BEFORE THE HEARING COMMISSIONERS
DUNEDIN

IN THE MATTER	of the Resource Management Act 1991 (**RMA** or **the Act**)
AND	
IN THE MATTER	of Proposed Otago Regional Policy Statement 2021 (Freshwater Planning Instruments)

STATEMENT OF EVIDENCE OF STUART FORD ON BEHALF OF HORTICULTURE NEW ZEALAND

(ECONOMICS)

28 JUNE 2023

ATKINS | HOLM | MAJUREY

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INTRODUCTION

Qualifications and experience

1. My full name is Stuart John Ford. I am a Director of The AgriBusiness Group and work as an agricultural and resource economist based in Christchurch. I have a Diploma in Agriculture and Bachelor of Agricultural Commerce from Lincoln University and have undertaken post graduate studies in Agricultural and Resource Economics at Massey University.

2. I am a member of the New Zealand Agriculture and Resource Economics Society and the Australian Agriculture and Resource Economics Society. I am also a member of the New Zealand Institute of Primary Industry Management.

3. I have spent 40 years as a consultant in the agricultural industry, with the last twenty years specialising in agricultural and resource economics and business analysis.

4. I have undertaken a wide range of economic impact and cost benefit assessments of proposed statutory planning proposals.

5. I have prepared evidence and presented it to District and Regional Council Hearings Panels as well as the Environment Court and Special Hearing Panels on Conservation Orders.

6. I have been asked by Horticulture New Zealand (**HortNZ**) to provide this evidence for the Commissioner Panel on the economic contribution from the horticultural sector in the context of how that sector is portrayed in the proposed Otago Regional Policy Statement (**pORPS**).

Involvement in project

7. I have supplied evidence to both the Commissioners hearing and the Environment Court on the ORC's Plan Change 7 on behalf of HortNZ.

8. I gave evidence to the Commissioners hearing the pORPS (non-freshwater) on behalf of HortNZ.

9. I collected the data for both HortNZ and the Central Otago Winegrowers and contributed to the writing of the Phase 1 base data report for the ORC Economic Impact Report of the proposed Land and Water Regional Plan.

10. I carried out the technical modelling and contributed to the Phase 2 modelling for Otago Regional Council Proposed Land and Water Regional Plan for both the Horticultural and the Viticultural sections of the report.

Purpose and scope of evidence

11. In my evidence I consider:

    (a) the National and regional economic benefits associated with horticultural production in Otago;

    (b) The importance of the inclusion of the LUC 4 and 5 land within the consideration offered from the National Policy Statement for Highly Productive Land (**NPSHPL**); and

    (c) The consideration of the efficient use of irrigation water for the horticultural sector.

Documents and materials reviewed

12. In producing this statement of evidence, I have reviewed the following evidence and materials:

    (a) HortNZ's original submission on pORPS;

    (b) HortNZ's further submission on pORPS;

    (c) Various parts of the section 42A Report particularly in relation to Part 1 and the SRMR section;

    (d) Statements of evidence for the pORPS non-freshwater hearing of Ms Roberts, Mr Hodgson and Ms Wharfe on behalf of HortNZ;

    (e) Statements of evidence for this pORPS freshwater process of Ms Roberts and Mr Hodgson.

13. In this statement, where relevant, I also refer to other materials including research and reference materials that I have considered in forming my opinion.

Expert Witness Code of Conduct

14. I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Practice Note dated 1 January 2023. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the

specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

NATIONAL AND REGIONAL ECONOMIC BENEFITS ASSOCIATED WITH HORTICULTURAL PRODUCTION IN OTAGO

15. The data presented in Table 1 is taken from the document Fresh Facts.[1] For data on the areas of crops grown it represents data that has been compiled by Statistics New Zealand as at 30 June 2017 and in terms of the investment data it is an estimate of the investment made in both the production of the crops but also the post-harvest facilities which has been compiled by the authors of the report. The latest version of Fresh Facts (Fresh Facts 2021) remains unchanged.

Table 1: Area of crops grown and estimate of investment

Crop	Area (Ha)	Investment ($ m)
Apples	427	81.06
Wine grapes	1,173	231.08
Summerfruit	1,144	152.37
Berryfruit	36	3.16
Nuts	144	9.11
Olives	19	1.66
Other subtropical	21	1.93
Other fruits	36	3.30
Potatoes	196	16.67
Cabbage and Cauli	164	10.75
Other Vegetables	67	4.37
Total fruit and vegetables	3,427+	515.47+

16. Table 1 shows that the three crops of Summerfruit, wine grapes, and apples are the dominant crops in Otago, making up 91% of the area, in the fruit category. Potatoes and cabbage and cauliflower make up 84% of the area of vegetables grown in Otago.

17. In total the investment in the combined fruit and vegetable sector and its ancillary post harvest facilities is over half a billion New Zealand dollars. It is a substantial industry in Otago and the Summerfruit and wine grape growing sectors are significant from a New Zealand perspective.

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[1] Plant and Food Research Ltd (2019): Fresh Facts 2019.

18. Importantly, this level of investment is predicated on the fact that it is absolutely essential that the growing of the crop is associated with the provision of irrigation water in sufficient quantity and reliability to ensure that the substantial investment is justified. The cost of securing the water is returned as it allows the quite significant investment both on the land and off the land. Without irrigation water, land use change to highly productive opportunities would not proceed.

19. The Central Otago area is unique in New Zealand. It has a combination of soil types and climate which makes it ideal for Summerfruit production in particular. The climate supports crops which require low winter temperatures complemented by hot and dry summer temperatures. The hot and dry summers allow for good summer growth, maturity of crops, and ideal harvest conditions which are free from substantial rainfall. This has encouraged the development of the specialist range of horticultural crops grown in the area.

20. The remainder of the Otago region has areas where the combination of the ideal soil types and favourable weather means that the region is ideal for the growing of a wide range of fruits and vegetables.

21. Essential to economically growing the majority of these crops in Otago is the ability to irrigate them at the times in their growth when soil moisture is limiting their growth potential.

22. The economics of growing these crops is variable in that it waxes and wanes according to local or international prices. Additionally, the demand for irrigation waxes and wanes according to the variable rainfall of the region. It is essential that the reliability of irrigation capability is maintained to enable and encourage growers to continue to grow the crops.

23. In association with the ability to grow the crops, the off-farm processing industry in Otago has developed to be able to receive, process, and pack the horticultural produce, and to then market it throughout the world. This off-farm industry is a significant contributor to and a significant employer in the Otago economy.

24. The crops which make up the Summerfruit brand are cherries, apricots, peaches, nectarines, and plums. These are all fruits that ideally suit the climate of Otago and are prospering as a

result of the infrastructure that has been created around them in Central Otago.

25. This infrastructure includes not only the growing of the fruit but also:

(a) the provision of accommodation which is necessary to house the large number of temporary workers that are required to pick and pack the fruit;

(b) the establishment of sorting and packing lines;

(c) cool store facilities; and

(d) the provision of a very efficient transport chain which allows the fruit to be taken to both the New Zealand market and also to export.

This is one of, if not the, most efficient production chain for large scale highly perishable fruit in the world.

26. To represent the order of growth in the Summerfruit sector since the 2017 statistics data was produced, we have an estimate of the area of fruit which has been provided by Summerfruit New Zealand, which is the peak industry body. This data is shown in Table 2 along with Summerfruit NZ's estimate of the short-term growth in the industry that is already underway or is planned.

Table 2: Estimate of the current and future area of Summerfruit

Crop	Estimated current area. 2020	Expected short term growth.	Total Area
Cherries	1,093	430	1,523
Apricots	267	25	292
Peaches	74	0	74
Nectarines	113	0	113
Plums	38	0	38
Total	1,585	455	2,040

27. This data shows that the area in Summerfruit, and particularly in cherries, has grown considerably since the 2017 statistics and that the rate of growth is expected to at least continue, if not to increase. The expected short-term growth will mean that in a few short years the area in Summerfruit will have effectively doubled.

28. The situation with apples is very similar to Summerfruit, with considerable growth in the crop area. The area of apples grown in Otago reached 470ha last season[2] which is a 10% increase on the area recorded in 2017. There is an expectation that the area will increase by an additional 100ha in the short to medium term.[3]

29. The fruit and vegetable sector in Otago is in a growth phase and offers a significant contribution to the Otago economy through both GDP growth and employment growth. This growth is entirely founded on the availability of a reliable amount of irrigation water and the policy framework must ensure that this is recognised and provided for.

30. By way of illustration, by estimating average production and price values for cherries we are able to estimate based on the known area of in ground and planned short term planting that the cherry crop will contribute approximately $329m to regional GDP. This will also account for approximately 890 FTE's in staff. This illustration is of one crop of the many that are suited to both the soils and climate of Central Otago.

31. In total, the horticultural sector accounts for approximately 4% of the Otago region's GDP, making it a significant contributor to the Otago economy. This position is completely predicated on the supply of the correct volume of reliable irrigation water.

32. That is why in the community engagement part of developing this pORPS the feedback was very strong from the horticulture sector that provision for food production in the vision statement was an important element.

33. HortNZ has also advocated very strongly for a pORPS which was both supportive and encouraging of the planned expansion of the horticulture sector and leaving the door open for potential new ways of production, within the bounds of the necessary environmental limits.

NATIONAL POLICY STATEMENT FOR HIGHLY PRODUCTIVE LAND

34. As I understand it the National Policy Statement for Highly Productive Land (**NPSHPL**) is designed to protect highly productive land (**HPL**) for use in land based primary industries both now and for future generations. It is specifically designed

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2 Apple and Pear Board grower data.

3 Jackie van der Voort, Otago Board member of Apple and Pear. Pers Comm.

to avoid it being subject to inappropriate urban rezoning, rezoning and development as rural lifestyle, and subdivision. The NPSHPL also provides for reverse sensitivity effects to be managed so as not to constrain land based primary production on HPL.

35. The NPSHPL requires every Regional Council to map any land in its region which:

    (a) Is in a general rural zone or rural productive zone; and

    (b) Is predominately LUC 1, 2, or 3 land; and

    (c) Forms a large and geographically cohesive area.

36. The NPSHPL also states that for any land that is not LUC 1, 2 or 3 but is, or has the potential to be, HPL, the regional council *may* map that land if it is in a general or rural production zone.

37. The vast majority of horticultural development within the Central Otago area has been, and is planned to be, on the LUC 4 and 5 land. This is because of a myriad of factors including the climate, location, access to water, proximity to a labour source, proximity to the post-harvest processing and packing industry, and because these soils, although not naturally very rich in nutrients, are very deep in their profile and very free draining. This means that they are ideal to grow the range of crops grown in the area because with judicious applications of both irrigation water and nutrients they can be managed to be able to produce very high yields of the highest quality of fruit.

38. The LUC 4 and 5 soils are ideal to grow the range of crops across the Pipfruit and Summerfruit range in a very efficient manner and therefore are Highly Productive Soils within the production context of Central Otago.

39. If we examine the area mapped as HPL on the OurEnvironment website[4] (**Appendix 1**), we see that there is a very limited range of LUC 1, 2 and 3 soils within the Central Otago area. If we then add LUC 4 and 5 to that map (**Appendix 2**) we see that the area classified as Highly Productive Land is greatly expanded and takes in the areas already planted in Pipfruit and Summerfruit and provides for sufficient scope for the planned expansion of the industry. For

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[4] https://ourenvironment.scinfo.org.nz/maps-and-tools/app/Land%20Capability/lri_luc_main/387,388

this reason, it is important to expand the definition of HPL in Otago to include LUC 4 and 5.

40. Another very important reason why it is essential for the Otago Regional Council to expand the definition of the HPL in the Central Otago area is because the NPSHPL at Policy 9 provides for reverse sensitivity effects to be managed so as not to constrain land based primary production on such land.

41. There are continuing conflicts between the use of rural land for horticultural uses and the potential or perceived negative impacts on neighbouring urban land. Horticulture development requires that it is protected from sensitivity effects concerns from neighbouring urban properties. It is important that all horticultural land uses are protected from the threat of reverse sensitivity by inclusion of LUC 4 and 5 within the definition of HPL.

42. I note that in the non-Freshwater Planning Instrument (FPI) process that the Council in its reply reports accepted the need to better protect additional areas of land that are valuable for horticulture and viticulture, including productive land outside of LUC 1, 2, and 3.[5]

43. I am of the opinion that in the FPI part of the pORPS that it is important to recognise that enabling the potential of the HPL land is an important feature. As I have stated earlier in my evidence one of the key enablers of the horticultural industries present and future productivity is the provision of secure and stable access to freshwater for irrigation, frost fighting and the processing sector.

ALLOCATION OF WATER

44. The predominant type of horticulture in Otago is pipfruit and summerfruit production, with some commercial vegetable production in North Otago. Pipfruit and summerfruit production are both relatively environmentally sustainable in comparison to some other rural land uses, with comparably low water use, nutrient loss and GHG emissions. In the transition to a low-emissions economy there is opportunity for horticultural production to increase and contribute positively

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5 Reply Report 09: LF Land and Freshwater, Felicity Boyd, 23 May 2023, paragraphs 56 and 58.

towards the country's long-term environmental and economic goals.

45. Growers need secure and reliable access to water to produce marketable crops, fight frosts, and wash fresh produce for human consumption. Growers need water at specific times in the crop growth cycle to achieve a marketable yield, particularly when soil moisture limits growth.

46. Analysis on the economic implications of water restrictions which was carried out as part of the Phase Two report for the ORC showed a decrease in yield for vegetables. Vegetable growers using Good Management Practices use water sparingly. It is more likely that less irrigation water will result in a non-marketable yield or crop failure. At forty per cent decrease in yield, the vegetable model was at breakeven (no profits).

47. Orchardists use a high degree of irrigation efficiency, delivered to trees by dripline or micro sprinklers. The exact amount of water is delivered reasonably directly. To keep trees alive and thriving, trees need continued supply of water at the right rate and time throughout the growth and production cycles.

48. The modelling shows pipfruit is very sensitive to the impact of a reduced yield with the breakeven point reached when yields reduce by 20 per cent. Summerfruit is also sensitive with the breakeven point reached at about 30 per cent reduction in yield. Traditional cherries are more resilient largely because of the high profits; however, the income loss is still sizeable.

49. On a per hectare basis, the loss in financial performance from a reduction in yield is substantial for all the representative models, which reflects the likely cost of restrictions in access to irrigation water.

50. A new allocation regime based on resource use efficiency is needed to address water quality and quantity issues in Otago to ensure the long-term sustainability of water resources for future generations.

51. A reduction in water availability will result in a reduction of yield, or failure to produce a marketable yield in either orcharding or vegetable production systems. There is a higher level of investment into more technically efficient systems of horticulture and therefore, justification for this level of

investment will be sought, including consideration of consent length and security of access to water.

52. Water security and efficiencies are key drivers for horticultural operations. Crop water requirements mean growers, provided they have water security, are likely to invest in more technically efficient forms of irrigation, infrastructure, or alternative growing systems.

53. That is why HortNZ in its submission advocated very strongly for inclusion of recognition that essential human health needs such as vegetables and fruit for domestic supply should be recognised within the second priority obligation of the Te Mana o te Wai hierarchy.

54. In order to enable that recognition of the human health needs as a second priority obligation I am of the opinion that the provision of secure and stable access to freshwater, within environmental limits, is also an important enabler of that principal.

55. I do not believe that it would be appropriate to give the horticulture sector a priority right to that water but rather to adopt an allocation system which is based on the principle of economic efficiency.

ECONOMIC EFFICIENT USE OF IRRIGATION WATER

56. I note that in the community engagement part of the process of development of the pORPS vision statements that communities including the horticulture sector and HortNZ have considered that freshwater used for efficient primary production is important.

57. In that context I am of the opinion that it is equally important to consider their economic use of irrigation water.

58. Economic efficiency of water use[6] has three components:

    (a) technical efficiency which relates to maximising the level of output from a given resource;

    (b) allocative efficiency which is the arrangement of all resources to maximise society's welfare; and

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[6] Robb C et al (2201): Water Allocation: A Strategic Overview *Prepared for Ministry for the Environment* (Report No 4455/1, May 2001)

(c) dynamic efficiency which is the way in which resources are able to be rearranged over time to continually maximise allocative efficiency.

Technical Efficiency

59. One way to measure technical efficiency of water use is to use gross financial output of the production systems across a range of common land use systems in Central Otago. This uses the average water use in the horticulture sector of 350mm/ha, and an average annual application in the pastoral sector of 500mm/ha. This measure is represented in Table 3 below.

60. Table 3: Measures of technical efficiency of water use in Central Otago.

Water use	Gross Revenue / ha	Efficiency expressed as $ earned per mm of water applied / ha.
Cherry UFO	240,000	686
Cherry traditional	127,575	365
Summerfruit	60,740	174
Pipfruit	56,705	162
Dairy	8,664	17

61. What we can conclude from Table 3 is that although there is a significant variation in the efficiency measures when compared across the horticulture categories, they are all significantly ahead of the pastoral sector (which is represented by Dairy farming).

62. This analysis indicates that there is significant room to improve the technical efficiency of the use of irrigation water within the Central Otago area.

Allocative Efficiency

63. Currently the allocation system is a first come first served allocation system. On renewal of a consent this effectively becomes a grandfathering system driven by the initial allocation system.

64. This system is perfectly efficient when there is no constraint on the allocation of water. It becomes inefficient when there are constraints on the allocation of water – this is now the case in Central Otago.

65. In order to move into a more efficient allocation system the Otago Region needs to adopt some measures of technical use to guide its reallocation of water. This will achieve the desired outcome of maximising society's welfare.

Dynamic Efficiency

66. At the same time, it would be appropriate to adopt an allocation system which can ensure that water goes to its most productive use over time.

67. I note that the recently introduced two new Bills which are to replace the RMA, the Natural and Built Environment Bill and the Spatial Planning Bill, seek to improve water allocation with more focus on economic efficiency, fairness and existing investment, rather than 'first in first served'. If ORC adopts this allocation approach, it will be in line with the future of resource management in New Zealand.

CONCLUSIONS AND RECOMMENDATIONS

68. The investment in the combined fruit and vegetable sector and its ancillary post-harvest facilities is over half a billion New Zealand dollars. It is a substantial industry in Otago, and the Summerfruit and wine grape growing sectors are significant from a New Zealand perspective.

69. The Central Otago area is unique in New Zealand with its combination of soil types and its climate which make it ideal for Summerfruit production in particular. One thing which is essential to economically growing the majority of these crops in Otago is the ability to irrigate them at times in their growth when soil moisture is limiting their growth potential.

70. The Summerfruit production chain in Central Otago is one of, if not the, most efficient production chain for large scale highly perishable fruit in the world. The area in Summerfruit has grown considerably since the 2017 statistics and the rate of growth is expected to at least continue, if not to increase further. The expected short-term growth will mean that in a few short years the area in Summerfruit will have effectively doubled.

71. In total, the horticultural sector accounts for approximately 4% of the Otago regions GDP. The horticultural sector is a significant contributor to the Otago economy and this position is completely predicated on the supply of the correct volume of reliable irrigation water.

72. It is my opinion that the significant economic status of the Horticultural sector in the Otago region should be recognised by the inclusion of food production in the vision statement.

73. The LUC 4 and 5 soils are ideal to grow the range of crops across the Pipfruit and Summerfruit range in a very efficient manner and therefore are Highly Productive Soils within the production context of Central Otago.

74. I am of the opinion that in the FPI part of the pORPS that it is important to recognise that enabling the potential of the HPL land is an important feature. As I have stated earlier in my evidence one of the key enablers of the horticultural industries present and future productivity is the provision of secure and stable access to freshwater for irrigation, frost fighting and the processing sector.

75. I am of the opinion that essential human health needs such as vegetables and fruit for domestic supply should be recognised within the second priority obligation of the Te Mana o te Wai hierarchy. And that to enable that recognition that the provision of secure and stable access to freshwater, within environmental limits, is also an important enabler of that principal.

76. This analysis indicates that there is significant room to improve the technical efficiency of the use of irrigation water within the Central Otago area.

77. In order to move into a more efficient allocation system the Otago Region needs to adopt some measures of technical use to guide its reallocation of water in order to achieve the desired outcome of maximising society's welfare.

78. At the same time, it would be appropriate to adopt an allocation system which can ensure that water goes to its most productive use over time.

Stuart Ford

28 June 2023