

BEFORE THE	Canterbury Regional Council and the Ashburton District Council
IN THE MATTER OF	the Resource Management Act 1991
AND	
IN THE MATTER OF	applications by Rangitata Diversion Race Management Limited to the Canterbury Regional Council and the Ashburton District Council for resource consents for the construction, operation and maintenance of the Klondyke Water Storage Facility, its associated water takes from, and discharges to, the Rangitata River, and all associated activities.

**STATEMENT OF EVIDENCE OF LIONEL HUME AND MICHAEL SALVESEN ON BEHALF
OF THE COMBINED CANTERBURY PROVINCES, FEDERATED FARMERS OF NEW
ZEALAND**

Dated 30 April 2018

Introduction

1. My name is Lionel John Hume. I hold B.Ag.Sc and M.Sc. (First Class Hons) degrees from Massey University and a Ph.D. (Plant Science) from Lincoln University. I am employed as a Senior Policy Advisor, by Federated Farmers, based in Ashburton.
2. I am a member of Irrigation New Zealand Board (2006 until present).
3. I previously worked as a scientist for the Department of Scientific and Industrial Research (New Zealand Soil Bureau/DSIR Land Resources) in the areas of plant nutrition and soil fertility. Specific areas of scientific research experience include:
 - a. nutrient uptake and use by plants – particular emphasis on nitrogen and phosphorus;
 - b. nutrient availability from soils;
 - c. effects of soil acidity (particularly aluminium toxicity) on nutrient uptake and symbiotic nitrogen fixation;
 - d. nutrient, water and management factors affecting the growth and competitiveness of major weed species;
 - e. effects of soil physical properties on plant growth; and
 - f. experimental design and data analysis.
4. I am a member of the NZ Institute of Agricultural and Horticultural Science, the NZ Society of Soil Science and the Agronomy Society of NZ.
5. Currently I am a member of Federated Farmers' Regional Policy team and have over ten years' experience of working with regional water planning processes, including:
 - a. the Natural Resources Regional Plan process (from submission through to resolution of High Court appeals);
 - b. development of the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 and membership of the implementation taskforce for those regulations;
 - c. development of the Canterbury Water Management Strategy;
 - d. the Regional Policy Statement and Land and Water Regional Plan processes (from initial consultation and submission through to the resolution of High Court appeals);

- e. participation in several catchment-based limit-setting/sub-regional plan processes (from initial consultation through to appeal); and
 - f. membership of science stakeholder groups as part of the limit-setting/plan change processes in the Waimakariri and Hurunui-Waiau Water Management Zones in Canterbury, membership of the Southland Science Steering Group as part of Environment Southland's Water and Land Plan process.
6. With me is Michael Iver Christian Salvesen. Michael graduated BSc, with honours in Agriculture, from the University of Aberdeen in 1984. He has been farming ever since, first in Scotland, then for the last 15 years in Canterbury. He has been involved in a range of sectors, including cereals, vegetables, intensive livestock and currently pastoral farming.
 7. Michael owns and manages a farm in the foothills of Mid Canterbury, running around 450 beef breeding cows and 1000 hinds. All progeny are taken through to be sold prime or as breeding stock to other farmers. He also trades lambs and cattle to maximise pasture use at different times of year. He is a past entrant and section winner at the Ballance Farm Environment Awards.
 8. He completed the Kellogg programme for rural leaders at Lincoln University in 2010.
 9. Michael has been involved in farm politics throughout his career, from the Scottish National Farmers Union to Federated Farmers of NZ. He is now Federated Farmers' Mid Canterbury Provincial President and chair of the Canterbury Regional Policy Committee of Federated Farmers. His interests lie in trying to ensure that farmers have the tools needed to enable them to thrive, whilst operating within the regulatory framework to achieve the wider aims of society.

Scope of evidence

10. Federated Farmers' evidence covers the following matters:
 - a. The economic benefits of water storage;
 - b. The importance of reliability of water supply;
 - c. Environmental and recreational benefits; and
 - d. Resilience to the impacts of climate change.

Rangitata Diversion Race Consent Applications

11. Federated Farmers strongly supports all of the resource consent applications made by Rangitata Diversion Race Management Limited ('RDRML') to Environment Canterbury: CRC170651 - 170662; and to the Ashburton District Council: LUC16/0067, to build, maintain and operate a large water storage facility and associated activities near Klondyke. We also support RDRML's associated resource consent applications CRC182630, CRC182631 and CRC182535 – 182542 to Environment Canterbury, and application LUC17/0122 to Ashburton District Council, related to the construction and operation of a new fish screen.
12. Federated Farmers attempted to support the resource consent applications related to the construction and operation of a new fish screen via an on-line submission. Our submission was sent but for some unknown reason was not received by Environment Canterbury (we understand that this also happened for some other on-line submitters). We ask that our support for those consent applications is recorded, and that any reference to the construction and operation of a new fish screen in this evidence statement (e.g. paragraph 29) is accepted.

The Importance of Water Storage

Economic benefits

13. Land-based primary production makes up 72% of New Zealand's total exports¹. The rise in global population and incomes is resulting in increased demand for New Zealand's primary products. Therefore, there is increasing pressure to make more efficient use of relatively scarce land and water resources. The development of rural water infrastructure (including water storage) will, in the opinion of Federated Farmers, continue to have a crucial role in increasing the productivity of farmed land and maintaining the competitiveness of New Zealand agriculture. The reliability of supply provided by water storage will enable more effective and efficient irrigation and enable farmers to take advantage of high-value markets that require reliable supply of high quality products. In addition, water storage provides the potential to manage water for multiple purposes, to achieve environmental and community objectives as well as economic objectives.

¹ Global New Zealand – International trade, investment and travel profile, year-ended December 2016. Statistics NZ, July 2017.

14. The development of irrigation, based on appropriate infrastructure, has large economic, community and environmental benefits² which have been clearly demonstrated by the Opuha irrigation scheme in South Canterbury³ and the North Otago Irrigation Scheme⁴.
15. Federated Farmers notes that the economic and social benefits to the community from the Opuha Dam Scheme include:
 - An additional \$7.7 million in output per 1000 ha of irrigation;
 - An additional 30 FTE's of employment per 1000 ha of irrigation (480 for the whole scheme);
 - An additional \$2.5 million of value-added per 1000 ha of irrigation (\$41 million for the whole scheme); and
 - An additional \$1.2 million in household income per 1000 ha of irrigation.
16. Further, we note that economic and social benefits to the community from the North Otago Irrigation Scheme include:
 - A 308% (\$44 million) increase in revenue from irrigated properties (compared with un-irrigated);
 - A 310% (\$29 million) increase in annual farm expenditure flowing into the local economy; and
 - An increase in on-farm employment of 76 FTE's – it was estimated that there would be an approximately equal number of additional FTE's off-farm.
17. It is estimated that reliable irrigation enables a two to three-fold increase in gross farm income (over dryland farming) by enabling greater productivity from existing farming systems. If reliability is sufficient to justify a change to a more productive land use, the increase in gross farm income may be much greater still⁵.
18. The economic benefits from the Klondyke storage proposal, outlined in the evidence statement of Ms Glen Greer, are broadly consistent with the benefits from irrigation summarised above.

² Ministry of Agriculture and Forestry, 2004: The Economic Value of Irrigation in New Zealand. MAF Technical Paper No: 04/01

³ Aoraki Development Trust, 2006: The Opuha Dam: An *ex post* study of its impacts on the provincial economy and community.

⁴ Waitaki Development Board, 2010: The Economic Benefit to the Community of the North Otago Irrigation Scheme, prepared by The Agribusiness Group.

⁵ Hume, L. and McGimpsey, W. 2009: Water storage for agriculture. Pp 7-11 in: Dams Operating in a Regulated Environment. The New Zealand Society on Large Dams. Proceedings of Technical Groups, Volume 35, Issue 1.

19. It is calculated that the Klondyke storage proposal will increase the reliability of irrigation water supply to existing RDR irrigators from 84 percent, on average, to at least 99 percent, and potentially expand the irrigated area by 19,155 hectares, to include the entire area consented for irrigation by the three irrigation schemes that are shareholders in RDRML. Ms Greer estimated that the direct increase in value-added is expected to contribute an average of \$34 million to the GDP of the Ashburton District, as a result of increased reliability of supply, and an average of \$43 million as a result of greater irrigated area (assuming the potential for increase in irrigated area is realised). The total of \$77 million is equivalent to 3.9 percent of the GDP generated in 2015 and an associated 445 jobs would be created on-farm.
20. Ms Greer states that the total (direct, indirect and induced) effect of increased reliability of irrigation water supply and expansion of the irrigated area on the Canterbury regional economy is estimated to be \$116 million in the average season. This consists of \$51 million from increased reliability of supply and \$65 million as a result of the increased irrigated area.

Canterbury soils

21. Soil type is a key factor influencing drainage and the loss of soluble nutrients (especially nitrogen) in Canterbury. Canterbury has 890,000 ha of stony soils (soil depth less than 45 cm to gravels), which are classified moderate, light or very light (in terms of their primary soil class)⁶. These soils occupy 64% of the total land area in Canterbury that could potentially be used for intensive agriculture (less than 15 degree slope). They have moderate to rapid permeability, and a large proportion have low water storage (less than 60 mm or 60-90 mm for very light and light soils respectively). Therefore, these soils are vulnerable to drainage and consequent loss of soluble nutrients. While the numbers quoted refer to the whole of Canterbury, in percentage terms they are equally true for the area supplied with irrigation water from the Rangitata Diversion Race.

⁶ Carrick, S.; Palmer, D.; Webb, T.; Scott, J.; Lilburne, L. 2013: Stony Soils are a Major Challenge for Nutrient Management Under Irrigation Development. In: Accurate and efficient use of nutrients on farms. (Eds L.D. Currie and C.L. Christensen). Occasional Report No. 26. Fertiliser and Lime Research Centre, Massey University, Palmerston North, New Zealand.

Reliability

22. Access to a reliable water supply is crucial for efficient water use and minimising drainage, especially on the moderate to very light stony soils in Canterbury which tend to have low water storage and moderate to rapid permeability. A constantly available, reliable water supply encourages investment in modern irrigation technology and enables little-and-often approaches to the application of irrigation water (providing the benefits outlined in the previous paragraph). It also removes the need for use-it-or-lose-it approaches to irrigation which are encouraged by intermittent and unreliable supply. If it is known that water will be available when it is needed, the appropriate amount can be applied when it is needed ('just in time' rather than 'just in case'). Reliability of supply also encourages the use of deficit irrigation, e.g. to leave storage capacity for expected rainfall, by providing the assurance that further water will be available if the expected rainfall does not eventuate.
23. Reliable water supply enables communities to maximise the benefits from irrigation. For example, it enables the development of high value arable and horticultural production systems where crop loss (decrease in yield or quality) or failure could occur if water is not available in the right quantity at the right time.
24. When irrigators have less reliability they tend to use greater quantities of water when it is available, hoping that will provide sufficient soil moisture and plant growth to minimize the impacts of possible future shortage (for example because of restrictions on takes related to minimum flows).
25. The economic benefit of increased reliability for the Klondyke storage proposal is estimated in the evidence statement of Ms Glen Greer, who states that the total (direct, indirect and induced) effect of increased reliability of irrigation water supply on the Canterbury regional economy is estimated to be \$51 million in the average season.

Environmental and recreational benefits

26. With appropriate planning and management, the development of rural water infrastructure will not only deliver huge economic and social benefits but will also assist with the realisation of environmental and recreational objectives.
27. This will be the case with the Klondyke water storage proposal, with the construction of a white water facility and associated amenities, and the creation of a 6 ha ecological

refuge, including lizard habitat, native planting and a constructed wetland. The project will also result in better public access to the Rangitata River.

28. A major environmental benefit of the storage, along with the additional water abstraction, will be to reduce the pressure on groundwater resources. As well as reducing the need for irrigators to take groundwater, the water could potentially be used for purposes such as targeted stream augmentation and managed aquifer recharge. In addition to benefiting Mid Canterbury, the storage could potentially enable the supply of water to South Canterbury, with similar benefits.
29. The installation of a more effective fish screen to reduce the numbers of salmon, trout and indigenous fish species entering the RDR, and to return large sediment particles to the river, is a further environmental benefit.
30. With regard to the effects of increased water takes from the Rangitata River (10 m³/s high flow take and 5 m³/s associated with the new fish screen), the hydrological effects are described in the evidence statement of Mr Bas Veendrick as being “at worst, minor”.
31. In her evidence, Ms Glen Greer states that the environmental and social impacts of the proposed development “are expected to be, or can be managed to be, acceptable to the wider community” and that, consequently, the economic costs associated with those impacts are expected to be very low.

Resilience to climate change

32. The building and operation of water storage will increase resilience to climate change. Given a regional climate change scenario which predicts less rain on the east coast, more rain on the west coast and in the Main Divide and greater (albeit more variable) flows in Canterbury’s alpine rivers⁷⁸⁹¹⁰¹¹, Canterbury is uniquely placed to build resilience to the impacts of climate change, and protect its local and regional communities and economies, through the development of water storage and associated

⁷ O’Donnell, L. 2007: Climate Change: An analysis of the policy considerations for climate change for the review of the Canterbury Regional Policy Statement. Environment Canterbury Report R07/4

⁸ Ministry for the Environment 2016: Climate Change Projections for the Canterbury Region. [Climate change projections for the Canterbury region | Ministry for the Environment](#)

⁹ Ministry of Agriculture and Forestry 2010: Introduction to Climate Change:12; Effects and Impacts: Canterbury. MAF Website.

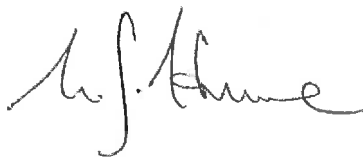
¹⁰ Woods, R. 2008: Projected Climate and River Flow for the Rangitata Catchment for 2040. NIWA Client Report CHC2008-097

¹¹ Zammit, C. and Woods, R. 2011: Projected Climate and River Flow for the Waimakariri Catchment for 2040s and 2090s. NIWA Client Report No: CHC2011-025

infrastructure. The development of such projects demonstrates far-sighted planning and investment.

Conclusion

33. In Canterbury, water is not merely one ingredient which enables economic and social wellbeing. Because it is naturally in short supply, the provision of water via appropriate infrastructure underpins land-based primary production and is an absolutely vital component of the economic and social wellbeing of the region.
34. Federated Farmers believes that the wise management of water resources, including the development and use of appropriate community-scale and on-farm infrastructure, is central to New Zealand's social, economic and environmental wellbeing.
35. Therefore, Federated Farmers seeks that the consent applications made by RDRML for the building, operation and maintenance of the Klondyke Storage Pond, and the replacement of its fish screen, are granted in their entirety.



Dr Lionel Hume
Senior Policy Advisor
Federated Farmers of NZ

30 April 2018