BEFORE COMMISIONERS APPOINTED
BY THE OTAGO REGIONAL COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the Proposed Otago Regional Policy Statement 2021 (Non-freshwater parts)
AND	
IN THE MATTER	of the First Schedule to the Act
AND	
IN THE MATTER	of a submission under clause 6 of the First Schedule
BY	**BEEF + LAMB NEW ZEALAND LIMITED** **Submitter**

BRIEF OF EVIDENCE OF THOMAS SPENCER ORCHISTON FOR BEEF+LAMB NEW ZEALAND LIMITED

23 November 2022

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BACKGROUND

Qualifications and Experience

1. My full name is Thomas Spencer Orchiston.

2. I am employed by Beef + Lamb New Zealand Limited (B+LNZ) as an Environment Capability Manager – South Island. This role aims to build the environmental capability of sheep and beef farmers to improve overall environmental outcomes on farms.

3. I hold a Bachelor of Science and a Postgraduate Diploma in Environmental Science from Otago University (2002).

4. I have a certificate in Sustainable Nutrient Management from Massey University (2010) and an AsureQuality Advanced Auditing Skills Certificate (2016).

5. My previous work experience includes 10 years for AgResearch Ltd as a Research Associate involved in soil, water and climate research based projects; 4 Years with Crop and Food Research investigating sustainable and efficient land use through crop diversification and; 3 years with Landcare Research measuring carbon sequestration and plant biodiversity in indigenous forests and shrublands.

6. I have been an auditor for a farm assurance programme that provided sustainable, high value meat from low chemical input New Zealand farms for export.

7. I have been a part of the New Zealand Institute of Primary Industry Management technical advisory group on farm planning certification.

8. I have been involved in development of B+LNZ refreshed farm plan documentation and training of facilitators to deliver the B+LNZ farm plans.

9. I have completed a Land Use Capability course held in Hawke's Bay.

10. I have been co-author in five peer-reviewed journal articles, lead or co-author of eight conference papers or reports and at least 50 other forms of dissemination such as farmer presentations and media articles, principally as part of my employment duties.

11. I have read the Code of Conduct for Expert Witnesses set out in the Environment Court Practice Note 2014 and agree to comply with it. I confirm this evidence has been prepared in accordance with the Code of Conduct for Expert Witnesses set out in the 2014 Environment Court Practice Note. I declare I am an employee of the submitter B+LNZ. I confirm the opinions I express in this brief of evidence represent my true and complete professional opinions. 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

12. I have been asked by B+LNZ to prepare evidence in relation to the sheep and beef sector

    (a) Ground up management solutions, farmer engagement and ownership of resource management responses.

    (b) Flexibility in adaptive management and responses to risk and uncertainty.

    (c) Catchment and sub-catchment groups promoting integrated management of land and freshwater resources.

    (d) Integration with Kai Tahu – how farm plans and catchment and sub-catchment groups can facilitate mana whenua engagement.

    (e) Farm plans.

    (f) LUC's and productive soils for food production from beef and lamb farming.

EXECUTIVE SUMMARY

13. The landscape in Otago is highly variable and farmers need to manage the complexity of the physical environment in order to be sustainable and contribute to the Otago economy. Farmers need to understand the risks and the physical environment on their farms and use adaptive management to achieve their goals and community objectives. This requires flexibility in

their farm system and management options available to use in the context of their farm, catchment and community.

14. Catchment community groups are an excellent way for farmers, landowners, community member and stakeholders to work collaboratively together to respond to various issues within catchment areas or explore opportunities to make local communities thrive. A local ground-up approach often has high engagement from farmers and the community which can lead to individual landowners understanding their part in reaching collective community outcomes.

15. Mana whenua are important partners in the community and can have important contributions to catchment groups. Catchment groups and individuals can benefit from gaining insight and knowledge from mana whenua by having a better understanding their values and perspective. This can lead to better community outcomes.

16. Management at different scales is often needed. Catchment groups are good at larger catchment or sub-catchment scale, however at the farm scale farm plans are a good option to assist with managing resources, decision making and appropriate selection farm management actions. They can be used to understand the risks, opportunities, and actions on-farm. By integrating catchment plans and farm plans, a catchment context can be used to help guide decisions on farm that will contribute to individual goals but also work collectively towards meeting community expectations or outcomes.

17. Farms on land within all Land Use Capability (LUC) classes are important contributors to food and fibre production and the Otago. The higher LUC classes (4,5,6 and 7) are critically important production areas for sheep and beef farmers in Otago and are higher LUC land classes also act as supply areas of stock to farmers in there more intensive LUC classes.

OTAGO FARMS AND MANAGEMENT OF RISKS

18. I have read the draft evidence of Mr Burtt and rely on that for a profile of the sheep and beef sector and its export value and note that Otago is an important food and fibre producing area in Aotearoa New Zealand. I agree

with him that sheep and beef farms are complex and diverse. I am familiar with the eight Farm Classes used by B+LNZ economic survey he describes but note that these Farm Classes differ from Land Use Capability (LUC) classes that are also called Classes 1-8. I describe the LUC classes later in my evidence.

19. There is an enormous amount of diversity in the landscapes, ecosystems, and environment types across Otago largely due to the underlying geology and climate in the area. There are many natural processes at work that are building mountains and eroding them to create different soil types and topographies. In Otago, these natural processes have created areas that are suitable for productive land uses such as farming.

20. The diverse physical characteristics of landforms and geomorphology is reflected by the diversity of farms in Otago. All farms have physical characteristics such as soil type, topography, climate, water flow and vegetation that can differ from a small a sub-paddock and paddock scale, through to sub-catchment and catchment scale. This can lead to a lot of diversity between farms but also creates complexity on individual farms. With the diversity and complexity comes varying degrees of environmental risk. These risks can be effectively managed or mitigated by farmers.

21. The degree of complexity in sheep and beef farms is in part due to the spatial and temporal variation in:

    (a) physical landscape,

    (b) climate, and

    (c) biological systems (both farmed and native).

22. Adding to this diversity on farms are the people that own, manage and work on farms in Otago. The individuality of each farmer and their personal business considerations mean that each sheep and beef farm has a different set of parameters and constraints which must be considered to ensure good environmental and business outcomes. There are many different farm types and management systems.

23. Flexibility is needed in farm management to control risk and allow for the diversity in the natural physical characteristics of the land to be taken into account. This allows for long-term, sustainable production that is a key part

of the Otago economy. By allowing for flexibility in on-farm management practices (rather than an overly prescriptive approach), allows for innovation and adaptative responses to changing risk priorities on farm. In turn, this allows farmers actions to change and adapt to the specific conditions on individual farms to achieve better overall environmental outcomes and risk management.

24. By working collaboratively together and with flexibility in farm management, long term changes can be made to improve environmental outcomes for land and soil, climate, native biodiversity, and freshwater. Local and community involvement is one of the keys to long-term health of water and ecosystems and climate change. Collective actions by farmers and communities can lead to more engaged and resilient rural communities, as awareness is raised and innovations and ideas are shared, developed and improved (Kin et al. 2016).

25. Innovative responses and actions can be made at farm scale that are specifically related to a particular farm or area. By improving farmer understanding of certain issues and the principles of good farming management and gaining a better insight to a broader catchment context, practical and cost-effective management solutions can provide targeted delivery of actions that make farming businesses more sustainable and improve environmental outcomes.

26. By having a direct connection to the land, farmers know that it is important to farm in a way that means that their business can remain profitable into the future. The success of farming businesses is directly related to the physical characteristics of the land and making the right decisions about how the land is managed in a sustainable way. In Otago there are many intergenerational family farms, and farming families often want to be able to pass the farm on to future generations to farm in a sustainable and profitable way.

27. A ground up approach to farm management helps keep farmers engaged and involved with trying to improve their businesses and environmental outcomes on their farms and in their catchments. Having other rural stakeholders such as industry bodies, regional councils and central government, helps support and encourage farmers can lead to better understanding of the key issues. This improved understanding can allow for

good farm planning and improved farming sustainability. An example of a ground up response is the creation of catchment groups to address certain issues, and manage risks, such as water quality. Catchment groups also allow for opportunities to be explored such as improving community wellbeing.

28. For the sheep and beef sector to continue to meet environmental and freshwater requirements, and address the environmental risks, flexibility around farming practices and mitigation strategies is needed to ensure farm systems can continue to adapt to environmental and market changes and fluctuations while also optimising land use.

29. Sheep and Beef farms collectively have over 2.8 million hectares of New Zealand's indigenous vegetation including native forest and shrublands (Norton & Pannell, 2018). This represents almost one quarter of the indigenous vegetation in New Zealand.

30. Case and Ryan (2020) estimated woody vegetation (including indigenous and exotic forest) on sheep and beef farms in New Zealand could offset between 63 and 118 percent of on-farm agricultural greenhouse gas emissions. The total carbon sequestration potential on sheep and beef farms was estimated to be between 10,394 kt CO_2e and 19,665 kt CO_2e (Case & Ryan, 2020). I note Dr Chrystal's evidence discusses the climate change impacts on sheep and beef farms.

CATCHMENT GROUPS

31. Catchment Community Groups may be broadly described as "a gathering of people, working together, who identify with a geographical area, usually based on a river or lake catchment, or who connect socially within a farming district" (B+LNZ 2020). Several types of groups including catchment groups have been defined by Sinner et al. (2022). They defined catchment groups as "Landowners and land users in a defined area who are collectively addressing shared issues on their own land and associated water bodies for which they have some legal or moral responsibility".

32. Not all groups that identify as catchment groups will necessarily adhere to these definitions and there is scope for groups to self-define depending on

what the members agree to. Sinner et al. (2020) also defined community environment groups, resource user groups and umbrella groups (formal or informal clusters of similar or geographically similar groups) as potentially related to catchment groups but could fall into different definitions.

33. There are many possible governance structures for catchment groups, ranging from informal, to more formal structures such as incorporated societies or trusts. Each group needs to assess their needs and determine the most appropriate structure. This can change over time as the group develops and may need to have a higher level of accountability, or if they want to apply for certain funds.

34. Catchment community groups are an effective way to achieve larger scale environmental outcomes. Collective responsibility and actions over a larger area can result in long-term gains in freshwater ecosystem health, biodiversity and climate change. Holmes et al. (2016) found that habitat quality improved in stream areas where there was a collective effort by farmers in a community led catchment group to put in riparian stock exclusion and management. Sediment reductions showed the strongest response.

35. A community-based approach to catchment groups and farm planning is essential to build trust and relationships. With the appropriate support and guidance, farmers and communities will be able to effectively engage with the Regional Council to manage the sustainability of the natural resources in their area while achieving other community based objectives such as economic sustainability, resilient rural businesses and community wellbeing.

36. As noted above, I have been involved in the B+LNZ catchment community programme for four years. The B+LNZ programme is only one example of such programmes but has a lot in common with work being done by other organisations, such as Landcare Trust and Otago Catchment Community Inc.

37. The B+LNZ catchment community programme aims to support and encourage farmers, community members and landowners to participate in, and help to establish and run catchment community groups either as group members, or in an active leadership capacity. An important part of

catchment groups is defining why the group is coming together and what is their shared vision for the future (see Figure 1). This often involves landowners being responsible for management of the land and freshwater resources.

Figure 1. B+LNZ Catchment Action Cycle

38. At a catchment scale and driven though farm plans and catchment groups, farmer practice change can be linked to changes in water quality outcomes (Scarsbrook, 2011). There is ongoing research into the temporal and spatial variability in water quality results, and long term and frequent water quality testing underway. There is evidence that change in land use practices can reduce the amount of contaminants lost from farms to waterways for example Monaghan et al 2017 show that strategic grazing of winter forage crop paddocks and management of critical source areas reduces sediment loss.

39. Freshwater ecosystem health is an important issue that catchment groups often consider. Freshwater ecosystem health is a measure of the overall state of a waterway. It takes in account chemical, physical and biological indicators, assessing parameters such as habitat quality, surrounding vegetative cover, stream bed composition, aquatic life, such as macroinvertebrates and fish, and aquatic plant life (O'Brien et al. 2016).

Traditionally there has been a large emphasis on the water quality component of freshwater ecosystem health. This usually focuses on a range of chemical measurements such as nitrogen, phosphorus, pH and metals, but often includes a, sediment and *E.coli*. These are potential contaminants of concern for sheep and beef farmers and are covered in Dr Chrystal's evidence). These variables are often used and have set limits in particular waterways and can provide some insight water quality but they don't necessarily give an accurate indication of overall ecosystem health.

40. Catchment groups can be important for biodiversity to help identify and coordinate potential areas for vegetation corridors across multiple land ownerships. Vegetation corridors can be set up to help link existing or new areas of biodiversity and allow native plants to colonise and animals to move from one area to another. Pest and weed control can also be instigated or coordinated by catchment groups.

41. Catchment groups in New Zealand and Otago have been growing in number over the last 5-10 years. In Otago (depending on the definition used) the number of catchment groups have gone from under five in 2017 to 26 in 2022. This number is still increasing and does not include sub-catchment groups or pods. Appendix 1 sets out a list of formal and informal catchment groups in Otago.

42. Catchment groups can allow for groups of individual landowners, community members and other relevant stakeholders to collaborate together along with mana whenua and the regional council, in the integrated management of land and freshwater by addressing catchment specific issues or exploring opportunities together to allow a community to thrive and be more resilient. To provide for flexible, adaptive management to address the risk and uncertainties, the groups can be actively engaged in the process of establishing a vision for the catchment or sub catchment, the development of action plans, monitoring programmes and in the review of results and any further information.

43. Locally developed responses to local issues where individuals and the community share collective responsibility can lead to the best outcomes. A ground up approach with good community buy-in and help from local or external organisations and stakeholders can lead to multiple benefits for improving freshwater, environmental and community outcomes. A

collaborative approach allows for sharing and development of innovative ideas and solutions while allowing for catchment scale opportunities to be explored.

44. Planning can help at many levels. At the catchment level, planning can help to identify issues and opportunities and help to define the priorities where multiple landowners can collectively work together on specific actions. This collective action may result in better outcomes than individuals working in isolation. Catchment level planning can help to guide planning at the farm level as to what actions to focus on and where to allocate resources. Farm planning in some situations can also be used to inform catchment plans and also to record actions and progress that has been made towards catchment scale outcomes.

45. Planning at the farm level is good to help individual farming business understand their contributions to the catchment and freshwater and environmental outcomes in the context of their farm. A farm plan allows for the diversity of land types, farming systems and farm management systems and identifies the specific on farm actions that can be taken to address issues or explore opportunities.

46. Farm environment plans have been used by the North Otago Sustainable Land Management (NOSLAM) group as a way for farmers using irrigation and other dryland farmers to document actions taken on-farm and work towards better environmental outcomes. NOSLAM was originally established in 1994 to address the issues of soil erosion and drought and currently has over 350 farmer members. NOSLAM covers 3 catchments (Awamoko, Kakanui and Waiareka) covering over 89,000 ha. Over 150 farm environment plans called “EnvioAg folders” have been distributed to farmers. NOSLAM’s purpose is “to educate, assist and encourage the North Otago farming community to farm in conjunction with sustainable land management objectives and practices”

47. The River Care South catchment collective comprises 5 catchment groups (Waitahuna-Tuapeka, Tokomaririro, Waiwera-Kaihiku, Lower Clutha-Lake Tuakitoto, and Owaka-Tahakopa) and covers more than 2000 km^2 in areas. They have encouraged farmer uptake of farm plans by partnering with B+LNZ to support farmers develop their own plans. Workshops have been held where farmers develop their understanding and build their own farm

plans, specific to their own property. Individual and group understanding is important to build to help meet the desired outcomes.

CATCHMENT GROUPS AND FARM PLANS INTEGRATION WITH KAI TAHU

48. In catchment groups local representation from local people, landowners and stakeholders is critical to their success. Key partners and stakeholders in most catchment groups are mana whenua. While I cannot talk from a Kai Tahu perspective or on behalf of Kai Tahu, I will talk about observations that I have made in a catchment group context.

49. Having mana whenua representation and involvement in a catchment group can lead to many benefits for the community, such as greater understanding of the cultural history in an area, awareness of cultural values, sites or areas of significance (e.g. urupā, tapu sites, mahika kai), a more resilient community, stronger relationships, better community wellbeing and improved environmental outcomes.

50. Kai Tahu may have people that are locally based in communities that are participating in a catchment group in a capacity as community members, landowners or farmers. A survey of catchment and community environment groups by the Cawthron Institute reported that 37% of the respondents had local tangata whenua as members of their group. While 69% said their group interacts with Māori entities such as iwi, hapū and Māori land trusts. (Sinner et al. 2022)

51. Catchment groups having positive relationships and interactions with iwi, hapū, marae or other Māori entities can lead to improved environmental outcomes and thriving more cohesive communities, due to better communication and understanding that is developed over time, bringing communities together. For Māori having relationships or partnerships with catchment groups can lead to being able to better communicate values important to local mana whenua, facilitation of access to areas of significance or for food gathering, a healthier natural environment, educational opportunities and improved community health and wellbeing. Catchment groups may help facilitate conversations between famers or individuals within the community and mana whenua to create a better understanding of local mana whenua values and perspective.

52. Many catchment groups already have positive relationships with mana whenua of local Māori entities. These relationships can be initiated and developed by the catchment groups themselves or mana whenua, but can also be supported by other stakeholder groups who may be able to help facilitate communication pathways or supply appropriate resourcing.

53. Catchment groups often have a strong focus on water and biodiversity and can potentially have a role as stewards of the land. Encouraging catchment groups to involve or reach out to mana whenua can help get a wider perspective on the community and natural environment, including how mana whenua see and understand their role as kaitiaki. When setting a vision or goals for a group or developing a catchment plan, this can be particularly important. Representation of mana whenua at a governance or committee level may be mutually beneficial.

54. Farm plans can help farmers and landowners recognise areas that may be of cultural significance or value. These can then be described or mapped. The B+LNZ farm template encourages landowners and managers to understand the sites of significance and the values local mana whenua place on different parts of the environment and ecosystem. In doing this a deeper understanding is gained and better environmental outcomes.

55. The Upper Taieri Wai catchment group developed from the Upper Taieri Water Resource Management group. The Upper Taieri catchment group was formed over 20 years ago and in 2020 became an Incorporated Society. The group have started conversations with mana whenua (Te Rūnaka o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki) to improve the understanding local farmers have about areas of cultural significance to mana whenua. Upper Taieri catchment covers over 1500 km^2 in area and contains a number of wetlands including the nationally significant Taieri Scroll Plain Wetland Complex. Field days have been held to help facilitate the conversation. They are also collaborating with Te Mana o Taiari Ngā Awa partnership, which is a partnership between mana whenua, Otago Regional Council and Department of Conservation, focusing on improving the condition, biodiversity and the ecological processes of the river, protecting threatened species, increasing the river's ability to cope with climate change. Upper Taieri Wai and Beef + Lamb New Zealand have also facilitated farm plan workshops in the area to help build farmer

understanding. Through a farm plan, farmers can look at their on-farm management in a context of the catchment scale and also in the context of mana whenua.

56. Wai Wanaka are a catchment group in the Upper Clutha and cover an area of 4600km^2 had their beginnings around 2016. Their vision is “Healthy ecosystems and community wellbeing for future generations”. They have Te Taiao (the natural world) as an important element of their mahi (see Figure 2). Their goal is to is “to forge and strengthen relationships with Tangata Whenua Hapū and Iwi of Kāi Tahu and work collectively with farmers, researchers, growers, industry groups and our community. This will inform future land use and management changes to increase the vitality of Te Taiao”. The group also recognises the concept of ki uta ki tai (from mountains to the sea). This is an example of a catchment group trying to better understand the Kāi Tahu perspective.

Figure 2. Te Taiao diagram from Wai Wanaka website

57. Several catchment groups in Otago, for example Rivercare South, have representation of mana whenua at a governance and stakeholder level. Other groups such as in East Otago and Pomahaka have engaged with mana whenua and local schools to be involved in planting days. Mana whenua can often give advice on which plants to use and how to care for them, help to raise plants, or take part in the planting.

FARM PLANS

58. B+LNZ has an environmental strategy that has emphasis on four key areas:

    (a) cleaner water;

    (b) thriving biodiversity;

    (c) healthy soils;

    (d) carbon neutrality

59. Farm plans and catchment community groups are crucial elements required to deliver on the four key areas listed above.

60. Farm Environment Management Plan (FEMP), Farm Environment Plan (FEP), Environmental Farm Plan (EFP), Land and Environment Plan (LEP), Whole Farm Plans (WFP) and Farm Plan are different terms for similar documentation that outlines how a farmer or landowner will manage their operations and activities in a way that takes into consideration environmental and business outcomes. For the purposes of this evidence I will refer to the above collectively as farm plans.

Farm planning background

61. In New Zealand farms plans have been used as a tool since around the 1950s in response to the Soil Conservation and Rivers Control Act 1941 (Stokes, Macintosh, & McDowell, 2021). They were first developed as soil conservation plans from ideas that were adopted from the United States. Initially many individual farm plans were prepared by Catchment Boards and were largely focussed on soil conservation and control of erosion prone soils (Powell & Heath, 2018). This was the start of a more integrated approach to on-farm management (Stokes et al., 2021).

62. Soil conservation plans became a fundamental base unit of soil conservation in the 1960s and were nationally recognised. During the 1980s the national programme ceased, and the development of Resource Management Act 1991 saw the devolution of responsibility from central government to regional councils. Councils different interpretations of how to implement resource management obligations led to a fragmented and diverse range of farm plan programmes (Manderson, Mackay, & Palmer, 2007).

63. The New Zealand Land Resource Inventory (LRI) was used to define national Land Use Capability units (LUC) and helped to provide a consistent approach to land evaluation (Stokes et al., 2021).

64. During the 1980s and 1990s the national farm planning process extended beyond just soil conservation to include water bodies, biodiversity and greenhouse gases (Stokes et al., 2021).

65. In recent years farm plans have become increasingly recognised as an important way for farmers to improve their farming systems and practices. Importantly, farm plans are also a means of recording and demonstrating these improvements.

66. Accreditation schemes offered by processors often require farm plans to demonstrate that farming is being carried out in a sustainable way and robust information is needed to maintain or access to market premiums (Stokes et al., 2021).

Natural capital

67. Natural capital is an important concept for farms and in farm planning. It has been defined as the *"stocks of natural assets that yield a flow of valuable ecosystem good and services into the future"* (Dominati, Patterson, & Mackay, 2010), (Costanza & Daly, 1992). In terms of farm systems, they include the farm's soils and geology, climate and air, freshwater, and living things (biodiversity).

68. Matching the appropriate farm system and on-farm management is a key part of pastoral agriculture to optimise farms for long-term productive and environmental success through careful consideration of underlying characteristics of the farm such as geology, soil, slope, topography,

vegetative cover, erosion potential and climate. Farm planning is a process that can align on-farm management with physical characteristics from paddock to farm scale and also take into account broader catchment characteristics.

Farm Planning

69. Farm plans can provide flexibility and a tailored approach to understanding and categorising a farm's natural capital assets such as geology, topography, soils, climate, biodiversity and water. It also a provides a mechanism to assess environmental risks and strengths, and a way to review these over time. Farm plans developed in this way also take into account wider business, social and cultural goals.

70. Farm plans when developed by farmers, with the appropriate support and guidance, ensure that farmers have a greater understanding of the relevant issues that they are faced with on their property. Providing a less prescriptive approach to farming allows the necessary flexibility that leads to greater resilience, innovation, and adaptability within the primary sector. Assistance by external experts is often helpful in developing a farm plan but farmers also need to understand what the farm plan contains and why particular actions or managements are necessary. They also need to understand any resourcing needs that may be needed.

71. Beef + Lamb New Zealand's approach to farm planning is designed to help farmers:

    (a) Ensure the sustainability and profitability of their farming business by adapting to climate change, understanding and managing greenhouse gas emissions, protecting the health of soil and freshwater and biodiversity.

    (b) Set their own values and objectives as well as contribute to the wider communities or catchment values and objectives. This helps to provide the overall catchment context for individual farm plans.

    (c) Provide an evidence base to tell farming stories and meet the needs of consumers and regulatory bodies.

72. The B+LNZ environment module is the first part of a wider farm plan that will also include modules such as biosecurity, health and safety, human

resources, and animal welfare. The environment module considers managing natural resources on farm such as soil, freshwater, biodiversity and climate.

73. An important step included in the B+LNZ farm plan is identification and consideration of local catchment or community objectives and values when landowners are developing their own for their farm. Acknowledging wider community or mana whenua objectives in this process can lead to integration and alignment at the farm and catchment level. Individual landowners can see how they can contribute positivity to meeting the objectives of the wider community.

74. Tailored farm plans that are developed by farmers can help inform wider catchment plans. They do this by supplying information on the broader scale issues that may be present in certain areas of a catchment. Conversely, tailored farm plans can also use catchment plans to help identify where collective actions on a number of farms may contribute to greater overall environmental gains on individual farms and also within the catchment. A project to use integrated farm and catchment plans is proposed to take place in the Taieri river catchment in association with catchment groups in the area. This project proposes to achieve effective integration of farm scale planning with catchment scale planning, across a range of issues while maximising the environmental benefits.

75. Farm planning needs to take a broader approach to sustainability than acting solely as a regulatory compliance tool. Farm planning should consider the economic, environmental, and social wellbeing of a farming business. It can work at different temporal scales and act to provide long-term strategic direction as well as inform day-to-day decision making.

76. In the Otago region between Sept 2020 and Sept 2022, B+LNZ provided 21 farm planning workshops that were attended by a total of over 263 people. Many of these were in conjunction with catchment groups. This represents industry-good investment in farm planning. This has helped farmers build and develop their own individual farm plans.

77. In Southland a farmer survey was conducted in 2019 and 2020. The surveys have shown that farms with farm plans were significantly more likely to have water resource management practices (such as stock exclusion, buffer

zones and riparian planting) and nutrient management practices (such as targeted fertiliser use and nutrient budgeting) implemented. Also farms with farm plans were more likely to report sound winter grazing practices (ResearchFirst, 2020).

78. In Otago the Pomahaka Water Care was formed in 2016 and has over 180 subscribed members. Their aim is "for the Pomahaka River to be recognized as having the absolute highest water quality so that future generations can enjoy the river as we have". The group surveyed its farmer members in 2019 and 2021 and found that farmers with winter grazing plans had increased in number and that the farmers with plans were more likely to implement good environmental practices such critical source area protection, riparian buffers and sediment mitigation (Simpson 2021).

79. As part of the delivery of farm plans, a modular approach has been taken to deliver greenhouse gas workshops. These workshops include an introduction to the main greenhouse gases related to agriculture, an emissions calculator- to generate a farm profile, and an action plan – to work though mitigation and adaptation options

80. Between Sept 2021 and August 2022 there were over 250 greenhouse gas workshops delivered by B+LNZ and partners throughout the whole country with over 3000 individual farming businesses attending. In Otago there were 15 workshops with over 200 farming businesses attending. These workshops were designed to contribute to the He Waka Eke Noa partnership and form a component of an overall farm plan.

LAND USE CAPABILITY

81. The Land Use Capability system is an assessment tool that can help farm and catchment scale planning by using biophysical assessments to help determine the natural capital of the landscape, providing for opportunities as well as identifying limitations of certain land types. It has two key components the Land Resource Inventory (LRI) and the Land Use Capability (LUC) classification. In Aotearoa New Zealand the LUC system was develop in the 1950's to help achieve sustainable land development and management on individual farms, in whole catchments, and at the district, region, and the national level (Lynn et al. 2009) LUC Survey Handbook 3rd ed).

82. The LRI is compiled first and assesses physical factors considered to be critical for long-term land use management. They are:

(a) rock type;

(b) soil type;

(c) slope;

(d) erosion risk;

(e) vegetation cover.

83. The LUC classification uses the LRI to systematically categorise land parcels into eight classes (see Table 1) and determines the capacity for sustained long-term production based on the physical qualities of land, soil and environment, while taking into account the physical limitations of the land and site specific management needs (Lynn et al., 2009). The limitations usually considered are susceptibility to erosion, steepness of slope, climate, susceptibility to flooding, liability to wetness or drought, salinity, and depth, texture, structure and nutrient supply of the soil.

LUC Class 1	Arable. Most versatile multiple-use land, minimal limitations, highly suitable for cropping, viticulture, berry fruit, pastoralism, tree crops and forestry.
LUC Class 2	Arable. Very good multiple-use land, slight limitations, suitable for cropping, viticulture, berry fruit, pastoralism, tree crops and forestry.
LUC Class 3	Arable. Moderate limitations, restricting crop types and intensity of cultivation, suitable for cropping, viticulture, berry fruit, pastoralism, tree crops and forestry.
LUC Class 4	Arable. Significant limitations for arable use or cultivation, very limited crop types, suitable for occasional cropping, pastoralism, tree crops and forestry. Some Class 4 is also suitable for viticulture and berry fruit.
LUC Class 5	Non-arable. Highly productive pastoral land, not suitable for crops but only slight limitations to pastoral, viticulture, tree crops and forestry.
LUC Class 6	Non-arable. Slight to moderate limitations to pastural use, suitable for pasture, tree crops and forestry and in some cases vineyards. Erosion is generally the dominant limitation.
LUC Class 7	Non-arable. Moderate to very severe limitations to pastoral use. High-risk land requiring active management to achieve sustainable production. Can be suited to grazing with intensive soil conservation measures but more suited to forestry.

LUC Class 8	Very severe to extreme limitations to all productive land uses, arable, pastoral or commercial forestry. Suitable for erosion control, water management and conservation.

Table 1. Description of Land Use Capability Classifications (Landcare research 2020)

84. It is important to note that sheep and beef farms can produce food on a number of LUC land classes. These classes go beyond the LUC classes specified in the National Policy Statement Highly Productive Land 2022. Figure 3. Describes the LUC classes. LUC classes 1,2 and 3 are the most versatile land classes and suited to a wide range of land uses, however the higher LUC classes (LUC 4,5, 6 and 7 are still very important agricultural production areas and often well suited to pastoral farming or other less intensive landuses. The higher LUC classes are often important areas and contain significant numbers of sheep and beef farms. As noted in Dr Chrystal's evidence these higher LUC classes often provide animals to farms in LUC classes 1,2 and 3 that can used for finishing stock.

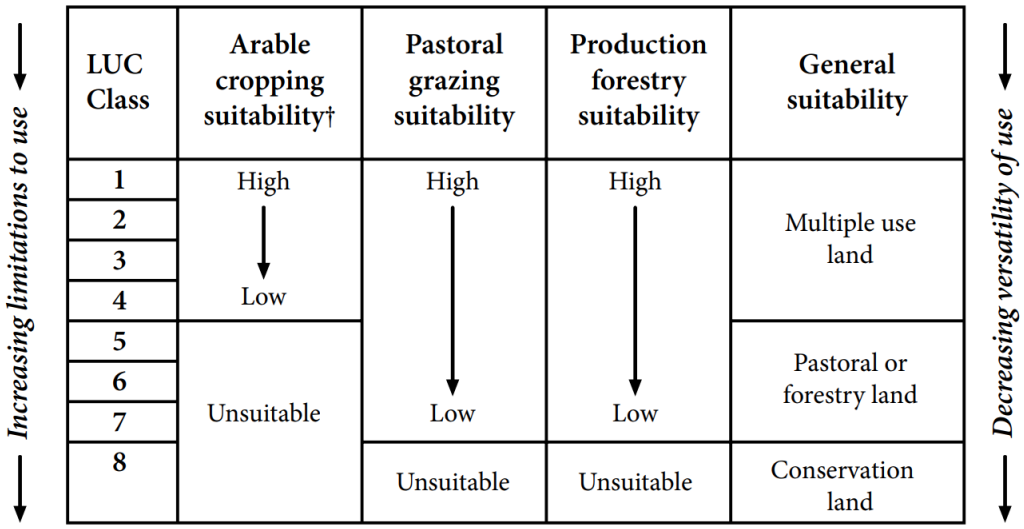

Figure 3. Increasing limitations to use and decreasing versatility of use from LUC Class 1 to LUC Class 8

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23 November 2022

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APPENDIX 1

The following is a list of formal or informal Catchment groups in Otago as at November 2022 (there are also sub-catchment groups that may not be mentioned here, there may be other groups that exist that are not mentioned in this list).

Owhiro

Tiaki Maniototo

WAI Wānaka

Mid Taieri Wai

Tomahawk Lagoon

Lowburn Group

Otago South Water Care Group

Openvue group

Cardrona

East Otago

Glenorchy

Ida Valley

Kyeburn CG

Lake Hayes

Lake Wānaka

Lindis

Upper Taieri Wai

Maungawera

North Otago Sustainable Land Management NOSLAM

Teviot Valley

Pomahaka

Thomsons Creek

Tuapeka/Waitahuna

Luggate CG

Waiwera South

Otago Peninsula Group