10 March 2017

Hearing Statement

IN THE MATTER OF:

The Resource Management Act 1991

TO:

Bay of Plenty Regional Council

ON:

Proposed Plan Change 10: Lake Rotorua Nutrient Management

BY:

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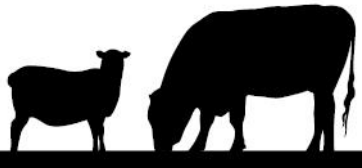

Hearing statement

INTRODUCTION

1. My name is Corina Jordan. I am the Environment Policy Manager (NI) for Beef + Lamb New Zealand.

2. I am not presenting expert planning evidence today, but am speaking to the B+LNZ submission on Lake Rotorua Nutrient Management: Proposed Plan Change 10 to the Bay of Plenty Regional Land and Water Plan (PC10).

3. B+LNZ is an industry-good body funded under the Commodity Levies Act through a levy paid by producers on all cattle and sheep slaughtered in New Zealand. Its mission is to deliver innovative tools and services to support informed decision making and continuous improvement in market access, product positioning and farming systems.

4. B+LNZ is actively engaged in environment based work at a farm, catchment, region, national and market level. As part of this work B+LNZ is actively engaged within the Bay of Plenty Region in developing and building our work programme to support the integrated and sustainable management of land and water resources. B+LNZ is:
    (i) Working with farmers to develop Land Environment Plans (LEP) through levy funded workshops;
    (ii) Supporting famer representatives to engage in the collaborative catchment plan development processes;
    (iii) Working with the Regional Council to ensure that management frameworks developed through Regional Plans are fit for purpose, and enable flexibility in land use and management practices, while ensuring that environmental issues are addressed in a targeted, efficient and effective way;
    (iv) Working with the Regional Council to develop Farm Environment Plans which meet the requirements of PC1
    (v) Developing and implementing science and extension programmes to help identify, prioritise and implement on farm actions that will make a difference to improving water quality, aquatic habitats, and biodiversity; and

(vi) Working with farmer leaders throughout the region to support uptake of farm environment plans and to encourage and support the development of sub catchment approaches to managing water quality

5. B+LNZ considers that farmer led, farm specific and industry supported initiatives and actions are the most effective method to achieve long term sustainable management of land and water natural resources.

PURPOSE OF PROPOSED PLAN CHANGE 10

6. B+LNZ understand that the key outcomes sought through proposed plan change 10 include:

i. Achieving a target lake trophic level index (TLI) of 4.2 as set out under the Water Quality Objective 11 of the Regional Water and Land Plan;
ii. Water Quality of the lakes within Rotorua to be enhanced along with other catchments at risk as set out in Objective 28 of the Regional Policy Statement (RPS)
iii. Establishment of a target load to the Lake of no greater than 435t per annum by 2032, Policies WL 3B and WL 6B (RPS)
iv. Requirement to achieve a 140t/N load reduction from the Lake Rotorua catchment (Current 601Tonnes N – Target 461 Tonnes N by 2023)

7. Beef + Lamb New Zealands submission, this hearing statement, and our ongoing interaction with Bay of Plenty Regional Council supports the intended outcomes as set out above. It is our submission however that the proposed plan change 10 will not meet these outcomes and is in some cases contrary.

8. It is our submission, that for the drystock sector PC10 does not provide an equitable nitrogen allocation framework, nor does it retain on farm decision making flexibility. B+LNZ submit, that by applying a discharge baseline or a NDA loss rate to a low nitrogen emitting sheep and beef farmer based on sector benchmarking, and by making it difficult to increase above that baseline in many cases throughout the region, PC10 is: inequitable, stifles flexibility and innovation, stifles the ability of farmers to changes management practices in response to market changes, is not proportionate to their level of Nitrogen risk, and fails to allow those farmers to focus on farm practices that will result in maintained or improved water quality outcomes. As

such B+LNZ submitted in opposition in part to policies LRP1 – LRP17; and rules LRR1 – LRR13.

9. B+LNZ predominant concern with PC10 is that the plan is too structured around providing for property level Nitrogen Discharge Allowances and incorporates an inappropriate and inconsistent use of Overseer. As set out in section 3.2.2 of the s42a report the allocation methodology is built on sector averaging with ranges – based on Rule 11 benchmarking as the start point. The allocation methodology results in a Nitrogen Discharge Allowance being allocated to each block within the catchment. These are summed for a property/farming enterprise and this is the limit required to be met by 2032. The NDA are expressed as a percentage of a reference file.

10. B+LNZ submit that as proposed the nitrogen allocation approach in PC10 is inequitable, inflexibility and fails to the drystock sector throughout the region. To try and address the inequities, in the current planning framework created by the proposed nutrient allocation approach B+LNZ have sought specific alternate relief throughout plan change 10, specifically in getting the thresholds right and providing for N management flexibility, that attempts to be consistent with the desired outcomes. B+LNZ seek that if PC10 is to allocate nitrogen leaching authorisations now that an alternative allocation system is put in place that is a fair and equitable way of allocating Nitrogen loads, and is based on the sub-catchment, to ensure that the proposed outcomes sought in PC10 can be met.

11. PC10 require farmers to undertake a Nitrogen Management Plan as the primary point of compliance which includes actions, described land uses, and OVERSEER input parameters. As set out in the section 42a report defined actions are to be implemented over a 5 year period, and include areas for different land uses (dairy pasture etc), stocking rate and stock type, fertiliser sue, effluent practice and imported feed (s42a report Nitrogen Management Plan as the primary point of compliance, page 70).

12. B+LNZ submits that the council's current approach to on farm management through potentially prescriptive farm plans is counterintuitive to achieving action at a sub catchment level, through coordinated, well supported and prioritised actions. Acknowledgement needs to be given to a whole farm approach to managing the potential impacts on water quality, not just limited to Nitrogen.

NUTRIENT DISCHARGE ALLOWANCES & NITROGEN FLEXIBILITY

13. While a pragmatic approach has been taken by some farmers in supporting the adoption of sector averaging approach to allocation of Nitrogen, to work towards an agreed community approach there are significant long term impacts on individual's flexibility of land use and potential constraints on land use within the catchment as a result of adopting the framework to managing nitrogen as set out in PC10.

14. For the majority of sheep and beef farmers in the Catchment, the N allocation framework is inequitable, will not be effective in achieving improved water quality directly from practice change on those farms, and places significant operating constraints on land uses that already have relatively low N losses.

15. B + LNZ submits that this proposal is only making the best of a flawed allocation approach, that will likely result in perverse behaviour, actions and market disturbance. It is our submission that just like the mentality of paint by numbers, stifles creativity in children, so farming by numbers will stifle creativity and innovation by sheep and beef farmers.

16. Providing for flexibility in land use is not only important for sheep and beef farmers, it's important for the local community and for the economy. Locking farmers into one land use, influencing property values through N allocation, and making presumptions about future land use through allocation methods will stifle farmers ability and response to what is the best use of that land to grow which product to respond to higher value markets. Such an approach is contrary to the principals of sustainable management which includes consideration of future generations.

17. As proposed PC10 gives an unfair advantage to the highest discharging land uses while placing restrictions on activities not causing or contributing to the problem. Under the currently proposed nutrient discharge allowance (NDA) approach based on sector averaging and benchmarking land uses with the higher loss and consequent NDA stand to sustain a higher level of productivity, have more flexibility, and will be valued more highly. Farms with a low NDA and potentially better environmental footprint are effectively capped with a ceiling on stock numbers, production, land value and future income earning potential. There is no recognition for the differential in N leaching between drystock farms and dairy farms. This NDA approach, as with 'grandparenting approaches' appear to favour businesses' that already have a high environmental impact. This runs counter to a "polluter pays"

principle, because those farms with the lowest environmental footprint are bearing a much larger burden as a result of PC10 rules.

18. On certain farms, under the currently proposed NDA approach land values will depreciate, in comparison to other land uses. This is rrespective of whether or not natural resource limitations are the same, such as soils, climate, and the assimilative capacity of water. This will create issues with the 'bankability' of some businesses and current lending arrangements. The biggest impact and most inequitable outcome will be the yearly opportunity cost or loss of potential future income created by the NDA approach to nitrogen. Until now this has been largely unrecognised/acknowledged, and for some of these properties this will be huge. Consequently, this has many unintended outcomes that have not been adequately considered within the section 32 analysis**.** These include:
    - Capital devaluation of properties with limited ability to farm to sustainable potential;
    - Increased risk profiles and interest rates with banks;
    - Loss of succession planning; innovation, growth and an inability to respond to market demands.

19. A report produced By Baker Ag for the Drystock sector as part of the Waikato Regional Council Healthy Rivers Plan has identified significant financial implications for the drystock sector in relation to application of a nitrogen discharge restrictions based on historic emissions. The report places the figures for opportunity cost at between $75,698 ($164/Ha) to $256,800 ($285/Ha) per farm.

20. Where allocation approaches are considered for natural resources, B+LNZ submit that they need to recognise and account for both land use capability and responsible environmental land management decisions. Landowners that have adopted land uses which have lower environmental impacts, and that match land use with land use capability and natural resource limitations , and that been actively involved in retiring land, and reducing nitrogen inputs should be rewarded and not penalised. The current NDA approach proposed in PC10 is inequitable unfair, with lower emitting land uses subsiding high emitters. The approach fails to take into account the variability of Drystock farming, and is contrary to the effects based philosophy of the RMA.

21. The proposed approach is contrary to Policy WL 5B which requires council to allocate the ability of Rotorua Te Arawa Lakes to assimilate contaminants among land use activities by having regard to the following principles and considerations:
    a. Equity/fairness, including intergenerational equity;
    b. Extent of the immediate impact;
    c. Public and private benefits and costs;
    d. Iwi land ownership and its status including any Crown obligation;
    e. Cultural values;
    f. Resource use efficiency;
    g. Existing land use;
    h. Existing on farm capital investment; and
    i. Ease of transfer of allocation.

22. B+LNZ submit that if the current approach to allocate NDA through PC10 is retained then the allocation approach should be amended to be based on the natural capital of soils, rather than existing land uses, where like land is treated the same, and the NDA drives farm optimisation including of land uses within the constraints of natural resources. Three different allocation approaches 1) Land Use Capability, 2) Lidar/DEM, and 3) equal allocation are set out below.

Different Allocation Approaches

23. Allocating an N-loss allowance to land users provides both certainty and clarity around the parameters that they are required to meet, in their day to day management and as they contemplate the range of land use and land use change options they have available. Depending on how the allocation is made, transparency around both the quantum of allocation and process can be enhanced. Equally, issues of equity can be addressed and managed
24. Where natural resources are to be allocated, B+LNZ support frameworks based on the natural capital approach which preserves equal opportunity for all land users to consider alternative uses for their land and adoption of practices and management that enable nutrient losses to be minimised, consistent with their respective LUC class limit. It also recognises any mitigation investment by current land users. The principals supported by B+LNZ are set out in Appendix 1 and were included in our submission.

Land Use Capability

25. Land use capability (LUC) is a New Zealand applied land classification system that has been operating since 1969. The approach has two key components:
    a. the NZ Land Resource Inventory, coupled with the
    b. LUC Classification

26. LUC allocation system enables land to be classified into eight classes according to its long-term capability to sustain productive uses. Slope, risk to erosion, wetness, soil, and climate underpin the LUC approach. LUC is a holistic approach to help improved decision making on sustainable land development and land use management in NZ.

27. Land Use Capability (LUC) allocation approaches to nutrient management were adopted in both the Horizons and Hawkes Bay regions, they are equally applicable to the bay of Plenty Region. As such the NDA adopted in these regions is a relevant matter for you to consider.

Land Use Capability – Natural Capital							
Class	I	II	III	IV	V	VI	VII
Year 1 (Kg/N/ha/yr)	30	27	24	18	16	15	8

Equal Allocation

28. Equal Allocation apportions NDA based on the level of discharges that could be sustained in achieving instream loads, and allocated these as a flat rate per hectare of land. Paterson et al as set under appendix 3 looked at alternative allocation scenarios including LiDar/DEM as set out below, and an equal allocation. From this work the equal allocation is around 22.7 to ~23.1kgN/h/yr. This would suggest that those farming systems and land uses leaching at or below these levels could be considered to have not caused or contributed to any nitrogen issues within the lakes catchment. Therefore under the RMA there is no requirement to manage or regulate these activities under section 9, as section 15 does not apply.

LiDar/ DEM

29. Paterson et al designed an alternative approach for allocating NDA through Digital Elevation Model for Land Assessment (DEMLA) "A concept of assessing land quality for productive capabilities for the purpose of N allocation". High resolution LiDAR (Light detection and ranging) is now available for the whole of the Bay of Plenty. LiDAR contributes to the working integrity of the GIS Digital Elevation Model (DEM).
30. The new LiDAR data of the Rotorua district enables precise and 'objective' assessment of slope and enables slope categorisation of the land surface. LiDar/ DEM is objective and precise, computer generated slope categorisation, Takes 20 – 30 min per property regardless of property size. LiDar/ DEM incorporates twelve rainfall bands which are used to grade responses in productive capability (plant growth). Four slope categories are provided:
    a. Flat 0 – 7.99°;
    b. Rolling 8 – 15.99°;
    c. Easy 16 – 25.99°; and
    d. Steep 26°+

31. Paterson et al, proposed allocation to achieve target 461t/N is:
    a. Flat 33kgN/ha;
    b. Rolling 15kgN/ha;
    c. Easy 6kgN/ha
    d. Steep 3

32. Given the uncertainty in relation to the science around the links between land use, leaching, attenuation, and use of OVERSEER within regulatory frameworks as currently proposed, B+LNZ do not submit that the numbers put forward by Paterson et al are accepted now. But rather that the approach is available now to determine alternative allocation approaches. Ultimately the numbers should reflect the level of uncertainty around the science and provide for adaptive management ie scaled reductions overtime which account for the economic constraints of individual farmers, and their business plans and personal circumstances in line with NPSFWM Policy CA.

Nutrient Transfer Regimes

33. In designing the allocation system the benefits of a nutrient transfer system within the catchment or water management unit should be considered. Maximum economic efficiency of land use can be assisted by a mechanism for transferring nutrient

discharge allowances within the same sub-catchment. However, B+LNZ submit that nutrient transfer systems are only appropriate where:

(i) the initial allocation system meets all of the allocation principles;
(ii) only occurs within a sub-catchment or watershed and enables and supports Catchment Collective Groups;
(iii) the transferable portion of the resource (e.g. nitrogen) only pertains to the load which achieves the desired environmental outcome;
(iv) be a transfer within an established sub catchment programme that's based on allocation of a load consistent with these principles; and
(v) results in improved economic outcomes and land use optimisation.

OVERSEER

34. There is too much uncertainty in the current and proposed use of Overseer within the plan both for modelling and understanding compliance with the NDA's. If NDA's and benchmarks are retained then the calculation of benchmarks for Nitrogen loss and proposed NDA's should be changed to be more consistent with best practice use of Overseer as a long term averaging model. This is incredibly important for sheep and beef farmers especially where the mix of weather events, animals, crops and land use can change within and between years, impacting on modelled Nitrogen loss.

35. Further the use of Overseer for sheep and beef farm systems is complex and requires significant investment in time to be able to get a true reflection of actual loss. Even then there are significant in paddock mitigations that may be occurring that will not result in a change in modelled outputs for sheep and beef farmers.

NUTRIENT MANAGEMENT PLANS

36. Council's current approach to on farm management through potentially prescriptive farm plans is counterintuitive to achieving action at a sub catchment level, through coordinated, well supported and prioritised actions.

37. Acknowledgement needs to be given to a whole farm approach to managing the potential impacts on water quality, not just limited to Nitrogen.

Purpose of Farm Environment Plans

38. Correctly tailored use of farm planning tools is critical in balancing the implementation of mitigations with farm system objectives to improve whole – system sustainability. The key contaminants generally for the drystock sector in relation to waterways, in a suggested order of decreasing impact are: sediment, P, N and faecal micro-organisms. The outstanding feature of drystock sector, in comparison with other agricultural land uses, is the high degree of spatial and temporal variation in both landscape structure and in system processes.

39. Studies consistently show that, far from being characterised by "diffuse source" pollution, the majority of contaminant losses occur over short time scales and/or from small areas of the farm where areas of high contaminant sources and rapid transport processes coincide (McDowell & Srinivasan 2009). These areas are called critical source areas (CSAs) and examples include tracks, troughs, gateways, headwater seeps and gullies and can generally be identified from farm mapping resources (Betteridge *et al*. 2013). Dodd et al[1] suggests that the best outcomes are achieved in relation to freshwater outcomes and "*reducing contaminant discharges from drystock operations in the long-term is achieved when they are: 1) chosen on the basis of suitability to the farm; 2) implemented on the basis of cost-effectiveness; and 3) implemented in critical source areas, with the result that 25-50% of some contaminant losses can be mitigated without impairing farm earnings*."[2]

40. B+LNZ has developed and supports, promotes and invests in the adoption by farmers of Land and Environment Plans (LEP). The LEP programme is entirely voluntary. It is delivered through a series of facilitated workshops, where farmers are assisted to identify environmental risk on their individual properties and to put in place a set of agreed actions to manage this risk. These actions are prioritised and given a budget allocation from year to year. The identification of these risks and agreed actions is undertaken in a whole farm systems approach to managing the effect of the operation on the environment and optimal resource use, by matching appropriate land use to different areas of the farm while achieving production and development goals for the property.

41. From an industry perspective, FEPs are an education tool which enables farmers to understand the natural resources (land, water and soil) on their farm. They provide a

[1] M.B. Dodd, R.W. McDowell and J.M. Quinn (2016). A review of contaminant losses to water from pastoral hill lands and mitigation options
[2] IBID

risk matrix for activities and enable farmers to better manage these in the long-term. The Land and Environment Plan guides farmers through a recorded assessment of their farm's environmental risks as well as land management opportunities, and can underpin farm optimistation decisions. Simply put it takes the farmer through a process which enables them to understand their land and water resources, and to put in place management approaches which maximise the productive potential of their land while addressing critical source areas and sustainably managing their freshwater and soils.

42. It involves a stock-take of land, soil and water resources, and results in the development of a personalised written plan identifying critical source areas including erosion risk, and potential actions to be undertaken, potential changes in management practices, where they might be targeted, and when they will be implemented.

43. A well prepared LEP captures stewardship and sustainability as a record showing that measureable actions are being taken to address environmental concerns and to demonstrate good practice. It also provides an understanding of the natural resources on farm, and allows all those involved with the farm business to understand the plan to manage them for the long-term

44. In summary application of appropriate FEP's assists farmers in understand their natural resources and to manage their farm sustainably, through addressing the environmental factors that make their farms unique. The intention is a living document which the farmer and workers take ownership of and which informs the day to day management of the farm and longer term farm planning.

45. Considerable flexibility needs to be built into FEPs because the goal posts in farming shift in ways an individual farmer has little control over such as market conditions and physical systems (climate, soil etc). This affects the capital they can investment, how they manage pasture, crops and stock etc.

DECISIONS SOUGHT

46. B+LNZ's position is that if nitrogen is to be allocated to land use then it should be allocated using the most effective and efficient tool available. Allocation approaches based on the natural capital of soils and which treat like land and resource limitations the same, should be adopted.

47. Any NDA applied at a property level adopted by council or included within this plan change should not be inconsistent with the B+LNZ principles of nutrient allocation included in the reasons for our submission. If this is adopted now or delayed until a future plan change, any policies or methods should move farmer behaviour around management of nutrients to be consistent with any proposed future approach.

48. The plan should provide for sufficient transition times from any allocation approach to provide optimal land use over time but to avoid any short term significant impacts on individuals or the local or regional economy.

49. To ensure that PC10 is effects based, efficient and effective, the Plan should target activities which exceed the 'sustainable level[3]' and require through consent those activities to progressively reduce contaminant discharges over time. Management approaches should ensure that those activities and land uses which are contributing the most to the over allocated parameter bear the majority of the cost of reducing the over allocation (polluter pays principle). The plan should build in flexibility, and allow of innovation and time for adaption. Frameworks should provide for the economic constraints faced by farmers and individual circumstances.

50. B+LNZ support generally the relief sought by Federated Farmers and seek that this be adopted. Federated Farmers has proposed an alternative regulatory and non-regulatory approach that looks to maintain the downward trajectory of nitrogen but does so within an integrated framework for nutrient management. Importantly the approach adopts a sub-catchment approach, considers all contaminants of concern, looks at multiple scales (catchment, subcatchment, farm, city), is adaptive and flexible.

51. B+LNZ support Federated Farmers in seeking that the council immediately adopt an Integrated Management Framework for Lake Rotorua which is focussed at the sub catchment level where the council works in partnership with farmer led groups. This is a preferred approach to the current proposed plan.

52. That a whole farm approach to managing the risks to water quality be adopted. Assessment of progress towards the overall objective of improving water quality in Lake Rotorua should take into account the whole farm approach rather than just focussing on nitrogen.

[3] IBID

53. B+LNZ seek that the council delete any reference to prescriptive input-based management, and remove all references in the rules to prescriptive management of farm plans. As set out in this statement farm plans are a method by which farmers can identify and describe actions to manage environmental risk specific to their properties and aligned with their overall objectives. The focus should be on farm specific and tailored critical source management. They should not be used as a method by which councils aim to prescribe and or manage farm activities.

CONCLUSIONS

54. B+LNZ considers that farmer led, farm specific and industry supported initiatives and actions are the most effective method to achieve practice change that results in long term sustainable management of natural resources.

55. B+LNZ is committed to supporting farmers to adopt farm practices that will meet water quality objectives for Lake Rotorua. As an industry good body we will continue to offer advice, science, support, extension and partnerships that improve sheep and beef farmers understanding of and actions to manage environmental risk and that align to meet their social, production and financial goals for their property and ultimately the local and regional economy. We consider that the current plan does not provide the right mix of regulatory and non regulatory methods to achieve lake water quality objectives.

56. There is an unwaivering commitment by farmers within the catchment to do everything possible to meet the proposed nitrogen reduction targets for Lake Rotorua. B+LNZ will work proactively with council to support on farm actions that support improved lake water quality

ENDS

Appendix 1

Principles for the Allocation of Nutrients

These principles have been developed to guide decisions on nutrient allocation. They seek to ensure that nutrient allocation is fair, equitable, recognises the complexity of farming systems, and provides for continued flexibility of land use. They support catchment specific solutions to nutrient management and that different allocation regimes will be established that reflect differences between communities and their catchments, and to meet water quality objectives in those catchments. These principles should be considered carefully when forming any nutrient allocation policies or methods to achieve them. Each principle is important but they should be considered as a whole to inform allocation discussions.

Principle 1 Like land should be treated the same

Allocation should be based on the intrinsic qualities of the land. Two pieces of land with the same qualities should receive the same allocation. This principle recognises that allocation regimes should not be overly influenced by existing land use.

Principle 2 Those undertaking activities that have caused water quality problems should be required to improve their management to meet water quality limits.

All New Zealanders have a responsibility to manage their activities to maintain or improve water quality. This principle reflects the need for those who have caused water quality problems or who are contributing a greater amount to them to take a greater responsibility for meeting the costs of reducing nutrient loss to water. It also reinforces that those who have managed responsibly should not be required to have their land use constrained as a result of others' activity.

Principle 3 Flexibility of land use must be maintained

Land owners need to have the ability to respond to changes in climate, input costs, markets and technological innovation in order to maintain a profitable and sustainable farming enterprise. Allocating nutrients in such a way that unnecessarily limits land use change constrains the ability of land users to respond to those changes and optimally utilise the land resource.

Principle 4 The allocation system should be technically feasible, simple to operate and understandable

A high level of technical feasibility is fundamental to a successful allocation approach. The simpler the system, the more likely it is to be able to operate effectively. The approach must also be understandable by land users and the wider community. It must be able to be administered fairly and at minimum transaction costs to users and the regulator.

Principle 5 The natural capital of soils should be the primary consideration when establishing an allocation mechanism for nutrient loss

A natural capital approach allows for an economically efficient allocation of nutrients. Those soils with the greatest ability to retain nutrients and optimise nutrient use give land users the greatest flexibility to optimise production, respond to markets and technology while

managing potential effects on water quality. Allocation systems should reflect the ability of these soil types to optimise production and land use flexibility.

Principle 6 Allocation approaches should provide for adaptive management and new information

Allocation decisions are primarily made on the information we know now and modelled future scenarios. Our understanding and the availability of both catchment and farm systems will change over the life of an allocation system as will possible management techniques. Allocation systems should provide sufficient flexibility to provide for adaptive management and be reviewed regularly to incorporate new information. Adequate transition times should be provided to incorporate new information where allocation changes as a result.

Principle 7 Appropriate timeframes must be set to allow for transition from current state to one where allocation of nutrients applies

Timeframes should take account of the degree to which any waterway is over-allocated (if that is the case), the period over which this state has come about and the costs for businesses and the current ability to manage to that allocation.

It should be recognised that current water quality issues are sometimes the result of many years of land use within catchments and may have developed over generations. Consideration needs to be taken of the legitimate expectations of people and natural justice. Accordingly time should be provided for them to adjust. There needs to be a balanced approach and recognition of the uncertainty associated with water science versus the likely economic impact on businesses and the region. The primary objective should be to set an appropriate direction of travel that will see a steady improvement in water quality.

Principle 8 Long term investment certainty is a critical feature of a viable nutrient management system

Changes to nutrient allocation regimes must be signalled as far out as possible. Refinements to those systems must be managed to minimise their impacts on business viability, land value and the flexibility of land use. The aim must be to reflect the underlying elements of sustainable management in achieving improved water quality outcomes including reducing those adverse impacts on social and economic outcomes.

Principle 9 Improvement in water quality must remain the primary objective of adopting any nutrient allocation regime

When exploring the adoption of methods to achieve water quality improvements and manage to limits, the focus of community debates, modelling and discussion of allocation of nutrients can distract from the primary goal – maintaining and improving water quality. This principle emphasises that allocating nutrients to a property level doesn't in itself result in improved in water quality; it is the actions of land users that ultimately result in improved nutrient management.

Principle 10 In under-allocated catchments, where property based nutrient allocation has not been adopted in setting water quality limits, the system for allocating nutrients must be determined well before the limit is reached, be clear and easy to understand, and designed to avoid over-allocation

The mechanism for allocating nutrients, even if it does not have immediate effect, should be clear from the time when water quality limits are set. Allocation mechanisms should reflect the level of risk that the catchment will become over allocated. This may include the adoption of a pre-agreed catchment-specific environmental threshold (e.g. 75%-90% of a limit) to determine when an allocation regime should be adopted.

Principle 11 In designing the allocation system the benefits of a nutrient transfer system within the catchment or water management unit should be considered

Maximum economic efficiency of land use could be assisted by a mechanism for transferring nutrient discharge allowances within the same catchment. Nutrient transfer systems are only appropriate where:

- The initial allocation system meets all of the allocation principals
- Only occurs within a subcatchment or watershed and enable and support Catchment Collective Groups
- The transferable portion of the resource (eg nitrogen) only pertains to the load which achieves the desired environmental outcome.
- be a transfer within an established sub catchment programme that's based on fair allocation of a load
- result in improved economic outcomes and land use optimisation

Principle 12 Regulation, monitoring, auditing and reporting of nutrients within an allocation regime needs to relate to the degree of environmental impact and pressure

If there is limited environmental pressure and if an activity has a low impact then regulation – and the financial cost of complying with that regulation – should be commensurate with the degree to which the activities are causing an adverse effect on water quality

Principle 13 As a minimum expectation, in all catchments, all land users should be at or moving towards (industry defined) Good Management Practice (GMP), recognising that GMP is constantly evolving and continuous improvement is inherent in GMP

In many catchments, lifting everyone to GMP is likely to go a long way towards achieving community objectives for managing to water quality limits. In catchments where nutrients are not over allocated, requiring good management practice is a sound alternative method to allocating nutrients to a farm (property based) level.

Principle 14 Nutrient allocation must be informed by sound science and stable and reliable catchment and farm system modelling and measurement

Modelling nutrient loss is important to inform nutrient allocation, but all models have limitations. Overseer is a key tool for understanding and managing nutrients on farms and to inform nutrient allocation decisions. In the short term there are significant limitations that need to be catered for in determining any regulatory or nutrient allocation regime (e.g. assumptions in Overseer regarding GMP, modelling of cropping regimes, ability of Overseer to estimate nutrient loss from the adoption of certain mitigations and the validation of Overseer estimates). Other measures may need to be included in the approach to managing nutrient loss to ensure innovative change is incentivised and that the focus remains on promoting good practice. Over time modelling designed to estimate nutrient loss will improve. Modelled estimates will change, so allocation regimes should account for modelling uncertainty and provide for appropriate transition periods.

Estimates of nutrient loss are a necessary input to decisions on nutrient management but broader catchment-scale modelling is critical if these decisions are to be robust. There is an urgent need to increase the emphasis placed on catchment-scale modelling.

Note: The principles have been adopted by the Board of Beef + Lamb New Zealand.

Appendix 2:

M.B. Dodd, R.W. McDowell and J.M. Quinn (2016) A review of contaminant losses to water from pastoral hill lands and mitigation options