 - Reduced losses through no stock being grazed (section 7.3). All grass will be harvested and removed of site (section 7).
 - (c) Scenario 3 - Reduced stocking numbers over winter (section 9.3). Approximately 45% of property under cut and carry with no stock grazing (section 9).
 - (d) Scenario 4 - Reduced stocking numbers over winter (section 11.3). Approximately 45% of property under cut and carry with no stock grazing (section 11).

31. The total mitigation for WHL KMT as calculated by OVERSEER is: 29,294 kg N/yr (Cell D20 – H20) from the original scenario of 3.5 dairy cows /ha wintered out and on farm that was used to generate the proposed unmitigated scenario.

Key mitigation measures for on farm reduction of P

Glen Eyrie

32. Some key mitigation measures associated modelled in OVERSEER with the different scenarios proposed for Glen Eyrie are:
- (a) Scenario 1 - Reduced losses associated with stock trampling and soil compaction through nil and restricted grazing through use of cubicle stables (section 5.2) and reduced effluent losses through collection, storage and careful reapplication (section 5.5).
 - (b) Scenario 2 - Reduced losses through no stock being grazed (section 7.3). All grass will be harvested and removed of site (section 7).
 - (c) Scenario 3 - Reduced stocking numbers over winter reduces losses associated with stock trampling and soil compaction (section 9.2). Approximately 43% of property under cut and carry with no stock grazing (section 9).
 - (d) Scenario 4 - Reduced stocking numbers over winter reduces losses associated with stock trampling and soil compaction (section 11.2). Approximately 43% of property under cut and carry with no stock grazing (section 11).
 - (e) Scenario 5 - Stock wintered off the property reducing losses associated with stock trampling and soil compaction (section 13.2). Approximately 31% of property under cut and carry with no stock grazing (section 13)
33. The total mitigation for Glen Eyrie draining to the Ahuriri Arm, as calculated by OVERSEER is: 1,094 kg P/yr (Cell E18 - I18) from the original scenario of 3.5 dairy cows /ha wintered out and on farm that was used to generate the proposed unmitigated scenario.

Killermont

34. Reduced losses associated with no grazing stock on Pebbly block (Section 5). No stock into watercourse (Section 5.2). Elimination of runoff from deer wallows and fenceline runs from reaching a watercourse (section 5.7). Reduction of total farm area by sellinG off WHL KMT block.
35. The total mitigation for Killermont Station, as calculated by OVERSEER is: 652 kg P/yr (Cell E19 - I19) from the original scenario of intensive beef/sheep and deer and fodder cropping that was used to generate the proposed unmitigated scenario.

WHL Killermont

36. The mitigation measures modelled in OVERSEER associated with the different scenarios proposed for WHL Killermont are:
- (a) Scenario 1 - Reduced losses associated with stock trampling and soil compaction through nil and restricted grazing through use of cubicle stables (section 5.2) and reduced effluent losses through collection, storage and careful reapplication (section 5.5).
 - (b) Scenario 2 - Reduced losses through no stock being grazed (section 7.3). All grass will be harvested and removed of site (section 7).
 - (c) Scenario 3 - Reduced stocking numbers over winter reduces losses associated with stock trampling and soil compaction (section 9.2). Approximately 45% of property under cut and carry with no stock grazing (section 9).
 - (d) Scenario 4 - Reduced stocking numbers over winter reduces losses associated with stock trampling and soil compaction (section 11.2). Approximately 45% of property under cut and carry with no stock grazing (section 11).
37. The total mitigation for WHL KMT as calculated by OVERSEER is: 1,214 kg P/yr (Cell E20 – I20) from the original scenario of 3.5 dairy cows /ha wintered out and on farm that was used to generate the proposed unmitigated scenario.

Melissa Robson

2 June 2010