IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the Proposed Canterbury Land and Water Regional Plan

REBUTTAL EVIDENCE OF GEOFFREY BUTCHER FOR THE GROUP 2 HEARING

1. INTRODUCTION

1.1 My name is Geoffrey Butcher and I have the qualifications and experience described in my Evidence in Chief for the Group 1 hearing. I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses.

2. SCOPE OF EVIDENCE

2.1 I have been asked to respond to the evidence of Dr Marsh and the proposals of Fish and Game. My rebuttal evidence addresses:

(a) Whether the cost of $21 million per annum to reduce N by 20 % in the Red Zone catchments is a reasonable estimate and particularly whether this covers all the costs associated with this reduction in N, given that there is a likely associated reduction in milk production with flow-on effects on regional employment;

(b) Whether the benefits of $35 million per annum are a reasonable estimate of the benefits of reducing N by 20% in the Red Zone;

(c) Whether any potential net benefit at an aggregate level implies that the proposed controls should exist across the entire Red Zone, given Ms Hayward's evidence that there are areas where additional N is unlikely to reduce water quality;

(d) The potential economic costs and social impacts of the proposed Fish and Game rules. These rules will make that fraction of existing farming that creates more than 20 kg / Ha / year of N and which does not meet minimum practice standards (undefined) and N leaching reduction standards (also undefined) by 2014, a non-complying activity.

3. THE COSTS OF REDUCING CATCHMENT N

3.1 Dr Marsh states that Environment Canterbury acknowledges a likely decline in water quality under its proposed plan, and he goes on to estimate a $21 million cost for achieving a reduction in N loading which he implicitly believes will achieve a sufficient improvement in water quality to achieve the outcomes which regional residents have indicated they will pay $250 / household / year, or $35 million / year collectively, to achieve.

3.2 Dr Marsh outlines his calculations at para 228, and bases the cost on varying declines in N leachate for specific land uses at varying costs / Ha. It is not clear why he has used a land area of 317,000 Ha since the source he quotes[1] shows this as being the total for all land uses which generate over 20 kg / ha, whereas the cost per Ha is for dairying only. Nor is it clear why he has assumed variable rates of reduction in N.[2] I have read the report from which the data was sourced and discussed the figures with one of the authors[3]. My understanding is that it would be more appropriate to use an average cost of $170 / Ha reduced operating surplus[4] to achieve a 31 % reduction in N leachate from dairy farms, which in turn produces a 20 % reduction in catchment N leachate.

3.3 While Environment Canterbury is unable to confirm the area in dairying in the Red Zone, discussions I have had with Ms Hayward and with Mr Griffiths of Fonterra suggest approximately 150 - 180,000 Ha, is in the Red Zone.

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1. Section 32 analysis; Appendix 1 page 59.
2. Unspecified reduction in N leachate at $0 / Ha for 20 – 25 kg / Ha;
   16 % reduction in N leachate at $70 / Ha for land leaching 25 – 30 Kg / ha and half of land leaching 25 – 30 kg / Ha; and
   32 % reduction in N leachate @ $170 /Ha for the balance of land leaching > 30 kg / Ha.
3. Sam Howard. The figure of $170 is not included in the report, but can be inferred as an average over all dairying land.
4. Defined as reduction in revenue less reduction in costs, where costs include any marginal interest and depreciation costs on additional capital required. Note that the actual costs per ha may be significantly greater than this.

Applying the average cost of $170 / Ha[5] to 165,000 Ha gives a cost of $28 million per year to reduce catchment N leachate by 21 %.

3.4 There are three caveats to the conclusion that the average cost of achieving this reduction will be $170 / Ha and the total cost will be the $21 million calculated by Dr Marsh or $28 million calculated by me. The first is that the calculation assumes that the reduction in N is achieved by an optimal change to all farms, hence achieving the greatest reductions at the least cost. While the linear programming model assumes that all farmers are capable of managing their farm in this optimal fashion, this is unlikely to be case in reality and hence the likely cost will be higher than $170 / Ha.

3.5 The second caveat is that Dr Marsh assumes that this least cost outcome can be achieved by a combination of rules relating to individual farms and trading of N permits.[6] While I support the concept of trading as a least cost means of achieving the outcome of reduced catchment N, I think it will take considerable cost to develop and operate such a market. Moreover it will take considerable time to agree on an appropriate method of defining total N leachate, and hence surplus N leachate, for each individual farm for each year. Dr Marsh implicitly assumes that this N leachate measuring and trading can be introduced costlessly by the time the new rules are implemented in 2014. I suspect that this is quite unrealistic. In my response to the Fish and Game proposals (below) I comment further on the potential additional costs of imposing standards throughout the Red Zone in the absence of an efficient market for trading N leachate permits.

3.6 The final caveat is that the calculation ignores an additional cost to the wider community associated with the 13 %[7] reduction in milk production which accompanies the 20 % reduction of catchment nitrogen leachate. A 13 % reduction in milk production is broadly equivalent to the loss of production from

5. I note also that this $170 is not the cost of reducing N from current levels, but is the cost of reducing N from optimised levels using current farming systems. So there is a significant potential reduction in N that can in principle be achieved at zero cost to farmers. This of course begs the question as to why they do not do this now. It probably reflects some mixture of inertia, budget constraints, and lack of awareness of opportunities. It may also reflect that fact that the assumptions underlying the models are not necessarily accurate.
6. I refer here to the right to trade any difference between allowable N leachate and achieved N leachate on a particular farm.
7. See Howard *et al*, Table 8.

29,000 Ha of the 220,000 Ha currently in dairy. As I showed in my evidence in chief for the Group 2 hearing (Table 4), the impacts of converting 1,000 Ha to dairy farming is the creation of a net 74 jobs, $9 million / year of value added and $4 million / year of household income in the region, with around 30 % of this being due to increased activity in processing industries. The loss of 29,000 Ha will put at risk up to 2,100 jobs and $116 million of household income. While the regional impacts per hectare will be different for a reduction in output driven by changed farming systems than for an increase in output due to changes in land uses to dairying, there is no doubt that a substantial number of jobs and regional household income will be lost. While this labour may find employment elsewhere in the region in due course, the loss of jobs will come at an economic cost[8] that needs to be added to the $21 million calculated by Dr Marsh or the $28 million calculated by me.

3.7 The average cost masks individual effects including the fact that to achieve a 20 % reduction in catchment N and a 31 % decrease in dairy N, an additional 11 - 13 % of dairy farmers would have a negative return.[9] One could argue that this is a short term effect, because in due course (a) inefficient farmers will be squeezed out and (b) land prices will fall to reflect the lower profitability of dairy farming and hence interest rates will fall and net returns will rise. Even if this is the case, there will be significant social costs during the transition period.

4. THE BENEFITS OF REDUCING N LEACHATE

4.1 Dr Marsh has compared this cost of reducing N to the benefit of retaining, or achieving, satisfactory water quality as calculated from a survey which he undertook. I have no particular argument with his calculation of $35 million, although I observe that it is notoriously difficult to be sure that respondents to such surveys truly understand the nature and implications of both the direct outcomes they are being asked to compare, and the associated effects. Were they, for example, presented with information about the likely difference in dairy farming and hence in wider regional income and employment which might accompany the difference in water quality.

8. This cost depends on whether people find alternative employment, and how long it takes them to do so.
9. See Howard *et al* Table 10.

4.2 It is also not clear to me that the 20 % reduction in catchment N leachate will achieve a change in water quality that is sufficient to create these benefits. .

4.3 There are many other factors which affect water quality, and if other measures are necessary (e.g. P and sediment management practices, riparian margins, other catchment mitigations), then these need to be either added to the $21 million cost or deducted from the $35 million net benefit.

5. BENEFITS OF INTENSIFICATION

5.1 Dr Marsh contends (para 36) that the benefits of intensification may be less than has been suggested and he refers to the evidence of Geoff Kerr (to the Hurunui hearing) and Alison Dewes as well as the paper by Howard et al. It is not clear from Dr Marsh's evidence what benefits in particular he thinks have been overstated, and I note that the economic experts conferencing statement by Dr Kerr And Mr Harris in the Hurunui case contains the statement "Given the stage of the project , the figures in Mr Harris's evidence can be relied on as a reasonable assessment of the economics of the project"[10]. That same statement refers to a Base Case net benefit of $200 million, and potential volatility within the range -$200 million to + $670 million.

5.2 Obviously there are potential environment and social benefits and costs which also need to be balanced against any financial benefits and I have said so implicitly in my evidence to the Group 2 hearing (para 4.9) and on numerous other occasions when I have given evidence to hearings and answered questions. The financial analysis undertaken by myself and others generally ignores net environmental costs, and does not attribute any financial benefit to the extra jobs that are created. Commissioners and judges are left with the task of assessing whether on balance the net outcome of financial and non-financial factors is positive or negative.

6. IMPLICATION FOR REGULATION OF THE RED ZONE

6.1 Even if Dr Marsh is correct in his assertion that the aggregate benefits exceed the aggregate costs of reduced N in the Red Zone as a whole, this does not mean that they will do so in every catchment or sub-catchment within the Red

10. Statement of Conferencing Outcomes for Economic Experts. 2013.

Zone. As Ms Hayward has stated in her Group 2 evidence, there are areas of land in Temuka and Ashley-Waimakariri zones where, in her view, a change in land use could occur without creating environmental problems of the sort which rule 5.45 is intended to prevent.[11] Hence it will not be efficient to impose the rules proposed by Fish and Game across all parts of the Red Zone.

7. POTENTIAL IMPACTS OF PROPOSED RULE CHANGES

7.1 The proposed rule changes have the potential to make some existing dairy farming non-complying, particularly in the short term until farming practices are adjusted and the proposed trading of N permits becomes feasible. It will also make additional dairy farming in the Red Zone non-complying. I comment on the economic impacts and costs of that.

7.2 My estimates are based on the following assumptions:

(a) 162,000 Ha of dairy farming produces > 20 kg / Ha / yr[12];

(b) A review of the appropriate Environment Canterbury maps suggests that about two thirds of dairying is in the Red Zone. Hence approx 97,000 Ha of dairy farming would not meet the sustainable leaching standard referred to in the Fish and Game proposed rules.

7.3 This 97,000 of existing dairy farming will be a "restricted discretionary activity if by 2014:

(a) It meets "the minimum practice standards" (whatever these are), AND

(b) Achieves "N leaching reduction standards from 2011/12 leaching rates" (whatever these standards are).

7.4 The balance of dairy farming would be "non-complying" if it fails to meet the standards by the proposed date. Presumably it will then have to cease dairy farming, or at least reduce output to a level at which it meets the standards. For a farm with high levels of leachate this could either be difficult in terms of

11. "The data for these zones indicate that there is potential assimilative capacity in areas of these zones that could allow some further development, providing appropriate measures are put in place as would be likely required for a land use change consent in an 'orange' zone". Hayward evidence in chief for the Group 2 hearing, section 7.3
12. See Section 32 analysis (Environment Canterbury); Appendix 1. Table 3 page 68.

physical farm management[13] or financially impossible, depending on what the "leaching reduction standards" are. Presumably that farming could not change to an alternative land use because that would be "new farming", which under the proposed rules is a non-complying activity.

7.5 I cannot say what the total economic costs will be since I have no way of estimating what are will be non-complying. However, the costs per Ha for a dairy farm which ceases to produce could be up to $3,700 / Ha / year (see Table 2 of my evidence in chief).[14] Hence for every 1,000 Ha which becomes non-complying the cost will be $3.7 million per year. Associated with this will be the loss of 105 jobs in the Region (see Table 4 of my evidence).

7.6 I have discussed in my evidence in chief the potential costs of imposing a rule which makes new farming non-complying in those parts of the Red Zone which Ms Hayward has identified as having sufficient assimilative capacity to allow further development. This potential cost of the proposed Fish and Game rules has not been taken into account by Dr Marsh in his analysis.

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13. But possible via N permit trading if a market for this exists.
14. Much of the capital cost will be fixed, and irrigation fees to a community scheme will still have to be paid.