

**BEFORE THE CANTERBURY REGIONAL COUNCIL**

**IN THE MATTER OF**      The Resource Management Act 1991 (**Act**)

**and**

**IN THE MATTER OF**      Applications by **BENMORE IRRIGATION COMPANY LIMITED**  
for a Water Permit (CRC156319) to take and use water for  
irrigation, and Discharge Permit (CRC156320) to discharge  
nutrients onto land from farming activities

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**REPORT AND DECISION OF HEARING COMMISSIONERS DAVID CALDWELL,  
HOANI LANGSBURY AND SHARON MCGARRY**

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## Representation and Appearances

### Applicant

**Mr Ewan Chapman** and **Ms Jamie Robinson**, Counsel (Duncan Cotterill)

**Mr Barry Shepherd**, Manager, Benmore Irrigation Company Limited (BIC)

**Mr Henry Williamson**, Farmer and Chairman of BIC

**Mr William Sutherland**, Farmer, Benmore Station

**Mr Simon Williamson**, Farmer, Glenbrook Station

**Mr Dave Gordon**, Business Manager, Twizel Dairy

**Mr Dave Lucock**, Agricultural Consultant, The Agribusiness Group

**Ms Nicole Phillips**, Nutrient Management Advisor

**Mr Tom Heller**, Director, Environmental Associates Limited

**Dr Graeme Ussher**, Restoration Ecologist, RMA Ecology Limited

**Dr Peter Espie**, Research Scientist of AgScience Limited

**Mr Andrew Craig**, Landscape Architect, Andrew Craig Landscape Architect Limited

**Mr Tim Ensor**, Planner, AECOM New Zealand Limited

**Dr Richard Allibone**, Fresh Water Ecologist, Water Ways Consulting Limited

### Submitters in Support

**Mr Bob Douglas**, Federated Farmers of New Zealand, High Country

### Submitters in Opposition

**Mr David Anderson**, Bog Roy Station Limited

**Ms Genevieve Rainey**, Counsel, Director-General of Conservation

**Mr Dean Nelson**, Senior Ranger for Biodiversity Assets, Department of Conservation (DOC)

**Mr Nicholas Head**, Plant Ecology Advisor, DOC

**Mr Ben Farrell**, Planning Consultant, John Edmonds & Associates Limited, for DOC

**Mr David Higgins**, Te Rūnanga o Waihao and Te Rūnanga o Moeraki (Ngā Rūnanga)

**Mr Timothy Vial**, Principal Planner, Ki Tahu ki Otago Limited for Ngā Rūnanga

**Ms Rosalie Snoyink**, Mackenzie Guardians Inc.

**Mr Gavin Wills**, Owner of Glide Omarama Limited for Mackenzie Guardians Inc.

**Mr John Hyde**, Producer/Director for Mackenzie Guardians Inc.

**Mr Jay Cassells**, Executive Producer for Mackenzie Guardians Inc.

**Ms Diane Lucas**, Landscape Architect, Lucas Associates Ltd for Mackenzie Guardians Inc.

**Ms Jennifer Miller**, Conservation Manager, Forest & Bird Protection Society of New Zealand Incorporated

**Mr Hamish Stevens**, Fish & Game Officer, Central South Island Fish & Game Council

**Section 42A Reporting Officers**

**Mr Simon Woodlock**, Consents Planner, Canterbury Regional Council (CRC)

**Dr Phillip Grove**, Land Resource Scientist, CRC

**Mr Ognjen Mojsilovic**, Land Resource Scientist, CRC

**Mr Hisham Zarour**, Team Leader, Groundwater Science Section, CRC

**Ms Shirley Hayward**, Senior CWMS Water Quality Scientist, CRC

**Mr Christopher Glasson**, Landscape Architect

## Background and Procedural Matters

- 1 This is the decision of independent Hearing Commissioners Mr David Caldwell (Chair), Ms Sharon McGarry and Mr Hoani Langsbury. We were appointed by the Canterbury Regional Council (CRC) to hear and decide an application by Benmore Irrigation Company Limited (BIC) for variation to conditions to Resource Consent CRC981619.1 and CRC156320, an application for a new consent to discharge nutrients associated with farming uses. Environment Canterbury did not accept that Application CRC981619.1 was a variation and the Application was accepted for processing as a new consent.
- 2 The application was first lodged in March of 2015. It was receipted on 24 July 2015. A further information request pursuant to section 92 of the RMA was made on 29 September 2015. A response was received on 22 December 2015.
- 3 The application was publicly notified on 2 February 2016 in The Christchurch Press, The Timaru Herald and the South Canterbury Herald.
- 4 A second request for further information was made on 22 April 2016 and a response was received on 8 June 2016.
- 5 As well as the public notification, a number of parties were individually served. These are listed at paragraph 23 of the Section 42A Report. The issues raised in submissions are summarised in a table on pages 8 – 12 of the Section 42A Report and we adopt that summary of submissions.
- 6 Prior to the hearing, a Section 42A Report was produced by CRC's Reporting Officer, Mr Simon Woodlock. The Report provided information and advice in relation to the applications and included technical reviews of specific aspects of the application by Ms Hayward, Dr Grove, Mr Mojsilovic, Mr Zarour and Mr Glasson. Mr Woodlock recommended the Applications be refused.
- 7 Expert evidence was also pre-circulated prior to the hearing and was taken as read. Witnesses provided a summary of their evidence at the hearing and responded to questions. The witnesses with an interest in OVERSEER® modelling caucused and we were provided with a copy of the caucusing report.
- 8 The hearing commenced at 9.30am on Monday 10 October 2016, and continued through to 6pm Friday 14 October 2016.
- 9 At the commencement of the hearing the Commissioners disclosed potential conflicts / relationships. Commissioner Caldwell disclosed that he acts for the Mackenzie District Council (MDC) and is currently acting for it on Plan Change 13 to the Mackenzie District Plan, which addresses outstanding natural landscapes in the Mackenzie Basin within that district. The Mackenzie District

Council is not a submitter on these applications, and the applications are not within its district. Commissioner Caldwell also recorded that MDC is a submitter on Plan Change 5 (PC5) to the Canterbury Land and Water Regional Plan (LWRP) and had submitted on the issues relating to the allocation of nutrient allocation headroom for community waste water and on proposed Policy 15B.4.2.3, which Mr Ensor addressed in his evidence. Commissioner McGarry advised that she had previously sat as a hearings commissioner with Mr Heller, a witness for the applicant. Commissioner Langsbury disclosed that he knew and had at times worked with the witnesses for the Rūnanga.

- 10 No issues were raised by any of the parties present. Mr Chapman confirmed that the applicant had absolutely no concerns with any of the issues disclosed.
- 11 We undertook a site visit on the afternoon of 12 October 2016. We were escorted by Mr David Ellis from The Glens, and Mr Andrew Sutherland from Benmore Station.
- 12 The site visit commenced with a drive along State Highway 8 (SH8) to The Glens, where we were shown the soil monitoring system.
- 13 We then proceeded along SH8 to Kelland Pond where we viewed both the pond and the Wairepo Arm.
- 14 We then followed the road / track along the Ohau River, past proposed irrigation sites TD1B, TD1A, TD5, and GB2B. It was apparent that considerable work had been undertaken on the proposed TD sites adjacent to the Ohau River, and particularly on TD1A and TD5. Those sites appeared to have been disced and cultivated. There appeared to have been earthworks undertaken, and pivots were installed. Quite a bit of the work that had been undertaken appeared to have been done recently, although some of that work appeared to have been undertaken prior to Mr Craig's report in March 2014. The activity appeared to be continuing, on the lower river terraces.
- 15 We stopped at a number of locations on that road to view the irrigation sites, the existing BIC irrigation intake structure and fish screen, and the Oahu River.
- 16 We then drove on a farm track through GB2B and up into GB2A. We were able to obtain a view of GB1, GB2A and TD2. Again, in terms of TD2, that site appears to have been the subject of considerable work. While we did not go onto that site, it was very green and appeared to have infrastructure and irrigators in place.
- 17 We then returned via Glenn Lyon Road, through Twizel and back to Benmore Station where we first drove up onto an area of developed pasture located near what we were told was Homestead Tarn. This enabled a very good view over

both the eastern areas of proposed irrigation, and a number of the western sites.

- 18 We then drove along the Lake Oahu Road and along a farm track through BM2 and into BM1A.
- 19 We then returned to SH8 and went up a farm track behind the Omarama Cemetery, which again enabled a view both to the east and to the west, including over Buscot Station and Little Ben.
- 20 We drove up Quail Burn Road to view WB2.
- 21 While we did not access all of the sites, all were viewed and we are confident that the site visit provided us with useful and sufficient information.
- 22 The hearing was closed on 15 November 2016 following receipt of the applicant's written right of reply.

### **The Proposal**

- 23 BIC sought the following resource consents:

#### **CRC156319:**

To increase the irrigation area currently authorised under BIC's existing Water Permit CRC981619.1 by 3666.5 hectares (ha) to a total of 7658 ha.

The proposed addition to the irrigation areas is located on a number of parcels of land in separate ownership located north of Omarama, essentially on SH8 between the Ohau River and Ahuriri River.

The diversion and take is from the Ohau River at an extraction point located at or about Map Ref. Topo50 BZ15: 5889-9328. Water is proposed to be extracted at a rate not exceeding 4000 litres per second and at a volume not exceeding 51,626,000 cubic metres between 1 September and the following 31 May. The application does not seek any additional water above that authorised under the current Water Permit.

The application is also for the use of water to irrigate land in the BIC command area at an average daily application of approximately 4.5mm. Irrigation was proposed to be generally by centre pivot irrigation systems. An expiry date of 17 February 2034 was sought.

#### **CRC156320:**

To discharge nutrients from farming activities onto land that may enter water. The primary nutrients are nitrate-nitrogen and phosphorous and it is proposed

to discharge a total load of 284.7 tonnes of nitrogen originally estimated using OVERSEER® V6.2.2. The nutrient discharge is split between the Ahuriri Red Nutrient Allocation Zone of 94.945 tonnes, the Haldon Orange Nutrient Allocation Zone at 67.368 tonnes, and the Wairepo / Kelland Pond Sensitive Lake Zone of 122.385 tonnes. An expiry date of 17 February 2034 is sought.

As noted above, the water take consent was originally applied for as a variation to the existing Water Permit. That was not accepted by CRC and was accepted for processing as a new consent application.

### **The Environment**

- 24 The existing BIC irrigation scheme traverses the flats which run from Lake Ruataniwha, the Ohau River and the canals south towards Omarama. The pattern of existing irrigation is primarily along both sides of SH8, except for Buscot Station and Little Ben, which are separated by a range of hills.
- 25 The BIC irrigable area, including the proposed additional area, is within eight shareholder properties. The additional irrigation area is to be allocated to six of the existing eight shareholders. Under the BIC irrigation scheme Twizel Dairy currently irrigate 1533.5 ha and propose an additional 791 ha; Glenbrook Station currently irrigate 447 ha and propose an additional 736 ha; West Edge currently irrigate 153 ha and propose an additional 133 ha; Benmore Station currently irrigate 585 ha and propose an additional 1334 ha; Buscot Station currently irrigate 285 and propose an additional 294 ha; and Willowburn currently irrigate 162.5 ha and propose an additional 378.5 ha.
- 26 Two of the remaining existing BIC shareholders, Little Ben and The Glens are fully irrigated and therefore no irrigation expansion is proposed.
- 27 Five of the existing shareholders also have additional individually held water permits authorising existing irrigation of 255 ha at Benmore Station, 65 ha at Buscot Station, 57 ha at Glenbrook Station, 118 ha at West Edge and 20 ha at Willowburn. These consents are exercised separately to the BIC irrigation scheme water.
- 28 The existing BIC irrigation scheme uses a control weir on the true right bank of Ohau River (approximately 4 km upstream from the outlet to Lake Ruataniwha) to take water at a rate of up to 4,000 litres per second into the main race. Water is gravity fed along the 25 km main race and each shareholder abstracts water from the main race, with some maintaining more than one off-take structure. Designated 'spill areas' are maintained in case of emergencies. No structural changes are proposed to the existing infrastructure, except for additional off-takes to supply new irrigation areas.



- 29 Existing BIC irrigation is predominantly by spray irrigation, using centre pivots and K-line, with some border dyke irrigation. The existing consent does not stipulate irrigation method or specific irrigation areas within the eight properties. A condition of the original consent requires details of the irrigation areas to be specified before commencement.
- 30 In addition to the applicant's assessments, the s42A Report drew on the CRC 2014 technical report titled '*Upper Waitaki catchment flows, water quality and ecology: state and trend*'. The technical report assessed the current state of the waterways within and surrounding the existing BIC irrigation scheme based on water and habitat quality, and aquatic fauna. It classified a number of waterbodies within the affected catchments in relation to negative land use impacts and the s42A Report summarised these. We note the technical report does not cover the Ohau River and Serpentine Creek. The report concludes that the Wairepo Creek, Ahuriri River, Sutherlands (swamp) Creek and Quail Burn are considered to be 'at risk' from land use activities; and the Willowburn Stream is classified as 'impacted'. Impacts identified include diversion and waterway modification, elevated contaminant concentrations (dissolved organic nitrogen, dissolved reactive phosphorous, faecal bacteria, and suspended solids), sedimentation, and increased macrophyte growth and periphyton cover. We accept this is an accurate summary of the current state of the waterways.
- 31 The application included a report titled '*Assessment of Aquatic Ecological Effects of the Extension of Irrigated Land*' by Golder Associates dated March 2015 ('Golder Report') which summarised the results of aquatic flora and fauna assessments<sup>1</sup> undertaken at ten sampling sites within the proposed irrigation area on 1-2 May 2014. The report noted that Sutherland Creek was dry in the lower section (where it lost surface flow to groundwater), which affected its habitat value, and the modified nature of the Wairepo Diversion and the Lower Willowburn. It noted the relatively unmodified habitat of Barclay Creek, Temple Creek and Spring Creek. Sampling of macroinvertebrate communities showed Barclay Creek had the highest number of taxa, with the highest percentages of sensitive taxa (Ephemeroptera (mayflies) and Trichoptera (caddisflies)), followed by Spring Creek; and that Willowburn and the Wairepo Diversion had the lowest number of taxa, dominated by poor water quality tolerant taxa (Mollusca, Crustacea and Oligochaetes (worms)). The macroinvertebrate community index (MCI) scores indicated that Barclays Creek and Spring Creek had the best water quality and habitat, and that Sutherlands Creek, Wairepo Diversion and lower Willowburn were ranked from moderately to severely polluted with poor water quality and low habitat value. The report stated the

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<sup>1</sup>Habitat Assessment, Periphyton Assessment, Macroinvertebrate Assessment and Fish Assessment.

MCI results correlated well with CRC's macroinvertebrate monitoring sites on the lower Willowburn and Spring Creek and were indicative of the modified flow regimes of the Willowburn and Wairepo Stream and poor water quality.

- 32 The Golder Report noted that electric fishing had resulted in the collection of five fish species, including three threatened species – *Galaxias macronasus* (Bignose galaxias), *Galaxias brevipinnis* (Koaro), *Galaxias vulgaris* (Canterbury galaxias). Bignose galaxias were found to be common at the upper Willowburn site and one was found in at the lower Temple Creek site. Canterbury galaxias were found at the lower Willowburn site, but were not found in Sutherlands Creek or the Wairepo Stream, despite previously being documented there. Koaro were found in Spring Creek, but not in Wairepo Stream, as previously documented. The report concluded that Spring Creek, Temple Creek and the Willowburn provide habitat for threatened and endangered native fish.
- 33 We accept that the Golder Report and the CRC technical reports provide an accurate summary of aquatic ecological values within the application areas.
- 34 The application included a report by Tonkin & Taylor dated January 2015 outlining the survey of terrestrial ecology values within the application sites. The report stated that the Mackenzie Basin has developed unique and unusual plants and animals that have adapted to often stony and infertile soils, and climatic extremes of drought, frost, heat and wind. It noted that human occupation has brought about widespread changes to indigenous vegetation through land clearance and conversion to exotic pasture to the extent that many indigenous species and communities supported in the Mackenzie Basin are locally, regionally or nationally rare or threatened.
- 35 The applicant's assessment of terrestrial ecology effects noted that broad scale changes to vegetation cover and the establishment of invasive weeds has led to soil erosion and ongoing biodiversity loss. It noted that ongoing biodiversity loss was not only caused by land use changes and intensification, but also plant pests such as wilding conifers and hawkweeds (*Hieracium*). It stated that despite ongoing loss of indigenous terrestrial ecology, the Basin still retains a disproportionate number and density of naturally rare ecosystems and habitat for a number of threatened indigenous species. The report noted the presence of the following fauna species of conservation value and their conservation threat status within the Mackenzie Basin - black stilt ('nationally critical'), black billed gull ('nationally critical'), black fronted tern ('nationally endangered'), Caspian tern ('nationally vulnerable'), banded dotterel ('nationally vulnerable'), pied stilt ('at risk'), green skink ('at risk – declining), spotted skink ('at risk – relict'), and Mackenzie Basin skink ('nationally vulnerable'). It also noted a

number of specialised invertebrate species which were naturally uncommon and three nationally rare species.

- 36 The physical environment is, to a degree, divided between two landscape units being what was described as the highly irrigated basin to the east between Omarama and Twizel, and the Ohau basin to the west of the Ostler Fault. Mr Glasson's view was that this was because there were two clearly identifiable landscape units with different issues and physical and cultural characteristics. Those units were clearly separated by the intervening landfalls of the Ostler Fault. Mr Glasson described the area east of the Ostler Fault as being a basin between Omarama and Twizel, traversed by SH8. He described it as being well contained by the landforms of the Ostler Fault and the Benmore Range. He described it as highly modified with its character being dominated by intensive agriculture, pivot irrigators and associated ancillary structures. He also noted the vegetation cover patterns dominated by green exotic pasture, which is present all year round, and that there was little, if any, mitigation of the irrigated sites which were visible from SH8.
- 37 Mr Glasson described the area to the west of the Ostler Fault as having a higher quality natural environment, opening out into a sub-basin of the Mackenzie Basin. He described it as a grassland environment with brown, tawny and ochre colours, with open expansive views, pockets of native vegetation, with areas of red and hard tussock and matagouri being common features of the landscape. He considered that the Ohau Basin was a significant landscape and that it had a high degree of openness, naturalness and a low level of modification. Mr Glasson considered that extensive pastoral farming was a common feature of the Ohau Basin and that the tawny colouring, open vistas and lack of intensive farming contributed towards the preservation of the existing landscape values and character, as well as maintaining long distance views across the open and expansive landscape. He considered that for the most part the existing modification to the land integrated well and was in keeping with the existing character of the landscape unit.
- 38 We consider that the description given by Mr Glasson of the landscape and physical environment is largely accurate. We accept the environment is not static and is subject to ongoing change from current farming practices and consented irrigation, including the recently granted Five Rivers consent, which we address in the body of this Decision.
- 39 We have also considered Mr Chapman's submissions in relation to the existing consent and the ability to move irrigation within the 4000ha command area. We do not consider that that is realistic given the level of investment in existing infrastructure and pastoral development. We have given that little weight in our

assessment of the existing environment. We also note Mr Chapman relied on an existing Certificate of Compliance for Benmore Station, which certified that vegetation clearance on land marked as Areas B and C and dated 13 December 2011.

## **The Hearing**

### Applicant's Case

- 40 **Mr Ewan Chapman**, as Counsel, introduced the application. He addressed the current Consent, noting that BIC as a scheme was fully operational at the time of the Upper Waitaki water take consent hearings and that the existing consent had allowed the properties within the Scheme area to remain viable in the face of challenges relating to weather, soil loss, weed infestation and rabbits. He acknowledged that the Scheme had resulted in the changes to landscape along SH8 and submitted that change to the landscape formed part of the existing environment.
- 41 Mr Chapman summarised what he considered to be the issues to be determined, including; the extent and applicability of PC5 to the hearing; what was the baseline and the existing environment; the relevance of land use status under the Waitaki District Plan; the extent to which terrestrial ecology is a matter controlled by the Regional Plans; and the extent to which mitigation measures and conditions proposed ameliorate the effects of the proposal. He identified a number of issues in relation to the nutrient allocation application, including - the appropriateness of OVERSEER® modelling and whether it had been run properly; was it practical for farmers to run their properties to the modelled OVERSEER® results; and was the allocation of nutrients consistent with other allocations in the Basin. In terms of the proposed irrigation expansion, he summarised the issues for determination as: the practicality of irrigating the extended area from the current source; did the extension assist the company and CRC to meet water efficiency targets; is it an effect on ecology an environmental bottom line; and what are the controls on landscape imposed by the Waitaki District and LWRP. Finally, he identified the central issue as being whether the application, on a broad overall judgment, met the purpose of the RMA.
- 42 Mr Chapman addressed what he considered to be the positive outcomes of the Application in terms of water efficiency, weed and pest control, prevention of soil losses and similar.
- 43 **Mr Barry Shepherd**, the Manager of BIC, outlined his role as Manager, addressed BIC compliance history, and described the existing irrigation scheme

and the distribution of water. Mr Shepherd also addressed the management proposed in terms of the catchment-wide discharges and the requirements for the individual farms to hold individual Farm Environmental Management Plans (FEMP), as well as a wider Scheme Environmental Management Plan (SEMP). He also addressed the enhancement of the Willowburn and outlined voluntary water monitoring which had been undertaken. He also briefly commented on tourism impacts.

- 44 **Mr Henry Williamson**, a shareholder and the Chairman of BIC and who farms at West Edge, outlined the background of West Edge, and addressed BIC's current resource consent and the benefits that had produced, BIC operational matters and the steps BIC would be taking to meet its obligations.
- 45 **Mr William Sutherland** farms in partnership with his brother Mr Andrew Sutherland on the homestead block of Benmore Station. Mr Sutherland addressed the history of Benmore Station and described its topography. He addressed the positive aspects existing irrigation had provided and the steps that had been taken in terms of fencing off the Barclays Swamp, and covenanting of Homestead Tarn and Big Tarn in 2004. He also addressed the problems with weeds and pest invasion and outlined the costs per annum of such controls. He discussed the farming practices, including the fertilizer programme, the visibility of irrigation areas and infrastructure, and the importance of irrigation to Benmore Station.
- 46 **Mr Simon Williamson** farms Glenbrook Station. He outlined the history of Glenbrook Station from their purchase of the property in December 2003. He noted the development that had occurred and the benefits of irrigation to the farm management. He also addressed tenure review, which was completed in 1991, and provided a copy of the Ecological Report completed as part of the tenure review process. Mr Williamson also expressed his frustration that the tenure review process had identified what was significant and they were now in a situation where other areas were being considered significant and requiring mitigation. He outlined the farming practices and the improvements under cropping and addressed the proposed extended area of irrigation west of SH8, predominantly on the west sloping faces of Table Hill.
- 47 **Mr Dave Gordon**, the Business Manager of Twizel Dairy, gave evidence. He addressed the history of irrigation at Twizel Dairy, noting that the property now had 1500 ha of irrigated pasture, milking 4000 dairy cows. He outlined the development of Twizel Dairy and addressed the farming practices. He also addressed OVERSEER® and its use, management of surface runoff, the more recent use of a FEMP and the benefits of irrigation.

- 48 **Mr David Lucock**, an Agricultural Consultant, outlined his qualifications and experience and addressed the role of his company, The Agribusiness Group, in developing a Scheme Environmental Management Plan (SEMP), auditing of OVERSEER® files and individual FEMPs and outlined how the auditing process would be undertaken. He noted the complications faced when auditing as the properties are spread over three different Nutrient Management Zones. His evidence was that he considered an accurate and thorough audit could occur and information would need to be verified as part of a reporting cycle to ensure that the reporting of the overall Scheme aligned directly with Nutrient Zone boundaries.
- 49 **Ms Nicole Phillips** provided expert evidence on OVERSEER® modelling and summarised the reports that she had provided as part of the application and in response to section 92 requests. She attended the expert caucusing meeting on behalf of the applicant. Ms Phillips also commented on submissions and the s42A Report and addressed the complications of modelling in this environment, particularly in relation to Glenbrook Station. She addressed the proposed changes to irrigation management, noting that the significant change proposed was the introduction of soil moisture monitoring equipment for all spray irrigator blocks, for both new and existing irrigation. She considered this to be an indication of the applicant's commitment towards Good Management Practice (GMP) and that the introduction of soil monitoring equipment showed a reduction in nitrogen loss when compared to the baseline period on most of the shareholders' properties.
- 50 **Mr Tom Heller**, a director of Environmental Associates Limited, addressed the background to the proposal and the latest OVERSEER® nutrient modelling results. He addressed the revised potential effects upon the environment using the latest OVERSEER® modelling results, the information presented by the applicant, surface water quality predictions, proposed irrigation efficiency and the proffered conditions of consent. He also provided a response to a number of the issues raised by the submitters.
- 51 Mr Heller noted that the latest version of OVERSEER® modelling provided the results of predicted nitrogen (N) and phosphorus (P) losses in each catchment and sub-catchment. He concluded the effects of the proposed BIC land use change varied from improvement, through to a small increase in conservatively predicted P concentrations. He noted that on balance, there was an overall significant improvement in N concentrations in each of the major catchments. He concluded that latest OVERSEER® modelling results, alongside conservative mass balance, predicted that the overall N loss decreased in the Haldon and Ahuriri Arm sub-catchments of Lake Benmore. He described this

as a positive effect. He noted a small decrease in P to the Ahuriri Arm sub-catchment, with a small increase predicted to occur in the Haldon Arm sub-catchment. He further concluded that nitrate-nitrogen concentrations in local groundwater aquifers were predicted to remain similar to current levels, reduce in concentration, or show a small increase in concentration. He noted that all surface water bodies were predicted to either remain similar or show some decrease in N concentrations and that small increases in P concentrations were predicted to occur in Willowburn Stream, Upper Wairepo Stream and Lower Wairepo Stream.

- 52 **Dr Graeme Ussher**, a Restoration Ecologist with RMA Ecology Ltd, provided evidence. Dr Ussher had been engaged by BIC to undertake an assessment of the terrestrial ecology values of the BIC proposed irrigation areas. He outlined the assessment process undertaken, noted that many of the sites had lost their original biodiversity values and that the remaining sites reflected a change and loss of biodiversity over time. He noted that seven of the sites supported moderate quality indigenous vegetation across part or all of the site, with rare plants being found in three of those sites. He noted that two non-threatened species of lizard were found on the least modified sites, and 270 invertebrate species, including the 'nationally critical' Tekapo ground weta were found. He also noted 22 species of birds were recorded and others were known from broader survey records. His evidence was that it was likely that up to eight threatened or at risk native bird species use the irrigation areas.
- 53 He considered there would be a direct loss of indigenous biodiversity values over five sites, totalling 1231 ha. He stated that those five sites were considered to be significant in the regional context when compared to the Canterbury Regional Policy Statement (RPS) criteria for assessing ecological significance.
- 54 Dr Ussher also addressed the ecological mitigation proposed, which in essence incorporated fencing, stock exclusion, planting of at least 20 metre (m) wide riparian margins, and wild conifer removal with sustained control over 400 ha of moraine terrain at Glenbrook Station. Dr Ussher addressed the potential effects of irrigation. In terms of indirect effects, he addressed the potential effects on wetlands, and potential effects from changes to water quality. He concluded there would no adverse ecological effects on wetlands outside of the immediate irrigation parcels.
- 55 Dr Ussher addressed direct effects, noting the physical effects of ploughing / discing, over-sowing, and effects of nutrient changes and water availability result in the total loss of habitat for indigenous plant communities, and removal of habitat for geckos and in most cases skinks. He also noted the loss of indigenous plant communities also resulted in the assumed associated loss of

native terrestrial invertebrate community. He noted the effects on birds, both positive and negative. Of the five sites that supported what he considered to be ecologically significant values, the adverse effects of irrigation on four of those sites was considered to be significant. He described those sites as being large expanses of moraine slope and outwash plain covered by sites GB1, GB1a, BM4a and BM1a. He noted that each of those sites occupies environments that are rare, or may support rare or threatened species of plants and invertebrates. In terms of site BM6, he considered that the effects of irrigation would not be ecologically significant because the loss of 10 ha of grazed scrubland and depleted grassland was small compared to the extensive areas of habitat that covered the hill slopes. He also recorded his understanding that the site has a Certificate of Compliance allowing conversion to irrigated land as a permitted activity.

- 56 In terms of mitigation, he outlined the proposals, for both direct and associated mitigation.
- 57 Dr Ussher addressed the Section 42A Report, noting that 17 sites remained in dispute. He acknowledged that in the process there may have been omissions or inconsistencies in the assessment across some of the sites and that rare or threatened species were likely to have been missed.
- 58 **Dr Peter Espie**, a Research Scientist from Agscience Limited, gave evidence. Dr Espie has been involved with Glenbrook Station for some time and has significant experience with South Island tussock grasslands. His evidence was that he is very familiar with the Upper Waitaki Basin and Glenbrook Station in particular. He addressed the terrestrial vegetation systems and the temporal changes in 1962-2012, the impacts of hieracium, the effects of irrigation development on vegetation and soils, and the effect of farming on terrestrial ecological values. Dr Espie's evidence was that direct assessment of ecological properties was preferred to indirect modelled surrogate indices. Overall, he concluded that the vegetation communities and habitats affected by the proposed irrigation development at Glenbrook Station are all modified or highly modified. He noted the mitigation measures provided for retention of representative areas of short and tall tussock grassland and that similar vegetation communities were already protected in conservation areas within the adjacent Mackenzie Basin. His conclusion was that the agricultural development would not result in loss of indigenous terrestrial biodiversity or conservation values in the Mackenzie region, noting in particular the amount of land which was already protected.
- 59 **Mr Andrew Craig**, Landscape Architect, provided evidence. He had prepared the landscape assessment provided as part of the application. His key



observations and conclusions were that all of the application sites were working farm environments and to varying degrees appeared as such from the viewpoint of onlookers and that all sites were modified to a certain degree by cultivation and improvement. He stressed that none of the sites were located within areas recognised in the Waitaki District Plan as outstanding natural landscapes or features; the proposed irrigation is a permitted activity under the Waitaki District Plan and his understanding that landscape and visual effects are anticipated and considered as acceptable. He considered the parties whose amenities are potentially adversely affected are road users, nearby residents and recreationalists. He considered that the chief landscape and visual effects were the visible presence of irrigation apparatus - pivot irrigators – and tonal contrast arising from various vegetation regimes. He was of the view that there was no permanent landscape effect as the activity is revocable. His view was that the proposed activity would maintain generic rural character and predominantly vegetated open space amenity.

- 60 His evidence was that the avoidance of potential adverse effects was the chief means of managing landscape effects. This was by avoiding unacceptable view intrusions from key vantage points; development in outstanding natural landscapes and features; unacceptable degradation of view quality; permanent irrevocable changes to the environment; alteration of land form; and introduction of buildings and development in areas not subject to existing farming activities. His conclusion overall was that the adverse landscape and visual effects would be less than minor.
- 61 Mr Craig addressed landscape matters raised in submissions, and in Mr Glasson's s42A Report review. He did not accept that the area to the west of the Ostler Fault was devoid of modification, although he generally agreed that it was less modified. He noted that farming activity was quite intensive in certain areas west of the fault and that some of the farming activity involved considerable cultivation and improved pasture. He did agree with Mr Glasson that much of the land west of the fault did not include irrigation structures. He stated there was no doubt that the proposed irrigation increase would result in changes to the landscape and visual amenity and that visual coherence would diminish. He also noted view quality would lessen, as would naturalness, and to a certain extent native vegetation would be lost. He concluded that for the most part, however, those effects were less evident due to intervening landform, intervening vegetation, co-location of existing irrigation activity, significant setbacks for the most part from key vantage points such as SH8 and Lake Ohau Road, and fore-shortening effects arising from low elevations of most sites relative to key vantage points. He also noted the positive effects of eradicating

noxious introduced plant species in the areas subject to proposed irrigation. In regard to the sites west of the Ostler Fault, it was his opinion that the proposed activity would not significantly diminish the openness and expansiveness and nor would it intrude important scenic views.

62 **Dr Richard Allibone**, Fresh Water Ecologist of Waterways Consulting Limited, provided evidence on the streams, noting that the irrigation extension area included a range of perennial and ephemeral streams ranging from natural and unmodified to artificial channels. He noted the watercourse contained in-stream communities of fish and invertebrates, indicating a range of habitat and water quality conditions, and that the area provided habitat for three rare fish; the threatened Bignose galaxias and two declining species native fish species. He addressed mitigation, including the implementation of a Biodiversity Management Plan, and fencing and riparian planting of several waterways. He anticipated good results from additional fencing proposed. He also addressed possible further steps which could be taken to improve habitat, including spring flow augmentation.

63 **Mr Tim Ensor** provided planning evidence. He addressed the Canterbury Water Management Strategy (CWMS), PC5, the role of regional plans and policy in relation to terrestrial ecology and indigenous biodiversity, the Waitaki District Plan and baseline issues, and landscape matters from a planning perspective. Mr Ensor also addressed consents from WDC, addressed the vegetation clearance rules in the Waitaki District Plan and addressed section 91. Overall, he concluded that the BIC proposal achieved a number of benefits by largely avoiding adverse effects on the environment. He noted that, where effects could occur, these were either anticipated by relevant planning documents, or would be mitigated through on-farm management measures. Overall it was his view that the application was consistent with the purpose and principles of the RMA.

#### Submitters in Support

64 **Mr Bob Douglas** of Federated Farmers of New Zealand provided evidence in support of the Federated Farmers submission. He noted the contribution the proposal would make to the social, economic and cultural wellbeing of the community and submitted that there was no justification for not approving the application. He noted that no additional water was being sought and exacting controls in relation to nutrient leakage had been imposed on the properties. He addressed the tenure review process and identified the importance of pest control.

#### Submitters in Opposition

- 65 **Mr David Anderson** of Bog Roy Station Limited farms in the Ahuriri Arm. He expressed reluctance to submit in opposition to the application. His concerns related to the potential impact on the current irrigation activity undertaken by Bog Roy Station Limited in the event that the TLI for the Ahuriri Arm of Lake Benmore was exceeded. He noted that the effect of the expansion would not be known for some considerable time and that if the TLI is breached in the future it would negatively impact on them.

Director-General of Conservation

- 66 **Ms Genevieve Rainey** provided legal submissions on behalf of the Director-General of Conservation and introduced the witnesses. She reminded us of the principles around the permitted baseline, submitting that there was no applicable permitted baseline in these circumstances given that this was a regional consent application. She submitted that it would be ironic if an application of the permitted baseline from the Waitaki District Plan resulted in the Regional Council discounting adverse effects on terrestrial vegetation in determining consents before it. Ms Rainey took us through the relevant planning documents, including the National Policy Statement for Freshwater Management 2014 (NPSFM), the RPS, and the LWRP, including PC5. Ms Rainey also addressed the Ahuriri Water Conservation Order, noting that it required that the waters of the Ahuriri River are to be maintained in their natural state. Ms Rainey also addressed conditions and Part 2 matters. She concluded by noting that the ecological values of the Mackenzie Basin are nationally important, particularly in relation to aquatic habitat, naturally rare and threatened terrestrial ecosystems and nationally important habitats for threatened species. She noted that some adverse effects may be able to be avoided or mitigated, but that the conditions as currently proposed did not adequately provide for that.
- 67 **Mr Dean Nelson**, Senior Ranger for Biodiversity Assets for the Department of Conservation (DOC), provided evidence. He addressed the New Zealand Threat Classification System, the native fish values of the BIC command area, and the effects of the proposal on native fish species. He noted that the New Zealand Threat Classification System is a national one led by DOC and that it is used to assess the status of any plant, animal or fungus that has a wild population in New Zealand and for which there is sufficient information available. He addressed the native fish communities of the BIC command area, identifying six indigenous species recorded in the New Zealand Fresh Water Fish database that were present. He noted that four of the fish species were currently of conservation concern. These were the Bignose galaxias, long-fin eel, Koaro and the Canterbury galaxias. His evidence was that the Bignose

galaxias is considered the most threatened, with its threat status being 'nationally vulnerable' and that the species only occur in the Mackenzie Basin within an area of 100 ha. He noted that one of the key threats was predation by trout, but that other major threats included loss of habitat due to water abstraction, modification of streams and the siltation of gravel substrate caused by stock. He also noted increased macrophyte growth as a threat. He noted that in general long-fin eels were not likely to be found in the BIC command area. In terms of the Koaro, based on the records, he considered that they were limited. In terms of the Canterbury galaxias, he noted that their range of habitat included braided rivers, foothill streams, water races and lowland streams, but not lakes. He commented on the application and noted that there were no proposals to modify watercourses. He stated that if channels are modified as part of the setup of the irrigation infrastructure, this could impact on invertebrates and fish. His opinion was that modification of waterways should not be permitted. Mr Nelson disagreed with Dr Allibone's evidence in relation to the width of riparian planting for ecological benefits to be realised. He also noted that revegetated and fenced riparian buffers of adequate width were critical.

- 68 **Mr Nicholas Head**, a Plant Ecology Advisor with DOC, provided evidence in his area of expertise, noting that the Mackenzie Basin mostly comprises naturally rare, glacial-derived ecosystems that are not replicated to any similar extent elsewhere in New Zealand. He noted that, although many remaining individual ecosystems were depleted, those not extensively developed are likely to contain significant indigenous vegetation and significant habitats of indigenous fauna and that even depleted ecosystems can recover. He noted many of the significant ecological values present in the Mackenzie Basin met the criteria for classification as 'national priorities' because they support indigenous vegetation on naturally rare ecosystems, threatened ecosystems, and/or provide habitats for threatened flora and fauna.
- 69 Mr Head noted that substantial ecosystem loss had occurred primarily as a result of intensive agricultural development and that the only relatively intact sequence of undeveloped moraine and outwash systems remaining in the Waitaki District occurred in Ohau Downs and Glenbrook Station. He agreed that the five ecological sites identified by Dr Ussher were significant, but was of the opinion that further significant ecological values were likely to be present if the sites surveyed had been assessed at the right time of year and a more rigorous plot-based method was used. Mr Head agreed with Dr Grove's opinion that there could be another 18 sites, totalling up to 2640 ha of significant indigenous vegetation and/or habitat of indigenous fauna, assuming they had

not been developed since assessment. He agreed with Dr Ussher's assessment that the impacts of irrigation on dryland ecosystems and indigenous biodiversity results in almost a complete loss of ecological values and that the loss is absolute. His evidence was that a permanent loss of 1256 ha, and likely over 2500 ha, of significant ecological values would be a major adverse effect and represented a substantial proportion of the remaining undeveloped Basin floor. In terms of the mitigation proposal, he considered that this was not 'like for like', nor in was it in perpetuity. His opinion was that the effects of the proposal on significant ecological values would not be avoided, remedied or mitigated, particularly as most of the significant sites are proposed to be developed.

- 70 Mr Head also provided rebuttal evidence in relation to Dr Espie's evidence, which had been filed late. He disagreed with many of Dr Espie's statements and in particular concluded that irrigation is a serious threat to dryland ecosystems, and that the loss would essentially be absolute. He did not accept that the decrease in fescue tussocks was largely as a result of competition from hieracium. Mr Head also considered that the maps showing the extent of protection of ecological values provided by Dr Espie was inaccurate and that the appropriate scale of assessment was the Omarama Ecological District, rather than the wider Mackenzie Basin.
- 71 **Mr Ben Farrell**, a Planner with John Edmonds & Associates Limited, provided expert evidence for DOC in relation to the potential effects of the proposal on significant ecological values and the assessment of these effects under the statutory framework. His evidence relied on that of Ms Hayward and Dr Grove, as well as the evidence of Dr Allibone, Dr Ussher, Mr Head and Mr Nelson. He concluded that the proposal would have major adverse effects on significant ecological values. Mr Farrell addressed the relevant policy documents, noting the strong direction in the NPSFM, and the direction of the LWRP and PC5. He described PC5 as a 'stop-gap' measure to achieve no net loss of significant indigenous biodiversity, until such time that the Waitaki District Plan sufficiently recognised and protected significant ecological values.

#### Ngā Rūnanga

- 72 We heard from **Mr David Higgins** of Ngā Rūnanga. He provided cultural evidence, describing the traditional and cultural relationships that Kāi Tahu had with the Waitaki and Mackenzie Basin. He addressed mahika kai and the importance of it to the culture and kaitiaki. He also addressed the ancient pathways and the archaeological sites in the Upper Waitaki and Mackenzie Basin. He addressed the history of the purchase and the efforts that have been

made to protect and restore their cultural association with the Waitaki and Mackenzie Basin.

- 73 **Ms Mandy Waaka-Home** had provided a written brief of evidence, but was unable to attend the hearing. Ms Waaka-Home addressed the Rūnanga's aspirations for the Waitaki Catchment, the significance of long-fin eel (tuna) and the adverse impacts of the existing intensive farming. She addressed the decline in tuna population and the efforts to restore Tuna at the Ahuriri River Delta.
- 74 **Mr Timothy Vial**, a Planner with Kāi Tahu ki Otago Ltd, provided evidence addressing the statutory framework, including the NPSFM, the RPS, the LWRP, the Ngāi Tahu Claims Settlement Act, the Te Rūnanga O Ngāi Tahu Fresh Water Management Policy and concluded that the current proposal did not provide for Kāi Tahu relationship with fresh water, nor did it provide for kaitiakitanga and customary use. He noted that Kāi Tahu was not opposed to development or intensification of land uses, but concurred that the proposal may have adverse effects on tangata whenua values.

Mackenzie Guardians Inc.

- 75 **Ms Rosalie Snoyink** provided submissions identifying the background to the formation of Mackenzie Guardians Inc. and its objectives. She noted the opposition to the application was because the proposal to double the area of irrigation would further degrade water quality, continue loss of indigenous biodiversity and further reduce the naturalness of the Mackenzie Basin. She was concerned about the potential adverse effect on the regionally significant Mackenzie Basin Outstanding Natural Landscape (ONL). The key issues she identified were water quality, nutrient discharge, indigenous biodiversity and landscapes. Her conclusion was that the location, type and scale of uses were considered to be inappropriate.
- 76 **Mr Gavin Wills**, who lives in Omarama, provided evidence of the changing landscape, particularly noted in observations from the air in his role as an owner/operator of Glide Omarama Limited. He noted the comments made by visitors that the landscape is much greener than anticipated and the degree of puzzlement the big green crop circles created. From his observation, he concluded that the extent of the greening of the Mackenzie Basin had reached a stage of development where the cumulative effects of the irrigated areas are overwhelming the essential nature of the Mackenzie Basin landscape.
- 77 He also gave evidence on what he described as the potentially far reaching and disturbing changes with the degradation of creeks, streams, lakes and underground water. He noted that as a child he drank straight from the

Omarama Stream, but now he would not even encourage his grandchildren to swim in the creek, let alone drink from it. He noted that according to CRC the most polluted creeks in the Mackenzie Basin are now those where intensive irrigation has been established and that the levels of pollution are increasing at high annual rates. He also gave evidence of other matters relating to the general degradation of the natural environment.

78 **Mr John Hyde** a freelance television Producer/Director, and **Mr Jay Cassells**, an Executive Producer for Natural History Ltd, gave evidence relating to two months in 2014 that they had spent carrying out a general reconnaissance of most of Canterbury's high country lakes and rivers to find the best location to film camp site scenes for a film entitled 'Flying South'. They noted that they had visited the Haldon Arm and were surprised to see a brown scum on the surface of the water. They produced photographs of that. They noted that after an extensive search on Google Earth, eight hours of flying time and several ground visits, no suitable camp sites were found in Canterbury, either because all the accessible waters had been modified and the high country lakes either had unsuitable shorelines or were polluted.

79 **Ms Diane Lucas**, a Landscape Architect, provided evidence for Mackenzie Guardians addressing landscape effects and the evidence of Mr Craig and Mr Glasson. She noted that the application area was incorporated within the regional Mackenzie Basin ONL, as recognised in the RPS. She considered that ONL would be significantly adversely affected by the application and agreed with Mr Craig that naturalness would be significantly diminished, that native vegetation would be irrevocably lost, and that the visual quality would be significantly reduced as a result of the proposed irrigation. Her evidence was also that the proposal would significantly adversely affect recognised natural science values, including the key components of the outwash plains. She agreed with Mr Glasson that the irrigation proposed west of the Ostler Fault would have significant adverse landscape effects. She also considered that irrigation concentration proposed east of the Ostler Fault would have very significant adverse effects on the regional Mackenzie Basin ONL. She noted that a number of the areas would themselves have significant adverse effects, and that others would have significant cumulative effects through exacerbating the contrast, extent and intensity with increased irrigation and significantly reduced naturalness. Overall she considered the adverse landscape effects were highly significant and were not able to be remedied or mitigated, and that the proposal was entirely inappropriate.

80 **Ms Jennifer Miller**, Conservation Manager, provided submissions on behalf of Forest and Bird Protection Society of New Zealand Incorporated (Forest and

Bird). She noted that Forest and Bird supported the findings of the s42A Report Officers regarding potential and actual adverse effects, and the evidence of DOC and Mackenzie Guardians.

- 81 Forest and Bird's position was that the application had not provided sufficient information to adequately assess effects and should therefore be declined under section 104(6). She submitted that water quality was central to the application and that the information provided by BIC had not provided any further certainty around OVERSEER® modelling. She also identified section 91 as a second preliminary issue before addressing effects on the environment. The adverse effects addressed in the submissions were those relating to indigenous terrestrial biodiversity. She noted that protection of significant terrestrial ecology had formed a critical part of conditions that supported the granting of similar applications for the take and use of water in the Mackenzie Basin and disagreed with Mr Ensor in a number of respects. She noted the relevant objectives and policies of the WDP provided for protection of significant indigenous flora and significant habitats of indigenous fauna, and submitted that the destruction of thousands of hectares of significant indigenous flora was contrary to the relevant objectives and policies. She also submitted that the proposal was contrary to the key provisions of the RPS.
- 82 Ms Miller then addressed adverse effects on water quality and aquatic ecology, submitting that the proposal was contrary to the relevant objectives and policies. In terms of the landscape values, she submitted that the landscape assessment was inadequate and agreed that, while the ONL had not been mapped at a district level, the activity should be assessed against the regional recognition of the area as being an ONL. She also addressed the relevant planning documents before concluding that the applicant had failed to provide the information necessary for proper consideration. She concluded that the application would have adverse and potentially significant adverse effects on the natural environment.
- 83 **Mr Hamish Stevens**, a Fish and Game Officer with Central South Island Fish and Game Council (Fish and Game), outlined the statutory function of Fish and Game and addressed issues arising from the Kelland Pond Kids Fishing Day, which had gone from attracting significant numbers of children, resulting in significant catches, to a significant drop in 2014. He noted that weed growth within Kelland Pond was noticeably increasing and that this may be the reason for the declining catch rate. He noted Fish and Game's concern that further expansion of irrigated areas could further adversely affect the recreational angling values of Kelland Pond. In the event that the consents sought were to



be granted, he requested that appropriate monitoring and mitigation conditions be imposed.

- 84 For completeness, we record that we received a letter from Anderson Lloyd on behalf of the submitters Ohau Snow Holdings Limited, Mr Mike & Mrs Louise Neilson, and the Ohau Protection Society in support of their submission seeking decline. We also received an email from Mr Neil Graham in support of his submission in opposition.

#### Section 42A Reporting Officers

- 85 **Ms Shirley Hayward**, a Senior CWMS Surface Water Quality Scientist with CRC, provided a technical review of the applicant's assessment of water quality effects appended to the s42A Report (Appendix 2) and supplementary evidence at the hearing in response to matters raised. Ms Hayward's concerns and conclusions remained unchanged. She clarified that she did support the use of OVERSEER® as a tool for modelling nutrient losses at a farm scale and at a catchment scale, but her view remained that it was important to be able to demonstrate how the modelled mitigations and modelled farm systems are able to be practically implemented. She noted that the conditions proposed reflected base line nutrient losses for the existing BIC command area. She noted that if they were to be adopted then all that would be achieved was the status quo in terms of the receiving environment.
- 86 Ms Hayward addressed trend in water quality, agreeing that there were no statistically significant trends in P concentrations in the sites analysed and that nitrate-nitrogen concentrations were increasing in the lower Willowburn Stream and Spring Creek at the Glenbrook boundary site, and that all of the sites listed showed a statistically significant trend of increasing concentrations of total N over the 10-11 year monitoring period. She disagreed with Mr Heller's assessment that there had been little in the way of change in water quality since BIC irrigation commenced in 2005. Ms Hayward also noted her concern with using the lake TLI as a trigger for managing risks associated with N losses across the Upper Waitaki catchment, as there was difficulty in achieving a timely response to exceedances, and the potential time lag effects from changes to nutrient losses in the catchment. Her preference was for the BIC proposed irrigation expansion to also have triggers in the waterways that are more reflective of their specific area of influence, such as Willowburn, Wairepo Spring and Sutherlands Creeks and groundwater.
- 87 **Mr Ognjen Mojsilovic**, a Land Resource Scientist with CRC, provided a review of the applicant's OVERSEER® modelling appended to the s42A Report (Appendix 4) and supplementary evidence responding to matter raised at the

hearing. He attended the expert caucusing meeting. He agreed that improvements in water efficiency can reduce diffuse nutrient losses, but that in order to match the OVERSEER® modelling results and practice the applicant would need to achieve a very high level of water efficiency over the entire BIC scheme, and initially over the land that is currently irrigated. He remained concerned that the proposed changes to irrigation scheduling would not achieve the outcomes modelled in OVERSEER® and that the proposed conditions were inconsistent with the modelled inputs. He considered there was a very low likelihood that the Twizel Dairy run off would contribute a real reduction to the nitrogen load and had concerns with the modelling inputs used for the baseline, noting that the baseline period captured the farm in an unstable state. He considered that, because improved irrigation management was the only mitigation that had been modelled, the N concentrations in waters draining from the areas experiencing this optimisation were likely to increase over time. He also considered that surface waterbodies fed by groundwater would be susceptible to the more concentrated inflows. He was concerned about the existing irrigation infrastructure and the ability to achieve the default deficit irrigation inputs as modelled. He also noted that under the applicant's modelling, irrigation was based on principles of deficit irrigation, with water to be applied only when the crop is close to experiencing a drought stress and that the proposed conditions were inconsistent with this approach.

- 88 **Mr Christopher Glasson**, a Landscape Architect, provided a review of the applicant's landscape assessment for CRC appended to the s42A Report (Appendix 6) and provided a supplementary statement of evidence at the hearing responding to the evidence of Mr Craig. Mr Glasson remained of the view that there were two landscape units - that to the east of the Ostler Fault between Omarama and Twizel; and that to the west of the Ostler Fault to Lake Ohau. He considered these areas were two clearly identifiable landscape units with different issues and physical and cultural characteristics.
- 89 Mr Glasson noted that extensive pastoral farming was a common feature in the Ohau Basin, with the tawny colouring, open vistas and lack of intensive farming contributing to the preservation of existing landscape values and character. He considered that the existing modification of the land integrated well and was in keeping with the existing character of the landscape unit. He noted that it was readily accessible to recreational visitors and was an important landscape. Mr Glasson also noted that there was no valid ONFL map in the Waitaki District Plan and his view was to defer to the ONFL map provided in the Canterbury Regional Landscape Study Review 2010.

- 90 Mr Glasson remained of the view that for the most part the effects were very much less east of the Ostler Fault. He considered that the area east of the Fault was capable of absorbing change, but it still needed to be managed in an appropriate manner to avoid further degradation of the landscape character and amenity, in particular the more sensitive views from SH8 towards the Ostler Fault and Benmore Ranges. For the area west of the Ostler Fault, he provided a table comparing his assessment to Mr Craig's. Overall, he did not accept that effects on the landscape would be less than minor. Mr Glasson's view was that Mr Craig had avoided addressing effects on landscape character. He was of the opinion that the proposals west of the Ostler Fault would appear anomalous, disconnected and out of keeping with the existing landscape in the Ohau Basin. Mr Glasson applied the modified Pigeon Bay criteria and concluded that the irrigation proposals for the land west of the Ostler Fault would cause a significant adverse effect on the landscape.
- 91 **Mr Hisham Zarour**, Team Leader - Groundwater Science Section with CRC Team South at Canterbury Regional Council, provided a review of the applicant's groundwater assessment appended to the s42A Report (Appendix 5) and provided supplementary evidence at the hearing responding to the matter raised at the hearing. Mr Zarour's evidence focused on the inadequacy of groundwater information. He noted that qualified understanding of the flow of the groundwater system was very important for the purposes of assessing potential environment effects and, in addition to adverse effects of groundwater quantity and quality in the area, groundwater acted as a medium to transmit quantity and quality effects into connected surface water systems, including streams.
- 92 **Dr Phillip Grove**, Land Resources Scientist with CRC, provided a review of the applicant's assessment of terrestrial ecology effects appended to the s42A Report (Appendix 3) and supplementary evidence at the hearing responding to matter raised. Dr Grove disagreed with Dr Ussher's assessment of the extent of ecologically significant sites that would be affected by the proposed irrigation and associated land use intensification. He considered that Dr Ussher had not considered all the ecological values identified in the original AEE when making his assessments under the RPS criteria. He considered that insufficient ecological survey for rare plants, native lizards, invertebrates and birds had been undertaken and that there appeared to an apparent confusion of different significance assessment criteria. He was critical of Dr Ussher for not using the Omarama Ecological District as the context of his assessment.
- 93 He considered the mitigation actions proposed were of little ecological benefit, as they did not deal with the direct effects on the terrestrial ecological values of

dryland habitats. He noted wetland and riparian fencing would relate to management of the aquatic wetland habitats. He considered that wilding conifer control proposed as mitigation, while useful, was on the moraine habitat and none of the suggested mitigation actions were directed towards the dryland outwash plains ecosystem, similar to that which would be most impacted by the proposed irrigation. He considered that the proposed mitigation was not sufficient, neither quantitatively nor qualitatively, to compensate for the significant ecological values that would be lost. He remained of the view that there was still considerable uncertainty over the scale and significance of the impacts of the proposed irrigation, particularly given the disagreement regarding the ecological significance of the terrestrial ecology at 18 of the proposed sites. Dr Grove also commented on the evidence of Dr Espie and on the evidence led by DOC, Mr Head in particular. He agreed with Mr Head's assessment of effects that the BIC proposal would result in the permanent loss of significant terrestrial ecology that included loss of naturally rare ecosystems, threatened land environments and habitats for rare and threatened species.

- 94 **Mr Simon Woodlock**, Consent Planner with CRC, prepared the s42A Report and provided supplementary evidence at the hearing. His supplementary evidence summarised the technical reviews and assessed the further information against the statutory provisions. His overall conclusion was that, having taken into account the updated nutrient modelling and the evidence presented at the hearing, the recommendation to refuse the consents sought remained the same.

### **Right of Reply**

- 95 **Mr Chapman** provided a preliminary oral reply at the conclusion of the fifth hearing day. He then provided a written reply which was received on 4 November 2016. The written reply provided a number of documents and responded to a number of issues raised. Mr Chapman commenced his reply by outlining what BIC was not applying to do, including that it was not applying for indigenous vegetation clearance. He noted that this was not a plan change application and we were required to implement the plans before us. He noted that we must rely on OVERSEER® and that, despite this not being an application under the WDP, we were required to have regard to what the rules say even if some may have argued that they are outdated. Mr Chapman addressed the planning framework and the Act, including the Ahuriri Conservation Order, submitting it was questionable whether it was in fact relevant, as there were no new areas of irrigation within 400 m of the bank of the river.

- 96 He addressed the NPSFW on fresh water management, submitting the proposal would result in improved water quality and was entirely consistent with the anticipated outcomes of the NPS. He addressed PC5, reiterating his position that, despite us being required to have regard to it, it was inappropriate to give it too much, or indeed any, significant weight. In any event, he considered that the proposal was consistent with what PC5 was trying to achieve and would not undermine the strategic direction it was taking. He suggested that section 91 was not available to us, as the matter had already proceeded to a hearing.
- 97 Mr Chapman addressed uncertainty in terms of OVERSEER® as a modelling tool, submitting that we must disregard any notion that it is uncertain as a modelling tool as it was the only tool anticipated by the LWRP. He addressed the apparent concern about the prospect of further dairying, advising that the proposed use input files to be appended to the consent sought were certain, were sensitive to stock numbers and that the increase in the stock numbers arising from the application were therefore known and certain.
- 98 He addressed the ability to comply, submitting that a comprehensive suite of conditions had been provided, that these would be internally monitored. Mr Chapman addressed the permitted baseline and what was allowed pursuant to the Waitaki District Plan. He also addressed the existing environment, vegetation clearance, landscape and addressed the WESI and Man O'War Station cases.<sup>2</sup> He submitted the Waitaki District Council had not identified this area as an outstanding landscape and that the boundaries of the current WDP should apply until changed. In terms of ecology, he submitted, in summary, we were not to take into account effects on indigenous biodiversity, although he noted that the applicant would accept a condition to place a further 50 ha of the proposed irrigation land in the Basin, within the management area, with the effect of reducing the overall proposed irrigation sought by the application. He presented and explained proposed consent conditions, including the offering of a spring augmentation condition. Overall, he submitted that the application should be granted.
- 99 The above is a reasonably detailed summary of the evidence and submissions we heard. Recording that information has added to the length of this decision, but avoids us having to restate submissions in evidence throughout. Some repetition is, however, unavoidable.

## ASSESSMENT

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<sup>2</sup> Wakatipu Environmental Society Inc v Queenstown Lakes DC [2000] NZRMA 59  
Man O'War Station Limited v Auckland City Council [2015] NZHC 767

### Statutory Framework

- 100 The applications are pursuant to s14 and s15 of the RMA. There was agreement between the parties that the applications should be considered as discretionary activities under the LWRP. We agree.
- 101 As a discretionary activity, the application must be assessed under sections 104B and 104(1) of the Act.
- 102 In particular, section 104(1) requires that, subject to Part 2, we must have regard to a number of matters including:
- the actual and potential effects of the proposal on the environment;
  - the provisions of any relevant statutory documents, including the Waitaki Water Allocation Regional Plan, the LWRP, the RPS, PC5 to the LWRP and the WDP; and
  - any other relevant matters.

### Purpose and Principles of the Act

- 103 The Act has a single purpose:  
*“Section 5 Purpose*
1. *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
  2. *In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people in communities to provide for their social, economic, and cultural well-being and for the health and safety while –*
    - (a) *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
    - (b) *safeguarding the life-supporting capacity of air, water, soil and ecosystems;*
    - (c) *avoiding, remedying, or mitigating any adverse effects of activities on the environment.”*
- 104 Subsections 6 – 8 of the Act are important in informing the decision. Section 6 lists the matters of national importance. A number were identified as relevant here, including subsections 6(a), (b), (c) and (e).
- 105 Section 7 provides that we are to have particular regard (relevantly) to:
- (a) kaitiakitanga

- (aa) the ethic of stewardship;
- (b) the efficient use and development of natural and physical resources;
- (c) the maintenance and enhancement of amenity values;
- (d) intrinsic values of ecosystems;
- (f) maintenance and enhancement of the quality of the environment.

106 Section 8 provides we are to take into account the principles of the Treaty of Waitangi/Te Tiriti o Waitangi.

107 Pursuant to Part 2, an overall judgment is to be made as to whether or not the proposal achieves the sustainable management of natural physical resources. That judgment allows for a comparison of conflicting considerations, their scale and degree of conflict, and their relative significance in the final outcome. We note that we are aware of and have considered the Supreme Court decision in *King Salmon*<sup>3</sup> which we address further in this decision. In the circumstances of this Application, we are of the view that the overall judgment approach is appropriate.

#### **Principal Issues to be Determined**

108 Mr Chapman, in opening, identified his view of the issues to be determined. These were as follows:

- overall the extent and applicability of PC5 to this hearing;
- what is the baseline and what is the existing environment;
- the relevance of the land use status under the WDP;
- the extent to which terrestrial ecology is a matter controlled by the regional plans; and
- the extent to which mitigation measures and conditions proposed by the applicant ameliorate the effects of the proposal.

109 On the nutrient application:

- is there acceptance that OVERSEER® is the correct tool for evaluating a nutrient allocation application;
- has OVERSEER® been run correctly;
- has Mr Heller applied the results of OVERSEER® correctly to the effects on water quality and on the surface water bodies;
- is it practical for the farmers to run their properties to the modelled OVERSEER® results; and

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<sup>3</sup> Environmental Defence Society Inc v New Zealand King Salmon Company Limited [2014] NZSC 38

- is the allocation of nutrients consistent with other cases in the Basin.

110 On the irrigation extension application:

- is it practical to irrigate the extended area from the current source;
- does the extension of irrigation area assist the company and CRC to meet water efficiency targets;
- is an effect on ecology an environmental “bottom line” – can effects on ecology be mitigated – can the Commissioners have regard through ecological management of significant species beyond the application site;
- what are the controls on landscape imposed by the WDP and the LWRP; and
- does the application on a broad overall judgment meet the purpose of the RMA.

111 While that summary is helpful, we consider that the principal issues in contention are more nuanced than that. However, it does encapsulate, in broad terms, many of the issues we are required to consider and determine.

### **Effects on the Environment**

112 A number of matters were raised relating to effects on the environment which we consider are of little, if any, relevance to our decision-making process. For completeness, we briefly address these issues below.

#### Tenure Review

113 A number of the farming witnesses expressed the view that, in essence, tenure review had identified the significant areas of conservation values and that these had been retained in public ownership. Mr Simon Williamson encapsulated the farmers’ frustration in paragraph 17 of his written brief of evidence.

114 While we can understand the frustration expressed, we consider tenure review is a very different process than an assessment under the RMA. We agree with Ms Rainey’s submissions on this issue. We do not give any weight whatsoever to the tenure review process.

#### Animal Welfare

115 The issue of animal welfare was raised in submissions, particularly in the submission of AG Talbot. That submission raised a concern that the Mackenzie Basin was an unnatural, if not cruel, environment for farming dairy cows outside. We consider that issue is not one we should, or need, to consider on these applications.



### Sport Fisheries

- 116 The effects on sport fisheries were not addressed in evidence. The submission in the evidence of Fish and Game addressed its concerns in relation to impacts on Kelland Pond, but no wider concerns were identified or addressed in any detail. We do not consider effects on sport fisheries, on the evidence provided, are of any relevance to our considerations.

### Effects on Tourism

- 117 This was identified in submissions and commented on in evidence. There were mixed views. The farming interests suggested that irrigation was beneficial for tourism. Other submitters, such as Ohau Snow Holdings Limited and Mr Wills, suggested it was negative. Other than note the issue, we do not make any findings on it. We have no probative evidence which would enable an informed decision in relation to that issue.

### **Relevant Environmental Effects**

- 118 There are a number of relevant effects on the environment. In reaching our conclusion on effects, we have considered the application documents, the information provided by way of further information, the s42A Report and technical reviews, the submissions received and all of the evidence provided during the hearing process. We record that our determination is squarely based on the evidence before us. Our findings have been informed by the environment as it appeared to us from our site visit.
- 119 Having considered the Application documents and all other information provided, it is our view that the relevant effects are as follows:
- (a) Landscape effects;
  - (b) terrestrial ecology effects;
  - (c) water quality and aquatic ecology effects;
  - (d) cultural effects; and
  - (e) positive effects.

### Permitted Baseline

- 120 Before addressing landscape effects and terrestrial ecology, it is appropriate that we address the issue of the permitted baseline.
- 121 Mr Chapman addressed the permitted baseline in some detail in both his opening and closing submissions. Mr Ensor also addressed it in his evidence.

- 122 The baseline argument here arises in perhaps a somewhat unusual context. The applications before us are fully discretionary. We have of course been tasked with determining the regional consent applications only. There were no district council consents before us.
- 123 Mr Chapman's argument on the baseline related to the Waitaki District Plan. He submitted permitted activities under a district plan can, and should, inform a permitted baseline in three aspects. These were, in summary, the greening of the basin, what one can do on over sown and top-dressed land under the WDP, and that irrigation is a stand-alone activity in the WDP.
- 124 He submitted that in relation to ecology and landscape issues, the District Council's position on over sowing, top-dressing and irrigation, as part of a farming activity in the rural scenic zone, is relevant. In essence, Mr Chapman submitted that in terms of landscape, the "greening" of the landscape was already provided for in the District Plan. In terms of ecology, he submitted that land could be over sown and top-dressed and fertilized, as well as grazed by sheep and cattle. Mr Chapman also reminded us of the evidence for the farmers that "all sites" have been subject to over sowing and top-dressing and fertilizer application, as well as grazing in the past. He stated that would continue with or without irrigation.
- 125 Ms Rainey submitted that the WDP did not create a baseline for the purposes of the current application. She noted Rule 4.3.1(ii) of the WDP permitting farming activities and irrigation of land for pastoral or crop production. She identified that section 104(2) refers to "the plan" – which in this case is the Regional Plan. She noted that under the Regional Plans the activity is discretionary and the permitted baseline does not arise. She submitted further that in any event, on the proper application of case law, we should not apply a permitted baseline. She identified Objective 16.9.2 of the WDP, which seeks the maintenance of biological diversity, nature conservation values and ecosystem functioning within the district by- the protection of areas assessed as having significant indigenous vegetation and significant habitats of indigenous fauna; and the maintenance or enhancement of the quality of water in the coastal environment, wetlands, lakes, rivers and their margins and the protection of these environments from inappropriate sub-division, use and development.
- 126 Policy 16.9.3.1 provides:
- "To manage the adverse effects of the use or development of land on significant indigenous vegetation or significant habitats of indigenous fauna so that the values of these areas are protected."*

127 She also identified Policy 8, which provides:

*“When considering resource consents that come before the Council, to ensure that regard is given to any adverse effects of the activity on the natural character of the District’s environment and on remaining indigenous vegetation and habitat; and that opportunities are taken to promote the retention of indigenous vegetation and habitat.”*

128 Having carefully considered the submissions and the evidence on this issue, we consider a “permitted baseline” properly understood is not applicable here. We agree with Ms Rainey that the application before us is fully discretionary in the regional planning documents. There is, from the perspective of the relevant plan, no permitted baseline. If we are wrong in that, we consider, in light of the relevant objectives and policies of the WDP, and Part 2, in our discretion we consider the baseline should not be applied.

129 We agree with the submissions by Ms Rainey that it would, in essence, be ironic if the application of the permitted baseline resulted in the Regional Council discounting adverse effects on terrestrial vegetation when the policy of the District Plan is explicitly that such effects should be considered in the consideration of applications for consent. We agree.

130 Despite that finding however, we consider the provisions of the WDP are still very relevant in informing our view of the environment. We accept Mr Chapman’s submission that this is not a static environment. It is one that is subject to change, whether that be by the implementation of consents, or the ongoing top-dressing, over sowing and grazing presently sanctioned by the WDP.

Can we consider all effects?

131 The question arises as to what effects we are able to take into account. This is a slight rephrasing of the issue as identified by Mr Chapman as to whether or not we can take into account landscape effects and effects on terrestrial ecology. To a degree, this is similar to the matters Mr Chapman raised in relation to the permitted baseline argument we have addressed.

132 Mr Chapman pursued an argument that the effects on terrestrial ecology in particular, and to a lesser degree landscape, were not matters for us. He discussed the role of the Canterbury Regional Council and compared it to the roles of territorial authorities. He referred to sections 30 and 31 of the RMA. In terms of terrestrial ecology, he essentially submitted that this was a matter for the Waitaki District Council.

- 133 We consider we are able to take effects on ecology into account. Section 104(1)(a) requires us to consider any actual and potential effects of the proposed activity on the environment. Section 104(c) enables us to consider any other relevant matter.
- 134 We consider landscape effects and effects on terrestrial ecology are effects of the proposed activity. They are not remote. They arise directly from the application to increase the existing irrigation command area.
- 135 In *Beadle v Minister of Corrections Sheppard PEJ* stated:
- “From reviewing all those cases we discern a general thread towards having regard to the consequential effects of granting resource consents, particularly if they are environmental effects for which there is no other forum, but with the limits of nexus and remoteness”<sup>4</sup>.*
- 136 Mr Chapman made it clear that indigenous biodiversity could be impacted upon by permitted activities under the WDP. Mr Chapman developed an argument that the planning framework made it clear that it was for the WDP to address these issues. We do not consider there is anything in the relevant planning framework, including the RPS, which precludes our consideration of these issues, and effects on terrestrial ecology in particular. Nor do we accept that the Supreme Court’s decision in *King Salmon* further restricts us in that regard.

#### Landscape Effects

- 137 The landscape effects were subject to considerable evidence. That has been summarised earlier in this decision and we do not repeat it here.
- 138 Our understanding of the evidence presented was assisted by all of the Landscape Architects providing helpful and comprehensive visual supplements.
- 139 The issue of landscape effects was identified and addressed in the application, including a landscape assessment provided by Mr Craig. It was also raised in a number of the submissions made, and was addressed in the s42A Report, particularly by Mr Glasson.
- 140 The topic raised legal as well as effects issues. Mr Chapman addressed landscape issues briefly in his opening. He identified an issue as to what controls on landscape were imposed by the WDP, and by the LWRP. He submitted that the properties involved did not contain ONL areas (by reference to the WDP), and commented briefly on the Regional Landscape Study. In closing, Mr Chapman gave this issue more consideration in both his oral and

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<sup>4</sup> *Beadle v Minister of Corrections*, Decision No. A74/2002 Sheppard PEJ

written reply. Mr Chapman reiterated that no part of the irrigation areas proposed were within the WDP ONL. He submitted that the identification of the area as within a regional ONL as part of the 2010 Landscape Study was of little assistance to us. He identified that it was not a 'plan' we are obliged to have regard to, although he acknowledged that it could be considered as another matter under section 104(1)(c).

- 141 Mackenzie Guardians made brief submissions identifying its concerns, but addressed the issue more fully through the evidence of Ms Lucas.
- 142 Forest and Bird submitted that the regional ONL was relevant and that, while it was not mapped as such at a district level, the activities should be assessed against the regional recognition of the area being within an ONL.
- 143 On the issue of the regional ONL and the identification of significant areas of the command area as within it, we consider this is a relevant matter for us to factor into our overall decision-making. We accept Mr Chapman's submission that no part of the proposed irrigation area is within the WDP ONL overlay. We also accept the WDP rules limiting certain activities within identified ONLs are not relevant. While not within those identified areas, and not subject to the WDP rules, we do note that some of the areas proposed for irrigation are very close to, and in some cases, adjacent to, areas identified as ONL in the WDP. These include, in particular, parts of BM1A, BM2, GB2A, GB1, TD2, LB1 and WE6.
- 144 The ONL identified in the 2010 Landscape Study Review identified, in essence, the whole of the Mackenzie Basin as an outstanding natural feature / landscape. It expressly excludes *"the more modified part of the basin floor around and south of Twizel ... as it does not display the same outstanding qualities as the remainder of the basin"*.
- 145 The area excluded, insofar as it relates to the Waitaki District, includes the margin of the Ohau River, and the area which has been subject to agricultural intensification pursuant to the existing BIC and other resource consents. In essence this is the corridor along SH8.
- 146 While we consider the terraces of the Ohau River, and in particular the areas included within TD5, TD1A and TD1B, were important from a landscape perspective, the remainder of the excluded area is reflective of our assessment of the environment. The RPS identifies the Mackenzie Basin as outstanding at a regional scale. This is recorded in Appendix 4 to Chapter 12 of the CRPS.
- 147 Overall, and taking into account Mr Chapman's submissions on the nature of the 2010 Landscape Study, we consider the identification of the areas to the west of the Ostler Fault in the 2010 Landscape Study, is helpful in informing our

decision pursuant to s104(1)(c). We have considered the Wakatipu Environmental Society and Man O'War Station Limited cases (full citation at Footnote 2). Overall we do not consider them particularly helpful for our analysis. They both relate to plan change hearings.

- 148 In our view, parts of the landscape appear to be outstanding. We do not however consider that it is appropriate, or indeed we are able, to delineate any precision what parts are or are not outstanding. We accept the sites are not recognised in the WDP as outstanding. The Rural Scenic Zone recognises landscape values. Objective 12.2.2 of the RPS also provides for the management of important landscapes.
- 149 One of the significant issues in dispute was the level of distinction or difference between the landscape units to the east and to the west of the Ostler Fault.
- 150 We understood all of the landscape architects acknowledged that there was a distinction. Mr Craig agreed that there was a distinction, but not one that was as black and white as Mr Glasson had conveyed. He noted that there were areas of irrigation to the west of the Ostler Fault, and that there were a number of areas which had been subject to pastoral improvement through top-dressing and over-sowing. He also noted the Five Rivers consent<sup>5</sup> recently granted by a consent order of the Environment Court, which enabled irrigation development west of the Fault on Lake Ohau Road.
- 151 Mr Glasson viewed this as an important distinction. He considered effects of irrigation would be significant on the land to the west of the Ostler Fault, whereas with appropriate mitigation, they would be no more than minor to the east. Ms Lucas again agreed that there was a distinction, but not perhaps to the degree adopted by Mr Glasson. In particular, she did not accept that the area to the east of the Ostler Fault was suitable for irrigation. Her view was that additional irrigation to the east of the Ostler Fault would have significant cumulative adverse effects.
- 152 While Mr Glasson's description of the landscape units to the east and to the west of the Ostler Fault was subject to some criticism by Mr Chapman, we consider that it was generally accurate. We acknowledge that there is irrigation to the west of the Ostler Fault, and we also acknowledge that there are areas of intensification apparent. The bulk of the intensification which is apparent seems to have occurred through over-sowing and top-dressing. While that does of course result in greening, we agree with Ms Lucas' opinion that it did not have the same degree of impact as irrigation from a landscape perspective. It dries off on a seasonal basis, better reflecting what occurs naturally, or with

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<sup>5</sup> Five Rivers Limited v Canterbury Regional Council ENV-2011-CHC-136

extensive pastoral farming practices. We again acknowledge the Five Rivers consent order. That informs us as to the environment and, in our view, also reflects the types of landscape conditions we would have expected to have been proffered as part of this application. It clearly identifies and protects areas of particular significance. We do of course acknowledge that that is not a full evaluative judgment from the Environment Court.

- 153 Our site visit was very helpful in our analysis of these issues. We were able to identify the characteristics which had been addressed by the experts, particularly at that stage by Mr Craig. Mr Craig in his oral evidence described the landscape as having a subliminal aesthetic and being somewhat awe-inspiring because it is very big. He noted it created a sense of human fragility, that it was a 'muscular' landscape and that it was very dynamic as a result of erosion, glaciation, and steep mountains. He also described it as a harsh environment, difficult to survive and thrive in, giving a sense of 'hanging on by the fingernails' and the aesthetic attached to that. He described it as dramatic, with strong contrast between major elements. He also described it as a 'stand-alone' landscape, different from the Canterbury Plains, and contained. We consider Mr Craig's description of the characteristics of the landscape as above was very helpful.
- 154 We do, however, have some issues with Mr Craig's position relating to the effects of the proposal and their scale. We perceived that a significant part of Mr Craig's reasoning related to the permitted baseline. He discussed this in a number of places, and the absence of controls in the WDP. He also put some focus on the lack of identification as an ONL within that Plan. It is obviously appropriate for him to have done so, but we do consider that it may have led Mr Craig to lose sight of the actual environment, and the effects on that. We also had some difficulty with Mr Craig's position that irrigation was not irrevocable and that the change to intensive pastoral farming was also revocable. In discussions on that, he confirmed his position on the basis that succession could occur in any event if not managed. Mr Craig did however acknowledge the effects would be at least enduring.
- 155 Mr Craig's view was that irrigation maintained grasslands and did not lead to a lessening of the legibility of the landscape. We do not accept that. It was apparent from our site visit that in the areas where intensification had occurred the landscape was much less legible than those where traditional pastoral farming appeared to have been in play. One could see the land form much more clearly on the dryland areas than on the intensively farmed areas. On our site visit we noted site TD1 had been cleared, significant earthworks appeared to have been undertaken and pivots were in place. The area appeared to have

been cultivated and disced. Despite identifying this in discussions with Mr Chapman, we remain unclear as to the basis that work had been undertaken, other than a somewhat oblique reference to the Waitaki District Council being aware of it. It is not our role to investigate or speculate on the lawfulness or otherwise that work. It has, however, provided us with a very clear picture of the potential landscape effects. On that site and the other sites immediately adjacent to the Ohau River, we consider the effects are significantly adverse.

156 We also consider that Mr Craig may have underplayed the importance of seasonality and seasonal variation as a landscape characteristic.

157 In terms of pivots, Mr Craig clearly had a concern with those from a landscape perspective, but noted that they are transparent. They do however, in his opinion, intrude and affect view quality but they do not obscure it. We agree with that assessment.

158 We also did not accept Mr Craig's view that the adverse effects were largely visual. In our view, the landscape effects clearly go well beyond visual. Mr Craig acknowledged that.

159 In terms of Mr Glasson's evidence, we largely accept his evidence on the landscape characteristics and values. Mr Glasson was subjected to some considerable criticism from Mr Chapman as to his evidence regarding his description of the area west of the Ostler Fault. However, as previously noted, we are comfortable that Mr Glasson's description is, at least to a large degree, accurate.

160 Ms Lucas provided some very useful evidence, and her visual aids and oral discussion were particularly helpful. We largely agree with the evidence of Ms Lucas regarding the areas to the west of the Ostler Fault and the effects of the proposal in that landscape unit. We do not, however, agree with her assessment of the areas to the east. In our view, the level of irrigation which has occurred has transformed that part of the landscape to one which is clearly reflective of intensive pastoral use. We consider that the proposed additional irrigation areas to the east of the Ostler Fault will be, in essence, an extension and infilling of the existing irrigation, and do not consider that the cumulative effects are such that further development should not be enabled on landscape grounds alone.

161 Overall, we consider the landscape effects of the proposal to the west of the Oster fault are significant. To the east, we consider the landscape has already changed to such a degree that the further intensification proposed would have only minor adverse effects.



- 162 Our findings in terms of landscape are not of course a veto on the grant of consent. They are factors we will consider below in our overall judgment.

#### Terrestrial Ecology Effects

- 163 The applicant's Tonkin and Taylor Report prepared by Dr Ussher concluded that seven of the 39 proposed sites supported indigenous vegetation and habitats of indigenous fauna that quality as 'Significant Ecological Areas' under the WDP or the RPS (sites GB1, BM1a, TD1a, Gb2a, BM6, GB6 and LB3). The 39 individual sites that comprise the scheme were surveyed on 24 April 2014, and between 19 May and 22 May 2014. The survey involved traversing the sites by vehicle and on foot by a botanist and fauna ecologist. Sites GB5 and GB2b were not surveyed. The report concluded that the seven sites contained three nationally rare plant species, specialised invertebrate species, habitat for threatened bird species, habitat for indigenous skinks and geckos, and land environment types that are nationally threatened or at risk. The sites of highest conservation values were considered to be BM1a, GB2a and GB1. The report noted that there are a variety of management options available to protect, restore or otherwise ameliorate threats on land of a similar type to improve ecological values and generate biodiversity gains that could be used to offset unavoidable losses within the application areas.
- 164 Dr Ussher's evidence summarised the significant ecological values and noted that even the sites with the greatest ecological values represented incomplete indigenous communities that face ongoing threats from land use, weed and pests. He stated that sites that had received no irrigation, over-sowing or regular fertilising supported the greatest biodiversity values. He outlined the adverse impacts of cultivation practices and the ongoing ecological changes to sites since the survey was completed. He told us that his re-analysis of the sites in 2016 identified that only five of the seven sites identified in the 2014 survey would trigger one or more of the ecological significance criteria (GB1, GB2a, BM4a, BM1a and BM6).
- 165 Dr Ussher identified that none of the proposed irrigation sites were within areas recommended or set aside for protection of biodiversity through QE II Trust covenants, or were listed in DOC's Conservation Management Strategy or through the national Protected Natural Areas Programme's (PNA) Recommended Areas for Protection (RAP).
- 166 Dr Ussher outlined amendments to sites BM6, BM7e and TD1b to avoid effects on kettle holes, wetlands, streams and slope scrubland, and fencing of Sutherland Creek, Barclay's wetland and Ben Omar Swamp as 'primary

mitigation'; and wilding conifer control on Glenbrook Station over 400 ha of moraine terrain as 'associated mitigation'.

- 167 In response to questions, Dr Ussher considered that the loss of 1250 ha of ecologically significant values had not been offset and that this loss would be a significant adverse effect.
- 168 Dr Espie concluded that the development would not result in loss of indigenous terrestrial biodiversity or conservation values in the Mackenzie region, noting particularly the amount of other land throughout the wider Mackenzie Basin which was protected.
- 169 Dr Grove, for CRC, disagreed with the applicant's assessment of ecological significance for 18 of the proposed sites and questioned the application of the RPS ecological significance criteria. He considered the loss of significant vegetation and the habitat of indigenous fauna would be closer to 2640 ha. He also considered it was likely there would be indirect impact on aquatic ecology. He stated the mitigation proposed was inadequate and would not address the direct significant adverse effects on terrestrial ecology. He considered the ecological survey was inadequate given the scale of the proposal and the significance of the ecological values present. He noted that the protection of rare and threatened species was a 'national priority for protection' and that the RPS requires no net loss of indigenous biodiversity as a result of land use. He considered the application was directly contrary to this as it would result in a substantial net loss. In his view this was a very significant adverse effect.
- 170 Dr Grove noted that the applicant had not sought to avoid significant areas and that the mitigation proposed was not sufficient. He disagreed with Dr Espie that the deterioration of fescue tussock was as a direct consequence of hieracium infestation, and considered burning, over grazing by stock and rabbits, and soil degradation explained the loss of tussock and increase in hieracium.
- 171 Mr Head, for DOC, emphasised the national significance of the Mackenzie Basin and naturally rare, glacial-derived ecosystems that are not replicated to any similar extent elsewhere in New Zealand. He noted the substantial loss that has occurred as a result of agricultural development in the Mackenzie Basin and that only the Tekapo and Pukaki Ecological Districts (ED) retain extensive sequences of undeveloped naturally rare ecosystems, but that these too are threatened by land use activities. He noted that the protection of these rare ecosystems was a 'national priority' and that at least 81 plant species classified as at risk or threatened had been recorded on the Basin floor habitat.
- 172 Mr Head stated the applicant's ecological survey was inadequate in extent, timing and methodology, and considered it was highly likely rare and threatened

plants were missed in some of the sites. He stated that given the lack of robust survey, it should be assumed that the 18 sites identified by Dr Grove are ecologically significant and that the total loss would be closer to 2640 ha. He considered that this scale of ecological loss was a major adverse effect.

- 173 Mr Head noted that the applicant had further understated the impacts by not considering the extent of loss that has already occurred in the Omarama ED, and that this was the appropriate context in which to assess the loss. He provided Map 3 and Map 4 of the three Ecological Districts of the Mackenzie Basin in 2000 and 2016 showing the extent of land use development over this period. Table 2 of his evidence indicated that over this period 37 percent of rare moraine ecosystem vegetation and 47 percent of rare alluvial outwash gravels ecosystem vegetation had been lost in the Omarama ED.
- 174 Mr Head, Dr Grove, Dr Ussher all agreed that there would be total loss of at least 1250 ha of significant ecological areas indigenous habitat. They also agreed that impacts of irrigation on dryland ecosystems and indigenous biodiversity would result in the total loss of ecological values and that the loss would be irrevocable.
- 175 Mr Head agreed with Dr Grove's opinion that there could be another 18 sites, totalling up to 2640 ha of significant indigenous vegetation and/or habitat of indigenous fauna that would be lost as a result of the proposed irrigation.
- 176 We agree with the comments of Dr Grove and Mr Head regarding the adequacy of the ecological survey and consider the survey lacked rigour and robust methodology and that it was undertaken at a time of year when small cryptic plant species would be missed. In our view, the scale of the proposal and the potential significance of the ecological values in the application area warrant a comprehensive and robust survey of each site.
- 177 While we accept the strong evidence of the ongoing loss of biodiversity to 'normal' farming practices, this does not in our view reduce the need for the applicant to establish a comprehensive baseline survey to enable sufficient assessment. In this regard, we agree with Dr Grove and Mr Head that we must consider the worst-case scenario of the potential loss of 2600 ha of ecologically significant vegetation and/or indigenous habitat.
- 178 However, we conclude that regardless of whether it is the loss of 1250 ha or 2600 ha, the loss of such significant ecological values would be a major adverse effect and represents a substantial proportion of the remaining undeveloped basin floor in the Omarama ED.

- 179 Dr Espie stated "*it is highly probable the decrease in fescue tussock was directly due to competition from Hieracium...*". While that is not a matter that we need to determine, we note that this it is not consistent with what has been observed in the Tekapo Scientific Reserve, as stated by Mr Head, where hieracium has not been an impediment to re-colonisation by fescue tussock and associated native herbs, grasses and sub-shrubs, given sensitive management.
- 180 We acknowledge that most of the experts agree that terrestrial invertebrate values are greatest where land has been least modified by farming practices or supports relatively intact botanical richness. The Twizel – Omarama corridor is noted as an area of high invertebrate conservation value – however that was noted at a time when short tussock grassland cover dominated in this area (1990s) and arose principally from work undertaken on invertebrate-tussock grassland associations in the Spring Creek Reserve area alongside SH8 in the 1980s and early 1990s.
- 181 In the last 25 years, most of the surrounding areas to the east of the Ostler Fault have been converted to improved pasture or have been managed in ways that have significantly decreased native plant cover and plant species richness. The remaining areas that contain indigenous biodiversity values cannot, in our view, sustain any further conversion to improved pasture, without these values being irreversible lost. We consider the WDP rule trigger of more than 30 percent indigenous vegetation coverage is highly problematic given the evidence of Mr Head that there would be very few areas on outwash that would naturally meet that threshold, and note it is not halting the rapid loss of biodiversity in the Omarama ED.
- 182 We agree with Mr Head that further irrigation poses a serious threat to dryland ecosystems and associated indigenous biodiversity by eliminating the component ecological attributes and indigenous species that define a dryland ecosystem, which are almost completely displaced by relative monoculture of exotic pasture grasses/herbs. We agree that bare ground, stony and/or depleted areas are an inherent characteristic of the Mackenzie Basin's alluvial and moraine ecosystems and that they provide important habitats for a distinctive suite of indigenous plant and invertebrate species including many rare and threatened species.
- 183 We agree with Mr Head's statements that, the smaller areas are less important than the larger contiguous areas identified with significant ecological value. We explored this with the applicant in terms of proffering an offset to enable some level of expansion within the existing BIC irrigation areas, but this was not acceptable to the applicant. We therefore agree with Dr Ussher, Dr Grove and

Mr Head that no mitigation or offset has been proffered to avoid or compensate for the direct and total loss of at least 1250 ha of significant ecological values.

- 184 We do not agree with Dr Ussher's assertion that the overall effects on birds from the conversion of typically dry outwash plains or dry moraine slope scrublands and grasslands, as are found within the proposed irrigation areas, are likely to be either a negligible loss of habitat or a gain in habitat. While we accept the more threatened birds that are in vicinity of the proposed irrigation areas (for example, black stilt, pied stilt, terns, and black-billed gull) may benefit from the increased feeding ground offered by irrigated land and/or to large open spaces for roosting, conversion of gravel outwash surfaces is likely to reduce breeding sites for species such as banded dotterel and pipit.
- 185 We agree with Mr Head that the appropriate context for assessing the loss is the Omarama ED and that the majority of protected land or land recommended for protection highlighted by Dr Espie, represents basin floor alluvial outwash and moraine ecosystems in the Tekapo and Pukaki EDs, and are almost entirely within the Mackenzie District. We note that very few areas representing basin floor outwash and moraine ecosystems are protected in the Omarama ED, which is almost entirely within the Waitaki District.
- 186 Overall, we agree with Mr Head that the Omarama ED has undergone widespread and largely 'unmitigated' loss of indigenous biodiversity over the last 15 years, including the almost complete conversion of the "Twizel-Omarama Grassland" which the WDP identified as having nationally significant ecological values, before it was converted to irrigated pasture. We note that a considerable portion of this occurred on Glenbrook Station.
- 187 We do not accept that the mitigation proffered by the applicant and outlined by Mr Ussher represents anything more than good farming practice. It does not mitigate the direct loss of terrestrial ecological values. We agree with Mr Farrell that it is not clear how the proposed wilding conifer removal and control reduces the direct adverse effects of the proposal. In his opinion, the removal and control of pest plants is merely part of good farm management practice and benefits productivity.
- 188 We agree with Mr Farrell that apart from some small reductions in irrigation area, the applicant relies on preparation of a Biodiversity Management Plan (BMP) to remedy, mitigate and compensate adverse effects on significant ecological values. However, we note the objective of the proposed BMP focuses on remedying, mitigating and compensating effects. There is no intent to avoid adverse effects on significant ecological values within the BMP regime. We agree with Mr Farrell that the proposed BMP does not actually identify how

or to what extent any actual adverse effects may be remedied, mitigated, or otherwise compensated.

- 189 Overall, we conclude that the proposal will result in the loss of a very large area of significant indigenous vegetation and significant habitats of fauna. That loss is, in our view, a significant adverse effect. In reaching that conclusion, we note Mr Chapman's submission that this is not an application for vegetation clearance. We accept that submission. However, the evidence of all of the ecologists, other than Dr Espie, was that this proposal would result in the total loss of a large area of ecologically significant indigenous biodiversity. While the activity for which consent is sought may not trigger the definition of vegetation clearance in the WDC, there appears to be no dispute between the majority of the ecological experts that the irrigation and farming practises proposed would cause that loss. Our view on this issue is also informed by the evidence in response to questioning of some of the farming witnesses as to what steps they would take to implement the increased irrigation.

#### Water Quality and Aquatic Ecology Effects

- 190 Water quantity, water quality and habitat quality are interrelated components of fresh water ecosystems which combine to support ecological values in surface waterways and waterbodies. The application does not seek to take any further water and therefore our assessment focuses on water quality and habitat quality. We accept that groundwater is a critical component of the upper Waitaki catchment and that is connected to surface water flows and water bodies in the application area. Our assessment of water quality effects includes both groundwater and surface effects, as one interconnected system. Our assessment of aquatic ecology effects includes impacts on water quality and aquatic habitat degradation/loss.

#### *Water Quality*

- 191 The applicant's case is that nutrient loss from the proposed irrigation expansion will be less than the existing baseline BIC irrigation scheme under the conditions of the existing water permit. The applicant proposes to use the same amount of water to irrigate nearly twice as much land by using water more efficiently and scheduling irrigation to reduce drainage and nutrient loss. This would be achieved by use of soil moisture monitoring, water usage metering and spray irrigation. Scheme wide nutrient losses would be mitigated by fencing waterways, and establishing riparian buffers zones and riparian planting. The basis for demonstrating this premise was supported by the use of OVERSEER® modelling to predict the nutrient outputs of the baseline

irrigation scenario for each property and comparing these to the proposed irrigation scenario for each property.

- 192 Appended to the application was an 'OVERSEER® Modelling Report' by Ms Phillips dated March 2015 (Annexure A). Table 1 of the report indicated a total existing BIC irrigation area of 3989 ha, total existing individual consented irrigation areas of 458 ha, and a proposed total increase of BIC irrigated area of 3998 ha (pg. 2). The report summarised existing and proposed nutrient losses for each farm, except Little Ben and The Glens due to no increase in existing irrigation area.
- 193 The applicant's section 92 response (dated 16 December 2015) stated that the proposed irrigation area had been reduced for a number of reasons relating to ONL areas and nutrient outputs. It stated that nutrient outputs were reduced to the Ahuriri catchment by removing 250 ha of proposed irrigation area from Benmore and 81.5 ha from Willowburn Station, defining pivot placement, reducing stocking rate on Buscot Station, and removing several fertiliser applications at The Glens to align its existing operation with good practice standards.
- 194 The applicant's further section 92 response (dated 9 June 2016) provided a revised OVERSEER® Modelling report by Irricon dated June 2016, supported by the individual property OVERSEER® files conducted under version 6.2.2. The revised report addressed a number of matters raised by CRC in relation to the modelling. The further information response also included a report by Mr Heller in relation to groundwater effects. Mr Heller outlined the water quality parameters within the individual catchments and a sensitivity analysis for both N and P loss assessments. Tables 1-7 of his report showed the sub-catchment nutrient distribution predicted by OVERSEER® between the current baseline and the proposed scenario, predicted N and P concentrations in receiving waters from the changes, and predicted nutrient concentrations within the three nutrient allocation zones.
- 195 Mr Heller provided a written statement of evidence in relation to groundwater and surface water hydrology, and water quality. He highlighted the revised modelling results and considered that, on balance, there is an overall significant improvement to N concentrations in each catchment, with a small increase in P loads to the Haldon Arm catchment (Willowburn Stream and in the Upper Wairepo and Lower Wairepo Streams). However, he considered that with riparian management and farm/scheme environmental planning (through the implementation of a SEMP and individual FEMP) the predicted P increases were unlikely to eventuate and were unlikely to be measurable. He considered

there were no existing increasing P concentration trends in the Willow Burn and the Upper and Lower Wairepo Stream.

- 196 Mr Heller disagreed that there was insufficient groundwater information to assess the nutrient impact of the proposal and that the audited OVERSEER® modelling had informed nutrient losses in consideration of appropriate mass-balances between irrigation activity, groundwater and surface water bodies, and potential water quality changes. He highlighted the sensitivity analysis of hydraulic conductivity inputs for the mass balance equations undertaken for each groundwater capture zone, the resulting differences in nitrate concentrations, and noted that no groundwater nitrate concentration were predicted to exceed 50% of the NZ Drinking Water Standard (NZDWS). He noted that overall there would be a reduction in N and P loads to the Ahuriri Arm, and a reduction in N loads to the Haldon Arm, with small increases in P loads. He noted that a component of the reduction in nutrient losses occurs from efficiencies associated with spray irrigation, and not assessing a base-case from border dyke irrigation as the existing consent allows.
- 197 Mr Heller responded to matters raised in the s42A Report noting he had audited the groundwater modelling previously undertaken by GHD, and that while it contained some errors, it was sufficiently representative. He stated that the groundwater contours, direction of flow, and flow boundaries were very similar to the SKM *'Waitaki Catchment Groundwater Information Report'* (2004), which he told us he was the author of. He considered he had improved on the existing reports and that the applicant's groundwater zones coincided with the groundwater catchment zoning undertaken to inform the LWRP. He stated that slightly different interpretations of groundwater movement were inconsequential to the applicant's assessment of groundwater effects. He considered aquifer testing was not necessary given the relative outcomes for nutrient concentrations were not sensitive to groundwater parameters such as hydraulic conductivity, which was demonstrated by the sensitivity analysis undertaken. He drew our attention to a CRC report titled *'Predicting consequences of future scenarios in the Waitaki catchment: upper Waitaki groundwater quality'* (2015) and noted it concluded similar water quality outcomes with use of a 'solutions package'. He stated there was clear supporting information which reinforce the applicant's data, methodology and conservatively predicted outcomes for groundwater quality.
- 198 Mr Heller concluded that the OVERSEER® results indicated that no water bodies would be affected by the proposal by more than a minor basis and that there was likely to be a measurable improvement in N concentrations. He noted there was no additional irrigation proposed within the groundwater capture zone



associated with Kelland Pond. He reiterated that the P load increase were small and that P concentrations in the existing receiving environment gives confidence this would have a minor effect. He said that Ms Hayward's inference that increased irrigation must increase nutrient loss had not been quantified nor supported by factual information. In response to questions, Mr Heller told us it would take 2-5 years to see any measurable improvement in N concentrations in the receiving waters due to the lag time to see full effect. He considered that 'at worst' there would be no change in water quality and 'at best' there would be an improvement.

- 199 We were provided with a document titled 'Caucusing Statement of OVERSEER® Experts' from a caucusing meeting held on 28 September 2016, which was signed by Ms Phillips, Mr Elwood and Mr Mojsilovic. The statement helpfully set out areas of agreement and the remaining areas of disagreement between the experts. It noted that the predicted nitrogen loss modelling relies on OVERSEER® being accurate in light of no property level data and assumed water use efficiency. It stated the modelling shows existing systems have low water use efficiency and proposed systems will have improved levels of efficiency, and that if this is not actually the case for both the existing or proposed scenario the nitrogen reductions predicted will not be realised.
- 200 The statement went on to outline outstanding specific concerns in relation to modelled N loss for Twizel Dairy baseline scenario, an 'implausible' N loss in July for the Glenbrook proposed scenario, and the relative productivity of pastoral block on Willowburn (compared to other farms) and any impact on the baseline figure.
- 201 The statement outlined the following agreement between the experts:
- (a) The N headroom created in OVERSEER® under the proposed scenario was from changes in irrigation management (which reduce irrigation application volumes and soil drainage);
  - (b) There is no information on levels and range of efficiency across the scheme (i.e. all farms are assumed to be equivalent) or how much water is applied and when;
  - (c) OVERSEER® is not suitable for determining seasonal irrigation requirements;
  - (d) That double shifting K-line to meet efficiency requirements is not practical; and
  - (e) The modelling showed increases in P loss.

- 202 The statement outlined the following remaining points of disagreement between the experts:
- (a) The ability of water users to achieve the high level of efficiency modelled on the ground with existing infrastructure;
  - (b) Scheme wide concern with the practical implications of the OVERSEER® inputs and that the modelled reductions in drainage can actually be realised and monitored; and
  - (c) The modelled reduction in irrigation volumes will introduce plant stress, insufficient pasture production, and will lead to increased irrigation use from that modelled, which will prevent the realisation of the modelled reductions in drainage and therefore N leaching.
- 203 In opening submissions, Mr Chapman noted that there was little in the way of monitoring conditions on the existing BIC consent and that the applicant undertook voluntary monitoring throughout the command area and in the adjacent waterways. He told us the existing consent had been fully implemented and that to date supply had be to the farm gate, with each farmer responsible for internal reticulation and irrigation method. He noted that this line of responsibility would change with the proposal, with BIC being responsible for nutrient management, scheme management and compliance auditing. He highlighted that the existing BIC scheme was factored into the GHD study that led to the imposition of the TLI in the Haldon and Ahuriri Arms of Lake Benmore. He told us the driver for the application was to meet CRC's water efficiency targets and irrigate more land, which is no different to other irrigation schemes around Canterbury.
- 204 Ms Phillips's statement of evidence summarised the findings of the OVERSEER® modelling and the comparison of the proposed land use to the baseline land use. She provided an updated pg.4 of Appendix 1 of her statement of evidence reflecting the revised modelling results. She noted the results indicated a reduction in N loss across the red and sensitive lake zone and a small increase in the orange zone; and P increases in the orange and sensitive lake zone and a small reduction in the red zone. She stated that the primary cause of the reduction was the commitment by the applicant to move to GMP in irrigation management with the introduction of soil moisture monitoring to schedule spray irrigation. She outlined the audit process of the OVERSEER® files, validation of information, and different versions of OVERSEER®. She highlighted that the model only predicts nutrient losses beyond the farm boundary in the case of P and past the plant root zone for N losses, and not what reaches the receiving environment. She outlined the

allocation of blocks to different nutrients zones for Benmore and Glenbrook, which span more than one nutrient allocation zone, to ensure ongoing comparisons between the baseline and proposed nutrient losses. She clarified that 1334 ha of new irrigation had been applied for on Benmore, how the fodder crop split had been allocated at Benmore, and that the total farm area on Twizel Dairies had been allocated to the Haldon Arm Orange Zone because any land in the Sensitive Lake Zone on Twizel Dairy had been added to the existing dairy farm. She also addressed concerns raised regarding Twizel Dairy baseline nutrient budget, Willowburn's productivity relative to other farms, and use of default settings instead of GMP proxies for soil moisture monitoring. She noted that beef stock were modelled as not having access to streams, as all permanently flowing waterways within intensive irrigated areas would be fenced off.

- 205 Following the adjournment of the hearing, we were provided with an email (dated 15 November) from the applicant forwarding a response from the OVERSEER® helpdesk to the concerns raised regarding the high N conversion efficiency rates in the first years of blocks changed from pasture to cropping.
- 206 The most common concern raised by submitters was the potential adverse effects of the discharge of nutrients on water quality and subsequent adverse effects on ecological values. Submitters were concerned that the application would result in additional nutrient losses to the Sensitive Lakes Zone and the nutrient allocation Ahuriri Arm Red Zone. Concerns were raised regarding increased nutrient runoff related to adverse effects on TLI for water quality in the receiving waters, the life sustaining capacity of freshwater ecosystems, hydroelectricity generation, the recreational sports fishery, recreational values and tourism values. Some submitters requested that in the event the consents were granted, that the applicant be required to reduce nutrient inputs first if any TLI are triggered.
- 207 One submitter suggested imposing a moratorium on any further irrigation until existing nutrient runoff is managed and waterways are not polluted. Another requested the existing irrigation area be halved, given much of the irrigation area is considered to be at risk.
- 208 Nga Rūnanga considered that tangata whenua values and interests in freshwater were not supported by the application.
- 209 DOC raised concerns that ongoing water quality impacts and stream disturbance would have increased adverse effects on threatened aquatic species.

- 210 The s42A Report highlighted the state of the existing water quality in the potentially affected catchments (as demonstrated in the recent CRC technical reports) and considered that the proposed discharge of nutrients to land had the potential to adversely affect water quality by increasing the load of nutrients discharge and increasing nutrient runoff. The report noted that the potential effects of the application must be considered at both a wider catchment level and a localised level on surface water bodies. In terms of the wider catchment and the groundwater resource, the report stated the primary concern to be nitrogen enrichment from collective loss within the BIC irrigation area.
- 211 Mr Mojsilovic outlined a number of issues which may compromise the accuracy of the modelling, including a number of assumptions. He urged caution in the predicted decrease in N loss rates given a key factor was the use of soil moisture monitoring in the irrigation management input data and a reduction in water use of an average of approximately 20 percent across the scheme. He noted there was no assessment of how plausible or practicable the model default values were to the proposed scheme; and that a reduction in water use could cause a greater nutrient concentration in the drainage from irrigated land in fully developed catchments, such as Kelland Pond. He urged caution in interpreting the modelled results given the number of assumptions and lack of assessment of whether these changes are feasible, which inserts significant risk. He noted that (with the exception of Little Ben) N reductions had been achieved by retaining a higher soil mineral N content, and not by adjusting N inputs or production. This increases the soil N pool and N concentrations in drainage (by about 10 percent under flat to rolling irrigated land). He also noted that for both the proposed and baseline scenarios stock (cattle) are assumed to be excluded on both the dryland and irrigated areas, but that this was not proposed by the applicant.
- 212 Mr Mojsilovic's review of the OVERSEER® modelling also included P losses and the vulnerability of young sandy and stony soils to leaching due to their ability to retain P. He highlighted the regional vulnerability ranking developed by Webb et al. (2015), and the identification of highly vulnerable areas of Wairepo Creek, Sutherlands Creek, Willow Burn and the Ohau moraines (between Lake Ohau and Table Hill) which were susceptible to leaching and losses through preferential flow paths.
- 213 Mr Mojsilovic noted additional information improved the characterisation of nutrient losses and implicit assumptions, but remained of the view the proposed change in irrigation management was hypothetical and should be independently verified via a separate line of evidence or through a risk assessment. He considered the scale of modelled mitigation exposed both

Council and applicant to significant risk. He re-iterated concern with Twizel Dairy runoff baseline estimate, Glenbrook's high nitrogen conversion efficiencies, and the allocation of crop blocks to the nutrient allocation zones on Benmore.

- 214 Mr Mojsilovic emphasised that the applicant would need to achieve a very high level of water use efficiency over the entire scheme (not just new infrastructure) to achieve the modelled nutrient reductions and that the proposed conditions were inconsistent with the modelled inputs. He considered there was a high level of risk that the modelled mitigation would be only partially achieved. He noted this was dependent on modelled water use improvement across the existing infrastructure and that this efficiency would be constrained by the design and that this had not been assessed.
- 215 Ms Hayward highlighted the large number of uncertainties and assumptions with OVERSEER® in determining effects and quantifying risks, and the need to consider other lines of evidence as well, such as examining the current water quality impacts and studies on water quality and the impacts of expansion. She referred to the study by Gray (2015) that demonstrates adverse effects of the existing BIC irrigation scheme on water quality and regional evidence of increasing nutrient enrichment in groundwater and surface waterways when land use intensification or increased irrigation occurs. She noted that technologies and methods to reduce nutrient losses and maintain productivity are new and are yet to be proven. She stated that the application is highly dependent on these mitigation strategies, and that there is considerable risk to that the predicted nutrient losses will not be achieved given the already stressed and degraded state of the surface waterways adjacent to irrigation areas.
- 216 Ms Hayward disagreed with Mr Heller's nutrient concentration trend analysis based on 'eyeballing' time series data for linear trends. She provided results of an appropriate analysis of statistically significant trends that indicated increasing nitrate nitrogen concentrations in Willowburn and Spring Creek, and a significant decrease in dissolved reactive phosphorous concentration in Willowburn at Quail Burn Road. She agreed with Mr Heller that there is an increasing trend in nitrate concentrations in Kelland Pond and low levels of phosphorous, and that this indicated it was receiving groundwater from a specific capture zone. She agreed that based on CRC's water quality data, Lake Benmore Ahuriri Arm, Lake Benmore Haldon Arm, Lake Benmore at the dam, and Kelland Pond all currently meet the TLI outcome in LWRP and PC5. However, recent data for the Willowburn, Sutherlands Creek and Wairepo Creek indicates that nitrogen limits proposed in PC5 for streams in the Upper Waitaki Zone are not currently met; and that the Upper Wairepo and Wairepo

Arm inlet do not meet the limits proposed in PC5. She noted the applicant's assessments did not include assessment of the risks of contamination with microbial pathogens or inputs of fine sediments, which are important contaminants.

- 217 Overall, Ms Hayward had a low level of confidence in the reliance on the applicant's predictions of reduced instream nutrient concentrations. She noted that N loads are predicted to decrease in all sub-catchments, except in the upper Wairepo where a significant 4-10 percent increase in N concentrations is predicted; and that P losses were predicted to increase in all sub-catchments by 5-14 percent, except in the Sutherland Creek catchment where a 59 percent decrease is predicted. She considered these predicted P increases were not insignificant and could promote growth of nuisance periphyton and macrophyte growth. She noted that P increases would also inevitably increase P load to the Wairepo Arm. She considered elevated organic N and total P in the Upper Wairepo Creek was probably from unrestricted stock access.
- 218 Ms Hayward highlighted the potential adverse effects of other farming activities, such as stock activity in and around waterways potentially damaging habitat and banks, sediment and faecal deposition, riparian plant damage, and waterways modifications. She noted that all these adverse effects are already occurring at some sites with the existing BIC irrigation area. There is no information how the risks identified in the applicant's aquatic ecological report will be managed such as, the identification and management of critical source areas, exclusion of stock from waterways (and provision of drinking water), sufficient widths of riparian buffers, appropriate riparian planting, weed and sediment management, or the design of irrigation infrastructure to avoid waterway modifications. Based on her analysis and the findings of CRC Technical Report R15/57 by Dr Gray (2015), she did not accept that the proposed expansion would not result in the continued deterioration of Willowburn and other waterways within the BIC irrigation areas.
- 219 In her supplementary evidence, Ms Hayward stated her support in the use of OVERSEER® as a tool for modelling nutrient losses at the farm scale and at the catchment scale, but remained doubtful that the mitigation modelled was achievable under the applicant's recommended conditions. She highlighted statistical trends of increasing nitrate concentrations in the Willowburn, Upper Wairepo Stream, Spring Creek and Sutherlands Creek ranging from 5-22 percent per annum over the last 10-11 years, and agreed with Mr Heller that there was no apparent trend for P concentrations. She considered the adaptive management conditions were 'a rather coarse instrument' for managing effects and the risks of irrigation expansion, and highlighted the considerable annual

variation of the trophic state of Lake Benmore and the time lag of effects from nutrient changes. In response to questions, she highlighted that Lake Benmore was the ultimate receiving environment, but that some of the localised streams were ecologically significant. She agreed that section 17 and expectations around PC5 would drive changes and improvements to address existing adverse effects such as disturbance and nutrient loss, regardless of the application.

220 Mr Zarour considered there was insufficient information to accurately determine the effects of the proposal on groundwater in terms of nutrient loads, possible modification to the water table configuration and possible changes to groundwater – surface water relationships. He highlighted uncertainty in the delineation of the groundwater zones. He noted concern regarding the uncertainty associated with groundwater zone delineation, flow direction, and the determination and assessment of groundwater flow rates. He considered that because there were basic errors in the applicant's groundwater data, sparse data, and the fact the GHD contours are modelled, there was a low level of confidence in the applicant's drawn groundwater level contours. He noted Figure 5 of the section 92 response was not clear and that unsuccessful selection of cross section locations would result in erroneous errors. He considered different contour maps could be drawn on the same sparse data and that it was critical as to what went where. He highlighted Mr Heller's use of groundwater 'capture zones' based in Figure 5 and considered the use of topography for a relatively dry area was flawed given the natural water table is relatively flat. He noted that the groundwater report did not address the potential for changes in the water table configuration, and groundwater flow and direction rates, which could influence the groundwater-surface water interaction. He concluded that the applicant had not provided the data necessary to adequately assess the actual or potential groundwater effects with any degree of confidence.

221 Mr Zarour's supplementary evidence noted that the increase in irrigation area by 90% represented a significant change in land use and therefore required a rigorous assessment of effects. He highlighted inconsistencies in the application and reports, and between the nutrient allocation zones defined in PC5 and the applicant's 'arbitrary' groundwater capture zones.

222 In response to questions, Mr Zarour noted there was very little groundwater information and that the available data could be used to draw different groundwater contour maps. He stated it was critical to know what is going where and that uncertainty in the receiving environment results in the mass balances being uncertain. He told us he needed to see calculations for the

cross sections, additional piezometers, a map clarifying links, data from surface water gauging used and an assessment of potential mounding effects. He considered that aquifer testing was desirable to have more certainty regarding aquifer flow through and aquifer parameters. He urged us to look at the potential environmental outcome to determine the level of certainty that is acceptable.

- 223 Mr Woodlock's supplementary s42A Report reiterated Mr Mojsilovic's conclusion that there is no data validating the modelled effect of the proposed change in irrigation scheduling and the resultant large scale reductions predicted in nutrient losses. He considered the further information provided against the LWRP requirements and PC5, and concluded that he was unable to determine whether the increase in total nitrogen loss to water in the Haldon Arm Orange Nutrient Allocation Zone would be within the limits set because of PC5 amendments to the zone boundaries. He noted the updated modelled total nitrogen loss for the Ahuriri Arm Red Zone and the Sensitive Lake Zone was predicted to be less than the baseline loss, but remained unconvinced that the mitigation modelled could be feasibly and practically achieved. Mr Woodlock maintained his view that there was insufficient evidence to show the adverse effects could be avoided, remedied or mitigated to an acceptable level and therefore the consents should be refused.
- 224 In response to questions, Mr Woodlock stated that while there would be some benefit to the existing BIC irrigation area being under adaptive management conditions, this could be achieved by reviewing the consent and would be required by 2020 anyway. He considered there was merit in a staged approach (such as meeting modelled requirements before expansion), but that this would need monitoring and checks in place. He considered the conditions, as proposed, did not address this.
- 225 In closing submissions, Mr Chapman submitted that we must disregard any notion that OVERSEER® is uncertain as a modelling tool and accept that the proposed nutrient discharges are within the limits of PC5 to the LWRP. He stated that a comprehensive suite of conditions had been proposed and were able to be complied with. He particularly noted water metering conditions and agreement on soil moisture content from 95% to 90% with Meridian, in line with the OVERSEER® modelling. He also submitted that there was agreement between BIC and Meridian that the OVERSEER® input file to be attached to the consent was the proposed scenario, with an amendment for the 1.6 kg/ha/annum of N in the Haldon Arm Orange Zone. He outlined that Kelland Pond had been removed from the adaptive management conditions, with the agreement of Meridian and in line with the evidence of Mr Heller that there was



no increase in irrigation in the groundwater capture zone of the Pond and groundwater influence.

- 226 We note there was unanimous agreement by the parties that OVERSEER® is the appropriate tool under the statutory requirements to assess nutrient losses and to predict water quality effects. We accept OVERSEER® is the appropriate tool and that the methodology used by the applicant to assess groundwater effects used simple mass balances with OVERSEER® modelling of water use and nutrient losses to the existing groundwater resource to assess any change in water quality. We agree it is appropriate to use OVERSEER® information and outputs to inform catchment nutrient loss predictions.
- 227 While there is some remaining disagreement regarding the modelling results for Twizel Dairy, Glenbrook and Willowburn, it is generally accepted that the results are indicative of the reductions in nutrient losses that can be achieved by implementing GMP, achieving a high level of irrigation efficiency, and scheduling irrigation to minimise drainage (runoff). We accept that soil type and the water holding capacity of soils are important factors in consideration of actual leaching rates under certain land uses, and that lighter soils generally have less water holding capacity. On farm practices, such as stock management, cropping regimes, the location of winter feed, stock type and level of intensity of the farming operations also contribute to leaching rates.
- 228 The N leaching losses predicted by OVERSEER® are directly related the number and volume of drainage events. A key factor is using soil moisture monitoring to schedule irrigation and significant improvements in water use efficiency to reduce drainage and consequently nutrient leaching. The existing irrigation practice modelled relies on small depths of irrigation applied frequently and stopping irrigation when the soil water storage is close to full (i.e. small deficits). This irrigation scheduling practice leaves very little buffer if rain events occur. The proposed irrigation practice would be to delay irrigation until a greater soil moisture deficit builds up and to restrict the level to which the soil is filled up by individual applications. The proposed practice relies on large amounts of irrigation less frequently and consequently a greater buffer against potential rainfall events (i.e. large deficit). If the proposed irrigation does not occur to the default values modelled, the N losses predicted will not be realised by the proposal. This is a significant risk given the sensitivity of the receiving environment to increased N concentrations. We agree with Ms Hayward that there is a moderate risk of unacceptable effects to the Ahuriri Arm, if the proposal cannot constrain nutrient losses to current levels (baseline).
- 229 We note that the applicant's final set of recommended conditions state that irrigation will not occur if the soil moisture content exceeds 90% of the profile

available water (PAW) and that this is not consistent with the deficit irrigation modelled where irrigation was applied when soil moisture dipped below approximately 60% (varying 50%-71% dependent on soil). The result of this would potentially be more drainage and consequently higher nutrient loss than predicted by the modelling. The proposed condition could result in the irrigation scheduling to maintain the soil moisture levels at 90% full, which would mean there would be very little buffer from rainfall and potentially more drainage than modelled under deficit irrigation. We agree with Mr Mojsilovic that there is no way of monitoring drainage levels, except by monitoring water quality impacts, and consider that the conditions as proposed would potentially allow higher nutrient losses than predicted.

- 230 We note that the final conditions proposed include a condition requiring all existing irrigation infrastructure is tested to ensure compliance with the inputs of the proposed scenario modelled and a distribution uniformity of 80% or greater. The applicant's intention being that only new irrigation infrastructure would be designed and certified in accordance with 'Code of Practice for the Design of Irrigation Systems in New Zealand, October 2012' and 'Design Standards for Irrigation Systems in New Zealand, October 2012', and tested initially and on an ongoing basis every five years. We consider these design standards would need to be achieved for the existing infrastructure before any new irrigation could occur. We consider the proposed conditions would not ensure that all of the irrigation infrastructure could achieve the required standard to achieve the modelled baseline scenario.
- 231 A key question is whether the proposed change to irrigation management are plausible and practical across the wider scheme. The applicant has not proffered any information on how the proposed irrigation system would be implemented or the time this would take. Despite discussions during the hearing regarding staging the irrigation efficiency of the existing infrastructure before expanding irrigation, the applicant has not proffered any conditions to give effect to such an approach. In this regard, we agree with Mr Mojsilovic that any expansion would need to be explicitly dependent on a demonstrable achievement of irrigation efficiencies over the existing irrigation system. We consider this is critical given it is the increased efficiency of the existing scheme that creates the nutrient head room to allow the expansion. In our view this would need to be demonstrated in reality, in order to validate the modelling inputs, before any expansion could occur.
- 232 We agree with Mr Mojsilovic that the modelled outcome in water use during the irrigation season needs to be demonstrated in real time across the scheme. There is a high level of uncertainty with the modelled outcomes related to

whether a 20 percent reduction in water use and a larger deficit of soil moisture is achievable scheme wide.

- 233 It is accepted that P losses generally occur 'overland' or as runoff to surface waterbodies, as it generally binds to soils preventing vertical drainage loss. We note that the modelling assumes direct routing of P loads to surface water and that it is therefore relatively conservative. There is agreement that the modelling indicates significant increases in P loads in the Haldon Arm catchment and may result in small increases occurring in the localised receiving waters through overland flow and could be associated with high groundwater levels. We note predicted P increases of 2 percent in the Willowburn, 11 percent % in lower Wairepo Stream and 20 percent in the Upper Wairepo Stream. We agree with Ms Hayward that these are significant increases and that no specific mitigation to address P load increases has been proffered by the applicant. In fact, there was no identification of critical source areas or sensitive areas to be protected, or any explicit commitment to establishing sufficiently wide riparian buffers or planting. We do not accept that such critical mitigation should be addressed under the SEMP or FEMP, or that amendments such as removing kettle holes from within the irrigation areas are sufficient.
- 234 We note there is agreement that there is no statistically significant trend of increasing P concentrations in surface water, but we are conscious that this may reflect sampling effort and the fact that contamination may occur in pulses associated with rain events.
- 235 We agree with Ms Hayward that the study by Gray (2015) clearly shows the existing cumulative impact of N losses on the Willowburn catchment along the length of the stream, and elevated N concentrations in the lower Wairepo and Spring Creek, and Sutherlands swamp. Water quality in Kelland Pond has clearly deteriorated from increased nutrient inputs and raises a 'red flag' for ongoing impacts in the Wairepo Arm. This is strong evidence of increasing nutrient enrichment in groundwater and surface water directly associated with existing land use intensification and irrigation. We consider this is extremely concerning given the 2-5 year lag time.
- 236 We agree with Ms Hayward that we would need to see evidence of catchment wide nutrient reductions before further irrigation expansion and note that her concerns regarding surface water quality are not based on modelling, but are primarily based on existing, measurable adverse effects of land intensification and irrigation.
- 237 We disagree with Mr Heller that local catchment water quality information does not suggest generic deterioration of water quality with irrigation development

and accept the evidence of Ms Hayward that there are statistically significant trends of increasing nitrate-nitrogen concentrations in surface waterways within the existing BIC irrigation areas. We note that the last five years of surface water monitoring indicates winter 'peaks' of total N are evident in the Willowburn Stream.

- 238 The application spans two groundwater sub-catchments that flow to the receiving waters of Lake Benmore through either the Haldon Arm or the Ahuriri Arm. We were told that the Wairepo Stream effectively at the Lake Ohau Road forms the dividing line between the two sub-catchments, with south of the road flowing to the Ahuriri Arm and north of the road flowing to the Haldon Arm.
- 239 Delineation of the modelled groundwater zones is necessary to determine predicted nutrient losses into the nutrient zones of the LWRP. It is critical given the Ahuriri Arm has no capacity for any further nutrient inputs. The application stated that there would be no increase in nutrient load proposed to the Ahuriri Arm. We do not accept this given the predicted increases in P concentrations.
- 240 We accept Mr Heller has utilised the best available information for characterisation of the existing groundwater system and that he has built on this with surface water gaugings and his own expertise and knowledge. However, given the lack of aquifer testing (due to lack of groundwater bores), limited surface flow data, and complexities of the delineation of the receiving environments, we agree with Mr Zarour that it is not clear exactly what nutrients will go where. Overall, we consider the groundwater system is not well defined or accurately quantified, and the interaction between groundwater and surface water flows is not well understood. This increases the risk that the proposal will increase nutrient loads to the Ahuriri Arm. However, we acknowledge that regardless of the delineation of the applicant's 'groundwater capture zones' any nutrient losses will ultimately be into Lake Benmore.
- 241 Overall, we consider there is a moderate to high risk that the reductions in N losses predicted by the modelling will be only partially achieved and that there is a high level of certainty that P loads will increase. In our view this creates a high potential risk of further degradation of localised water quality, which will ultimately have cumulative impact on water quality in Lake Benmore. We consider this is a significant potential adverse effect.

#### *Aquatic Ecology*

- 242 The applicant's Golder Report assessed the effects on the aquatic ecology of the proposed irrigation extension area, not including any changes to water quality and its effect on aquatic ecosystems. There was a high level of

agreement between the parties regarding the aquatic ecological values present within the application areas.

- 243 The Golder Report stated that current stock access to streams is leading to bank erosion, instream habitat degradation and a reduction in shade plants; and that fine sediment inputs are reducing habitat quality and increasing the potential for algal proliferation. It noted that any increase in stock activity will further degrade the streams throughout the irrigation area. The report stated the application had the potential to increase surface water flows (depending on application rates and subsequent transpiration and evaporation) and potential beneficial effects of more permanent flows in Sutherlands Creek and lower Temple Creek. It noted that increased flows, coupled with stock exclusion, would improve instream habitat. The report stated that the extent of flow changes in Spring Creek, Barclays Creek and Wairepo Streams was likely to be limited, as more efficient irrigation would not be expected to change habitat to a significant degree.
- 244 The Golder Report stated that although there was no proposal to modify any watercourses, such works could impact on instream habitat availability and habitat quality.
- 245 The Golder Report summary stated that the extension of the irrigated areas would increase stock activity in the riparian areas and in the streams themselves, further degrading the instream habitat for invertebrates and fish. To effectively mitigate this, the report recommended fencing watercourses and planting riparian buffer zones; creation of a secure, trout free upstream reach of the Willowburn for the Bignose galaxias; and riparian fencing and instream habitat manipulation to increase the abundance of low velocity habitats.
- 246 Dr Allibone's evidence focussed on the five fish species captured during the survey and macroinvertebrate surveys undertaken, noting that the Willowburn was the most degraded, and Spring Creek and Barclays Creek were relatively good quality habitat. He noted that riparian zones on perennial waterways were generally unfenced, with stock access and bank damage evident. He also noted a number of artificial waterways and modified waterways, which had little ecological value with homogenous channels and poor quality habitat. He recommended minimum riparian zone widths of two metres for streams less than two metres wide and 10 metres wide for larger streams, and riparian planting with local native plants. He noted that relatively little was known about the biology of the Bignose galaxias, but that it had been recorded spawning in springs within the irrigation area. He considered any loss of springs in Willowburn and Temple Creek should be avoided and that provision of a small

constant flow at the spring heads during dry periods would benefit threatened fish species.

- 247 In his closing submissions, Mr Chapman noted that BIC had offered a condition to ensure stock are excluded from waterways that are surrounded by intensified farming/irrigated land. He stated it was not practicable or necessary to fence waterways in the extensively grazed hill country. He also addressed riparian planting, urging us to be clear on its purpose and suggesting that existing plants could be left to flourish without stock access.
- 248 Mr Nelson on behalf of DOC stated that fish were susceptible to short term 'pulses' of nutrients and changes in invertebrate communities. He considered the recording of Bignose galaxias in the Wairepo Stream and Temple Creek for the first time probably reflected limited surveys within the BIC irrigation areas and trout numbers. He noted long-fin eel were relatively scarce within the BIC irrigation area and that this probably reflected barriers to migration from the existing dams.
- 249 Mr Nelson highlighted the degraded state of the waterways within the BIC irrigation area (Willowburn, Wairepo Creek and Sutherland Creek) from existing land use and the confirmation of this in the Golder Report. He disagreed that a two metre wide riparian zone was sufficient to provide adequate protection and noted that a minimum of five metres of vegetation provided a 50% removal of N and P loads, with trees providing for higher reductions than grasses. He stated the existing fenced waterways only provided for 1-2 metres width and riparian vegetation consisted of were either one row of native planting or just grass. He noted management of these riparian areas included chemical spraying of weeds and that the efficacy of removal of N and P must be minimal. Overall, he considered the application would exacerbate existing habitat degradation by increasing sediment inputs and potentially increasing weed growth.
- 250 The s42A Report noted that CRC 2014 technical report recorded Koaro present in the lower Wairepo Creek and Quail Burn; and Bignose galaxias in the Ahuriri River, Sutherlands Creek and Willowburn. Ms Hayward highlighted that the applicant's assessments were based on a single survey of ten sites in autumn 2015 and that the periphyton and macrophyte assessment had not assessed the waterways against relevant national guidelines, or objectives of the LWRP or PC5, despite being identified as a key issue of irrigation development. She noted the applicant's assessment were generally consistent with Gray (2015) and that sites on the Willowburn and lower Wairepo Stream are showing signs of nutrient enrichment and sedimentation.

- 251 The applicant's assessment of aquatic ecology effects concluded that the presence of threatened fish species and macroinvertebrate communities indicative of high quality habitat support a conclusion that some of the streams have significant ecological values. We agree that Spring Creek, Temple Creek and Willowburn provide significant habitat for threatened native fish, particularly for Bignose galaxias. The imposition of consent conditions could provide for the protection and enhancement of these significant habitats by preventing disturbance and further modification, fencing and riparian planting, and potentially flow augmentation. However, we do not consider the applicant has adequately identified these sensitive areas, and details on the extent and quality of riparian planting were not provided. The state of the existing waterways suggests that leaving these details to the SEMP or FEMPs will not avoid or mitigate adverse effects on significant aquatic ecological values within the wider BIC irrigation area.
- 252 There is agreement that the watercourses within the existing BIC irrigation area are currently being adversely affected by disturbance from stock access, channel modification, flow changes and poor water quality. We note that the CRC reports and the applicant's assessments concur that the Wairepo Creek, Sutherland Creek and Quail Burn are classified as 'at risk' from flow changes, sedimentation and nutrient leaching. It is agreed that Willowburn is classified as 'impacted'. It is clear that these impacts have increased significantly since 2004. Our site visit reinforced this view.
- 253 We note that concerns regarding stock disturbance, waterway modifications and nutrient leaching were raised by various submitters during the original consent application in 1998 and that the applicant considered these effects would be avoided and mitigated by fencing and riparian plantings. Arguments were made that the irrigation development would enable habitat enhancement and would benefit aquatic ecology. This was not guaranteed by way of consent conditions and has clearly not been the case. Waterways within the existing BIC irrigation area remain largely unfenced, limited riparian planting appears to be grossly inadequate in terms of both extent and quality, and disturbance and modification of waterways has occurred with little regard for ecological values. In short, since the original consent was granted most of the waterways within the BIC irrigation area have been significantly degraded. The evidence before us suggests this degradation has accelerated since 2004.
- 254 Given this consent would supersede the existing consent, it is appropriate that the applicant is required to remedy existing adverse effects of disturbance from stock, channel modification and flow. This was not proffered.

- 255 We consider the exclusion of stock from waterways with fencing and the establishment of riparian buffer zones is critical to remedying, avoiding and mitigating adverse effects on aquatic ecology. In particular, the width of riparian zones and the type of vegetation planted is critical to reducing adverse impacts on aquatic values by reducing disturbance, preventing bank damage, reducing inputs of sediment and nutrients, and enhancing habitat.
- 256 We agree with Mr Nelson that existing riparian zones are inadequate in both extent and quality. We consider riparian planting needs to be designed according to the particular location, and plantings established and maintained to achieve good vegetative coverage and density to reduce land use impacts.
- 257 On basis of applicant's assessment and the Reporting Officer's analysis, we consider there will be little benefit of increased flows to surface water from the efficient irrigation of land. To minimise nutrient losses, drainage and runoff must be minimised. We conclude there is unlikely to be any improvement in habitat availability and habitat quality from increased surface water flows if the proposed application rates are complied with and irrigation of more land is to be achieved with the same volume of water.
- 258 We agree with Ms Hayward that there are no explicit mitigation strategies to address concerns raised regarding increased stock activity or modification of waterways, and no upfront design of infrastructure to avoid impacts on waterways. We also agree that increased P loads are likely to increase macrophyte growth, which would further degrade aquatic habitat quality.
- 259 Examples of waterway modification, such as what we saw on our site visit to The Glens, showed little regard for aquatic ecological values, with straight channelisation, sparse riparian vegetation, narrow riparian buffers and poor habitat condition.
- 260 Dr Allibone suggested the adverse effects of stream modification could be mitigated by providing heterogenous channels that provide for pool, riffle and run habitat, together with variation in stream width and stable flows. While we note stream modification was is not proposed by the applicant, we were told that significant funds are being committed by CRC and landowners to improve habitat quality in the Willowburn.
- 261 Overall, on the basis of the evidence, we find that the application is likely to have significant localised adverse effects on aquatic ecology values within the wider BIC irrigation area, and in particular on Spring Creek, Barclay Creek and Willowburn

#### Cultural Effects



- 262 Overall the evidence presented identified that the Waitaki Awa and catchment is holistically important to Kai Tahu Whānui. Starting at Aoraki the entire catchment of the Waitaki and its tributaries, from the mountains to the sea are of cultural significance to Ngāi Tahu Whānui (Ngāi Tahu, Kati Mamoe and Waitaha).
- 263 The catchment draining to Lake Benmore and the Ohau Lake and River are, on the evidence, a significant component of the tangata whenua indigenous landscape.
- 264 We understand the customary or whakapapa link is consolidated through traditions, place names, waiata, whakapapa and a strong history of mahinga kai gathering (seasonal food gathering). Kai Tahu Whānui maintain the responsibilities of Kaitiakitaka for this area as passed on by the Tiaki who came before. Reference was made by Mr Higgins to the occupation of Te Ao Mārama (Omarama) by the Waitaha Tohuka Te Maiharoa and his followers in protest of the Crown asserting ownership of the high country
- 265 The evidence of Mr Higgins was that the link to this area is through the whakapapa recited and that the right through whakapapa has never been extinguished.
- 266 We understand from the evidence that the proposed increase in the command area of the Benmore Irrigation Scheme affects the takiwā of three Papatipu Rūnaka, namely Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki. Te Rūnanga o Waihao and Te Rūnanga o Moeraki being submitters to this application.
- 267 The Iwi authority of Te Rūnanga o Ngāi Tahu does not hold manawhenua status, but provide support to Ngāi Tahu Whānui in matters of policy and advocacy where requested or a tribal interest is in contention. Kai Tahu ki Otago represented both Iwi and Papatipu Runaka, effectively the Nga Rūnanga position in relation to this activity.
- 268 Mr Higgins' evidence was that the Crown, through the Ngāi Tahu Claims Settlement Act 1998 recognised the significance of the Ngāi Tahu association with the Waitaki catchment (inclusive of the Mackenzie Basin) by provision of Statutory Acknowledgements that transcend the catchment.
- 269 Mr Higgins' evidence was that the Statutory Acknowledgements are an acknowledgement by the Crown of the particular cultural association that Kāi Tahu Whānui holds for specific areas and ensures that Te Rūnanga o Ngāi Tahu is informed when a proposal may affect one of these areas. The Statutory Acknowledgements in the Upper Waitaki and Te Manahuna are Aoraki (Mount

Cook), Hakataramea River, Lake Ōhau, Lake Pūkaki, Lake Tekapo, Mahi Tikumu (Lake Aviemore), Te Ao Mārama (Lake Benmore), Waitaki River and Whakarukumoana (Lake MacGregor).

270 Ms Waaka-Home in her written evidence discussed the importance of the Waitaki tuna fishery and noted that it is recorded in the Statutory Acknowledgements for both Te Ao Mārama (Lake Benmore) and Lake Ohau. The Statutory Acknowledgement for Te Ao Mārama (Lake Benmore) states:

*"An important and productive fishery exists in the lake, with the Haldon and Ahuriri arms once rich in long finned eels, although in more recent times the fishery has been depleted."*

271 Mr Higgins discussed the concept of Mauri as being from the Mountains to the Sea and within this landscape "Ka Roimata o Aoraki".

272 There was no dispute that Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki hold manawhenua status and are the respective kaitiaki for area the BIC Command area occupies.

#### *Mahinga Kai*

273 The evidence of Mr Higgins was that for Kāi Tahu, mahika kai is the basis of culture, and he explained the unrelenting cultural imperative is to ensure that they as kaitiaki keep the mahika kai intact. In addition, it was the basis of Kāi Tahu's economy both historically, and to a degree today. Further that the cultural and economic benefit from mahika kai resources are limited predominately by the hydroelectric generation activities of the Waitaki River Catchment.

274 Mr Higgins explained that over many generations Kāi Tahu Whānui developed food gathering patterns based on the seasons and lifecycles of various birds, animals and plants. The Waitaki and Te Manahuna were a fundamental component of these systematic seasonal food gathering patterns. A particular example is that during the months from May to August, specific Kāi Tahu families travelled to the Upper Waitaki catchment to harvest tuna, weka and other resources.

275 The evidence of Ms Waaka-Home was of the importance that eel played in this catchment for manawhenua. She stated, tuna, more so than any other mahika kai, played a vital role in their traditional, social and economic relationships. Tuna provided her Tīpuna with the rich dietary sustenance required to move around the island. Her Tīpuna harvested different types of tuna at specific points along the Waitaki and Ahuriri Rivers on their inland hikoi.

- 276 It was acknowledged by the witnesses that the loss of natural eel passage had been created by the dams. The evidence was, however, that this did not negate the cumulative loss of habitat that is caused by the modification of waterways and increase of nutrients adjacent to riparian zones. The evidence was that the catchments within the BIC Command area remain important for Manawhenua's mahika kai aspirations.
- 277 Ms Waaka-Home discussed a number of steps that had been undertaken towards restoration of the tuna fishery in the Ahuriri Delta. Her evidence was that, to ensure manawhenua can be given effect to, the next significant measure is to reseed the tributaries of the Ahuriri River with eel elver (juveniles), many of which will eventually make their way to the Delta. She considered there had been no assurances that SEMP will be able to respond to breaches of TLI to ensure that water quality can be maintained, allowing for manawhenua to have confidence of their ability to manage or harvest mahika kai from these catchments into the future.
- 278 The evidence was that manawhenua have undertaken mahika kai enhancement, for example between November 2008 and March 2009, with 75 kg of eel elver, both long-fin and short-finned eel, were released into the Omarama, Quailburn, Henburn and Willowburn Steams, which are kōhanga (nurseries) for tuna.
- 279 Ms Waaka-Home's evidence was that approximately 16,000 eel elver are released into the Ahuriri River catchment annually, as the means to maintain the species in this location, and identified the potential for this to be detrimentally affected by the increase in nutrients that may follow the intensification of irrigation.

#### *Kaitiakitanga*

- 280 The evidence of Mr Higgins was that from a Kāi Tahu perspective the entire landscape of the Waitaki Valley is dotted with archaeological sites. These places did not function in isolation from one another, but were part of the wider cultural setting that included not only sites defined by the presence of archaeological remains, but all manner of highly valued places that were named by the earliest inhabitants of the area. Many culturally significant sites and landscapes were lost as a result of the mid and upper Waitaki hydro-electric developments.
- 281 Kai Tahu Whānui established the Waitaki Native Fish Committee, which initially had two key functions. Firstly, to install a new fish pass system at Waitaki to trap eel elvers for relocation in the upper catchment and secondly to implement a programme to trap breeding migrants and move them to the lower river to

enable their whaka heke. A research component was also added to the downstream trap and transfer programme. As part of this mahi, regular hīkoi have been undertaken to monitor the success of fish passage initiatives.

282 Ms Waaka-Home addressed the impacts of intensive farming and the concerns that degraded water quality in the Waitaki will destroy the aspirations to restore tuna there. She noted that while tuna may be able to survive and grow, harvesting them would be out of the question. She noted that from past experience tuna living in nutrient-rich habitats become unfit for harvesting because they smell and taste like tutae (effluent).

283 Ms Waaka-Home's evidence was that for the last 140 years they had been shut out of the Waitaki catchment, all of the reserves are now land locked, de-watered or in private ownership and access to a lot of these reserves is at the discretion of the farmer. Not all farmers are amicable to iwi crossing their farms.

#### *Kaitiaki Aspirations*

284 The evidence of Mr Higgins was that it is the responsibility of this generation to continue the work of its Tīpuna to ensure that the cultural and historical association that Kāi Tahu Whānui holds for the Upper Waitaki and Te Manahuna are protected and preserved for future generations – mō tātou, ā, mō kā uri ā muri ake nei (for us and our children after us).

285 Ms Waaka-Home outlined that the aspiration of Arowhenua for the Waitaki is to continue to preserve and grow the relationship with the ancestral river – Ko Waitaki te awa – and to enhance the use of the catchment, including its many rivers, lakes and wetlands. Engagement and interaction is central to realising this aspiration, and more importantly, continuing the generation and use of mātauraka while sharing it with their moko and whānau katoa.

286 She went on to state that they had undertaken many measures to restore the Ahuriri Delta for mahika kai, including the closure of the area to commercial eeling. Initially, they worked with the commercial eelers to implement a voluntary closure of commercial eeling in the Ahuriri Arm of Lake Benmore. Unfortunately, this approach proved to be unsuccessful. In 2004, they successfully applied to the Minister of Fisheries to stop commercial eeling in the Ahuriri Arm of Lake Benmore.

287 Mr Vial on behalf of Nga Rūnanga (Te Rūnanga o Waihao & Te Rūnanga o Moeraki) outlined that Kāi Tahu is not opposed to the development or intensification of land uses for farming or other purposes. Kāi Tahu whānau are farmers themselves, and appreciate the need for healthy economies to support

people and communities both in Otago and across the takiwā. However, for Kāi Tahu it is not a choice between a healthy economy and healthy waterways.

- 288 The Kai Tahu position was that both outcomes must be provided for to achieve sustainable management. Given our findings on water quality and aquatic ecology in particular, we do not consider that the mitigation proposed adequately deals with the potential adverse effects of the activity on cultural values.

#### *Conclusion*

- 289 Overall, we accept that the proposal does not provide sufficient evidence that manawhenua values will be preserved. The impacts on cultural values are another factor to be considered in our overall judgment.

#### Positive Effects

- 290 The application stated that a significant proportion of the proposed irrigation areas, and particularly those on the west side of SH8, are subject to ongoing threats from two major introduced species, namely wilding conifers and hieracium (Hawkweed). It noted that left unchecked, the landscape and ecological reports indicate further degradation of habitat for native species, particularly on Benmore Station and Glenbrook Station. It stated that the proposal would eliminate wilding pines within the irrigation areas and provide a springboard for further property wide wilding pine control. The section 92 response stated that the irrigated areas would '*...form a physical barrier to the incremental spread of wilding pines*' (pg.3).
- 291 The application stated that irrigation would assist with soil retention and minimise soil erosion, concentrate livestock management to irrigation blocks, and reduce grazing pressure on hill blocks.
- 292 Mr Chapman submitted that, but for the influence of farming, many values of the Omarama Basin would have been irretrievably lost. He highlighted the rates of change occurring from wilding conifers and other pests, and the existence of identifiable values because of responsible grazing regimes. He noted that the proposal would allow farmers to manage their properties on a more sustainable basis by enabling lighter grazing.
- 293 Mr Chapman also submitted that there would be substantial benefit from applying adaptive management conditions to the 4000 ha irrigated under the exiting BIC consent and achieving consistency with other Upper Waitaki consents that require nutrient reductions if TLI triggers are exceeded. He noted this would bring them into line to pay for lake water quality testing and the consequences of those tests. He considered the proposed conditions would

result in moving from a relatively uncontrolled irrigation regime to one with significant management and water quality controls. Although, he noted the proposed adaptive management conditions were not entirely consistent due to the difference in starting points, as the BIC baseline is based on best practice (including soil moisture monitoring and efficiency requirements) and the NDA has been set on known likely practice.

- 294 Mr Chapman noted that the applicant had proposed additional objectives to be included within the SEMP to include the management of high country blocks and the control and reduction of wilding pest species to give more certainty to the benefits to unirrigated hill country.
- 295 Mr Chapman highlighted the predicted improvements in water quality in the sensitive water catchments.
- 296 The evidence of Dr Espie supported the applicant's position that the proposal would reduce ecosystem degradation by increasing vegetative cover and reducing soil loss from wind erosion.
- 297 The submitters in support of the application highlighted benefits for sustainable water use, soil sustainability, habitat for birds, tourism, and pest control.
- 298 We accept the proposal may have positive effects on soil erosion, particularly given the soils are relatively light and fragile. We also accept that irrigation creates a sterile zone for pest plants. However, as discussed above, establishment of exotic pasture and crops also results in the total loss of indigenous vegetation, which we accept is irrevocable. This was the position of all ecologists, other than Dr Espie.
- 299 We accept that traditional extensive farming has assisted in the retention of a number of values of the Omarama Basin. However, it appears that a number of current farming practises such as cultivation, direct drilling, over-sowing, top-dressing and intensive grazing are significantly contributing to the ongoing and accelerating biodiversity loss in the Omarama Basin. Our site visit illustrated this, as did Dr Ussher's evidence in relation to the reduction in the sites of ecological significance as a result of land use practices between the time of the original reports and his preparation of evidence.
- 300 Protection of the dryland hill areas was put forward as a positive effect, as was the enabling of pest control on unirrigated land. We consider that the consent conditions, as proposed by the applicant, do not provide any certainty that the proposal would actually result in lighter grazing on the dryland hill areas or that sufficient pest control would be undertaken on unirrigated land. Therefore, in

our view we cannot give these purported positive effects much weight in our overall consideration of the proposal.

- 301 We accept there would be some benefit in imposing adaptive management conditions on the existing irrigated areas. However, given the current adverse effects on water quality and aquatic ecology values demonstrated in recent CRC technical reports, we consider this could be achieved through other mechanisms, such as consent review and plan change provisions. In our view, statements made in the original application regarding protection of water quality and aquatic ecology values have clearly not eventuated. To allow more irrigation as a potential means of remediation and mitigation of these existing adverse effects is in our view untenable.
- 302 We accept the proposal will have positive economic effects for the BIC shareholders and their employees.

#### **Relevant Statutory Provisions**

- 303 The planning framework applicable to this application is somewhat complex. It is, to a degree, dynamic. The objectives and policies were addressed by a number of witnesses and an assessment of the proposal against the policy framework in existence at that time was included in the application.
- 304 To a large degree, as would be expected, the various planning witnesses identified similar objectives and policies. There were however a number of differences on issues of relevance and weight, particularly in terms of PC5.
- 305 We were assisted by the provision of a comprehensive assessment by the Reporting Officer, Mr Woodlock. We consider the relevant statutory documents are:
- National Policy Statement for Freshwater Management 2014 (NPSFM);
  - National Policy Statement Renewable Energy Generation (NPSREG);
  - Ahuriri Water Conservation Order;
  - Canterbury Regional Policy Statement (CRPS);
  - Waitaki Water Allocation Regional Plan (WWARP);
  - Land and Water Regional Plan (LWRP);
  - PC5 to the LWRP;
  - Waitaki District Plan (WDP).

306 We confirm that we have also considered all of those documents and the provisions of the Canterbury Water Management Strategy (CWMS).

National Policy Statement for Fresh Water Management 2014 (NPSFM)

307 Mr Woodlock identified that the LWRP was developed to give effect to the 2011 NPS. He noted Policies A4 and B7 of the NPSFW (2014) had been inserted into the LWRP pursuant to section 55. He also noted that the NPSFM had not been subject to the first schedule process.

308 Mr Woodlock identified, properly in our view, Objectives A1 and A2 and their associated policies as being of particular relevance.

309 Objective A1 provides:

*“To safeguard:*

- (a) the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water; and*
- (b) the health of people and communities, at least as affected by secondary contact with fresh water; and sustainably managing the use and development of land, and of discharges of contaminants.”*

310 Objective A2 provides:

*“The overall quality of fresh water within a region is maintained or improved while:*

- (a) protecting the significant values of outstanding fresh water bodies;*
- (b) protecting the significant values of wetlands;*
- (c) improving the quality of fresh water and water bodies that have been degraded by human activities to the point of being over-allocated.”*

311 Policy A4 provides:

*“(1) When considering any application for a discharge the consent authority must have regard to the following matters:*

- (a) the extent to which the discharge would avoid contamination that will have an adverse effect on the life-supporting capacity of fresh water including any ecosystem associated with fresh water; and*
- (b) the extent to which it is feasible and dependable that any more than minor adverse effect on the fresh water, and on any ecosystem associated with fresh water, resulting from the discharge would be avoided.”*

312 In terms of water quantity, Policy B7 provides:



“(1) When considering any application the Consent Authority must have regard to the following matters:

(a) the extent to which the change would adversely affect safeguarding the life-supporting capacity of fresh water and of any associated ecosystem; and

(b) the extent to which it is feasible and dependable that any adverse effect on the life-supporting capacity of fresh water and of any associated ecosystem resulting from change would be avoided.”

313 The policy applies to any new activity, and to any change in the character, intensity or scale of any established activity.

314 Mr Woodlock was not comfortable that the proposal, in its current form, would be consistent with the relevant objectives identified above, largely due to what he described as a significant uncertainty regarding the effects of the proposal on water quality.

315 Mr Ensor did not address those objectives and policies, but focused his comments on Objective B3 of the NPSFM, which is “to improve and maximise the efficient allocation and efficient use of water”. His evidence was that at the highest level the NPSFM seeks to improve and maximise both the efficient allocation and use of water.

316 Mr Farrell, for the Director-General of Conservation, addressed the NPSFM in more detail. He noted Objective C1 and Policy C1, which he considered provided very clear direction to improve integrated management of fresh water and the use and development of land and whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment.

317 He noted Objective A1(a) required the safeguarding of the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water. He also noted Objective A2(b) required the protection of significant values of wetlands. His view was that the evidence suggested the proposal presented a considerable risk to ecosystem processes and indigenous species (both terrestrial and aquatic). He considered the proposal may not accord with those objectives. He also identified Policy A3, noting that Policy A3 can only be given effect by consideration of the provisions in PC5, which had established in accordance with Freshwater Management Units Process (FMU) Directive provisions and for that reason PC5 was relevant. Mr Farrell also identified Policy A4 of the NPSFM.

- 318 We agree the provisions of the NPSFM 2014 noted above are relevant to our consideration. Whether they are infringed or not is largely determined by our findings on effects.

Canterbury Regional Policy Statement (RPS)

- 319 The RPS was given some considerable analysis by the planning experts involved. Mr Woodlock identified Objective 7.2.1 of Chapter 7 and expressed his view that that the objective provided clear guidance that water may only be used for activities that improve economic and social wellbeing, if the life-supporting capacity of fresh water ecosystem processes, and natural character values of wetlands, lakes and rivers and their margins are protected, and requirements for community and stock water supplies and customary uses were provided for. Mr Woodlock also identified Objective 7.2.3 and its implementing policies and again expressed concern that the proposal in its current form may be inconsistent due to the uncertainty regarding effects on water quality. Mr Woodlock also addressed Chapter 9 – Ecosystems and Indigenous Biodiversity, noting that the relevant objectives and policies had been discussed in his assessment on effects on aquatic ecology and terrestrial ecology. His view was that the proposal was inconsistent with Objectives 9.2.1 and/or 9.2.3, given the advice of Dr Grove that the proposal would likely result in areas of significant indigenous vegetation and habitats of indigenous fauna being removed. He considered that it was inconsistent with those objectives.
- 320 Mr Woodlock also identified Chapter 12 landscape and the relevant objectives of that chapter.
- 321 Mr Ensor also identified Objectives 9.2.1 and 9.2.3, together with Policy 9.3.1 which identified how significance will be assessed through policy. He noted Policy 9.3.1(3), which states:
- “Areas identified as significant will be protected to ensure no net loss of indigenous biodiversity or indigenous biodiversity values as a result of land use activities”.*
- His opinion was that the policy did not require the protection of indigenous biodiversity or indigenous biodiversity values from other activities such as discharges. Mr Ensor’s reference to the RPS consisted largely of his expression of his view that the RPS did not intend for terrestrial vegetation and biodiversity issues to be addressed through the regional consenting process, or the regional plans.
- 322 Mr Farrell addressed the RPS in a little more detail. He considered the various objectives and policies in Chapter 5 (land and infrastructure); Chapter 7 (fresh water); Chapter 9 (indigenous biodiversity); and Chapter 10 (beds of lakes and

rivers including their riparian zones) were particularly relevant. He helpfully provided a list of the relevant RPS provisions. His opinion was that the RPS provided strong direction to enable rural land use and development, provided it was maintained in an integrated and co-ordinated way with, among other things, effects on significant ecological values to be avoided to the extent that there should be no net loss of significant biodiversity values.

- 323 Mr Farrell referred to Objective 5.2.1(2), including Policies 5.3.11 and 5.3.12. He noted they provide for rural land uses, including irrigation infrastructure among other things, provided that development and activities do not contribute to significant cumulative adverse effects on water quality and quantity or degrade Canterbury's important natural and physical resources affected by the development. Mr Farrell addressed Objective 7.2.1, Objective 7.2.2, Objective 7.2.3, Objective 7.2.4 and implementing policies. Again, his view was they generally sought to enable development provided the health of fresh water ecosystems is maintained or enhanced. He also considered Policy 7.3.12 was relevant in that it directed a precautionary approach to be taken in circumstances where the effects of activities were unknown or uncertain.
- 324 He considered the objectives and policies in Chapter 9 were particularly relevant, including Objective 9.2.1, Objective 9.2.2, Objective 9.2.3 and the corresponding policies. He noted that these provisions seek to halt the decline in quality and quantity of Canterbury's ecosystems and indigenous biodiversity by identifying and protecting significant biodiversity and values. He also noted Objective 10.2.1 and its corresponding policies.
- 325 Mr Vial also identified the RPS and set out in an appendix the relevant objectives and policies. He considered they provided for kaitiakitanga, mahika kai and the intrinsic values of fresh water systems. He noted specifically Objectives 7.2.1, 7.2.3 and 7.2.4 and the corresponding policies. He also identified Chapter 2 by reference to provisions addressing fresh water, ecosystems and indigenous biodiversity, including loss of indigenous biodiversity and habitat as a result of inappropriate land-use, development and water resources management, and the impact on Kāi Tahu culture, heritage and identity, particularly with regard to mahika kai. Overall, he considered the application was not consistent with these provisions.

National Policy Statement for Renewable Electricity Generation (NPSREG)

- 326 Mr Woodlock identified the NPSREG and its relevance, given the water in the Waitaki catchment flows through a total of eight hydro power stations.
- 327 Mr Woodlock focused on the potential for decline in water quality to impact on generation by increasing algal growth, rather than on any issue relating to the

efficiency of increasing the irrigated area as opposed to the efficiency of the unused water remaining in the water body and therefore available for generation.

- 328 Given the position taken by Meridian in withdrawing its evidence, we do not consider the NPSREG is of particular assistance in our decision-making process and we do not discuss it further.

Waitaki Catchment Water Allocation Regional Plan (WCWARP)

- 329 The WCWARP is, as its title makes clear, a water allocation plan. The WCWARP addresses issues that arise within the Waitaki catchment. The plan defines the Waitaki catchment by reference to the Waitaki Act as:

- (a) the area of land bounded by the watersheds draining into the Waitaki River; and
- (b) includes aquifers wholly or partially within the area of land.

- 330 The WCWARP records that “*other matters*” should be addressed through the relevant statutory planning instruments of the Regional and District Councils. It specifically records that it addresses identified matters to the extent necessary to provide for water allocation but does not make comprehensive provision for them. The listed matters include landscape, water quality, wetland management, afforestation, soil and bank erosion and a number of other matters.

- 331 Objective 3 of the WCWARP is particularly relevant. That provides:

*“In allocating water, to recognise beneficial and adverse effects on the environment and both the national and local costs and benefits (environmental, social, cultural and economic).”*

Land and Water Regional Plan (LWRP)

- 332 Mr Woodlock addressed this in some detail. He discussed objectives and policies of particular relevance to adverse effects in various sections. He also addressed Objective 3.2, which provides that water management applies the ethic of *ki uta ki tai* – from the mountains to the sea – and the integrated approach to natural resources recognises the connectivity between surface water and groundwater, and between fresh water, land and the coast. He identified Objective 3.7 which provides:

*“Fresh water is managed prudently as a shared resource with many in stream and out of stream values”.*

He also noted Objective 3.11, which provides:

*“Water is recognised as an enabler of the economic and social wellbeing of the region”*

and identified Policy 4.36 which provides:

*“Sustainable farming practices are promoted in all areas by:*

- (a) enabling very small farming operations or farms with minimal nutrient discharges to be undertaken without requiring the record-keeping of model entry and loss;*
- (b) recognising that there may be limited increases in the loss of nutrients in farming activities in areas where regional water quality becomes at risk of not being met, ...*
- (c) encouraging industry, principal water supply and irrigation-scheme initiatives to improve land and water use practices for farming activities, reduce nutrient loss and nutrient discharges, and facilitate land use consenting, including irrigation and principal water supply scheme-wide initiatives, reporting and auditing of the constitute farms.”*

- 333 Mr Ensor again addressed the objectives of the LWRP, principally from the perspective of seeking to establish that it did not provide any policy guidance in relation to landscape outside of fresh water bodies, including braided rivers and their margins, wetlands, hāpua and coastal lagoons.
- 334 Mr Farrell noted that the LWRP provided the regulatory response to the CWMS and the NPSFM. He provided a list of provisions as Appendix 1. His evidence was that the plan sought to maximise the benefits of water use, as determined through community outcomes developed under the CWMS process, while ensuring the connectedness between the effects of activities on land and water environments. His evidence was that the LWRP also sought to ensure that decision-makers on resource consent applications had regard to the community outcomes set out in section 15 of the LWRP and also the Upper Waitaki Zone Implementation Programme Addendum. Mr Farrell was of the view that the proposal was likely to compromise water quality that supports aquatic life, and that it may not protect or improve the biodiversity of the zone’s water body and dryland systems.
- 335 Mr Vial again set out the relevant objectives in an appendix to his evidence, noting that the objectives of the Plan recognise and provide for Kāi Tahu values and provide a strong background from which the strategic policies and proposed Waitaki sub-region policies in PC5 and rules were derived. He noted in particular Objective 3.1, which provides for the management of land and water to enable Kāi Tahu culture, traditions, customary uses and relationship with the land and water. He also noted Objective 3.2, which promoted water

management that applies the ethic ki uta ki tai and strategic Policies 4.3 and 4.4. He concluded that in his opinion the current proposal was inconsistent with the relevant policies of the LWRP.

Plan Change 5 (PC5)

- 336 Mr Woodlock addressed and introduced PC5, focusing particularly on Part B – Changes to Section 15 (Waitaki and South Coastal Canterbury). He noted that the amendments delivered on recommendations developed through a collaborative process led by the Upper Waitaki and Lower Waitaki Zone Committees. Overall, he considered that the package aimed to maintain the oligotrophic state of Lake Benmore, maintain the ecosystem health of streams, improve mahika kai gathering and nohoanga, provide for the intensification of farming activities on small blocks of land within extensive properties, and provide for consented aquaculture and opportunities for urban expansion. He identified the key actions as giving effect to the recommendation included PC5 itself, the implementation of FEMP for farming activities and providing for opportunities for the establishment or intensification of farming activities on small blocks of land on extensive properties in order to align with the Mackenzie Agreement.
- 337 He introduced Policy 15B.4.18, which he considered to be of particular relevance. He outlined the submissions which had been made on that policy, including submissions by the applicant seeking amendments. He noted that it was only afforded limited statutory weight given that it was in the early stages of the planning process, but considered that reasonable weight could still be given, given that the policies of PC5 had legal effect, PC5 gave effect to community aspirations for the management of the environment within the Waitaki District through the CWMS, and that some PC5 provisions were specific to areas directly affected by the proposals.
- 338 Mr Woodlock identified Policy 15B.4.23(b) of PC5, which related to the maintenance of significant indigenous biodiversity. He noted clause (b) of the policy which provided:
- “Until District Council provisions that require identification and protection of significant indigenous biodiversity are notified, any application for resource consent for a farming activity which exceed the nitrogen baseline needs an assessment of effects that demonstrate that no net loss of significant biodiversity will occur.”*
- 339 Mr Ensor was of the opinion that little weight should be given to PC5. He stated that Policy 15B.4.23, or his understanding of it, was that it implemented existing LWRP objectives. His view was that the provisions, by utilising an exceedance

of the nitrogen baseline as a trigger, indicated that PC5 only addressed biodiversity of waterbodies and their margins. He noted that Policy 15B.4.23 did not focus specifically on biodiversity or ecosystem effects relating to the margins and noted that the Reporting Officer had interpreted it as having wider implications. His evidence was that the objectives the policy was implementing are limited. He also noted that the policy is triggered by exceedance of the nitrogen baseline. His opinion was that the policy was intended to provide direction to activities having potential effects on water quality and waterbodies and their margins, rather than terrestrial ecology. Overall, he concluded that the relevant regional plans had made a conscious decision to exclude terrestrial ecology.

- 340 Mr Farrell was of the view that the proposed amendments provided a clear intention for effects on terrestrial biodiversity values to be protected and considered as part of the regional resource consent process. He disagreed firmly with Mr Ensor, noting the section 42A report on PC5 stated that '*the Upper Waitaki FMU contains specific provisions to protect dryland biodiversity*'. It was his view that it clearly sought to ensure that applicants requiring consent identified indigenous biodiversity values present within the application area, identified the sites of significant indigenous biodiversity, and demonstrated that no net loss of significant indigenous biodiversity would occur. He also addressed further commentary from the s42A Report, noting that it applied only to the Haldon and mid-catchment zones because PC5 did not enable further intensification in the other FMU areas.
- 341 This was an issue on which there was some discussion with Mr Ensor during his presentation. Mr Ensor was asked what the purpose of the policy would be if not to address terrestrial indigenous biodiversity, given that the relevant planning documents already addressed biodiversity of water bodies and their margins. Overall, we consider that Mr Farrell's interpretation is correct. That is clearly supported by the zone implementation process (ZIP), and it would be somewhat meaningless. That position was also addressed in the submissions of Forest and Bird.

#### Waitaki District Plan (WDP)

- 342 The WDP, its provisions and relevance, was raised as a matter of some significance, particularly by the applicant. We have addressed the WDP in more detail when considering the applicant's arguments relating to the permitted baseline, landscape, and the environment. We have noted Objective 16.9.2 which is that the maintenance of biodiversity, conservation values, and ecosystem functioning within the district by the protection of areas assessed as having significant indigenous flora and significant habitats of indigenous fauna;

and the maintenance of other indigenous flora and fauna associated with wetland, riparian areas, alpine areas and other areas that have particular nature conservation values.

#### The National Water Conservation (Ahuriri River) Order 1990

- 343 The National Water Conservation (Ahuriri River) Order 1990 came into effect on 3 August 1990. It applies to the Ahuriri River and catchment in the Upper Waitaki Basin.
- 344 Section 104(3)(c) of the RMA provides that the consent authority must not grant a resource consent contrary to section 217 of the Act. This prohibits the grant of resource consents to take or discharge into water where this would be contrary to a provision or restriction in a Water Conservation Order. We accept the order is relevant. We have considered it, but we do not consider that the order would prevent us from granting the consents.

#### **Section 105**

- 345 Section 105 requires us to consider the nature of the discharge and the sensitivity of the receiving environment to adverse effects, the applicant's reason for the proposed choice, and possible alternative methods of discharge, including into any other receiving environment.
- 346 Our assessment of environmental effects has not addressed water quantity issues because the application is not to take any additional water for irrigation. However, in terms of the sensitivity of the receiving waters, we note Gray (2015) reports that Quail Burn and Sutherlands Creek are potentially stressed by low flows associated with high levels of abstraction. We also note the evidence showing existing water quality impacts, and in particular Figure 2 of Ms Hayward's supplementary evidence (based on Gray (2015)), which shows the existing state of the waterways within and surrounding the BIC irrigation scheme. Overall, we find that the existing water quality of some of the waterways and the presence of threatened and endangered indigenous fish species makes the receiving environment highly sensitive to any intensification of land use within the catchment.

#### Part 2 RMA

- 347 Section 104(1) provides that the matters which we are to have regard to and which we have discussed above, are subject to Part 2.



348 We have considered whether the Supreme Court decision in *King Salmon*<sup>6</sup> should alter our approach to the question of “*subject to Part 2*”. There is conflicting Environment Court authority on this issue. We note that the issue is not subject to detailed legal argument. Mr Chapman, in his submissions seeking to persuade us that we were unable to consider maintenance of indigenous biodiversity, stated:

*“These should be seen in the light of the Supreme Court’s approach in King Salmon, which makes it clear that decision-makers under the Act are to accept that a settled operative planning document must be deemed to articulate the manner in which Part 2 is best given effect in a particular context.”*

He submitted that it must be accepted that, because Part 5 requires both the District and the Regional Plans to give effect to Part 2, and National and Regional Policy Statements, and prevents a District Plan from being inconsistent with the Regional Plan, these documents must be taken as an expression of how Part 2 and the superior planning documents are to be given effect to in the regional and district context. He submitted it is not for us to second guess whether those plans actually do give the right expression to Part 2 or the superior documents, or whether they have correctly apportioned the management of certain types of effects between the district and the region.

349 In the circumstances of this case, given the acknowledged importance of the significant indigenous vegetation and habitats, and the significance of the effects on that, we consider that we would be remiss not to consider section 6(c) in particular.

#### Section 6 Matters of National Importance

350 Section 6 identifies a number of matters of national importance we are required to recognise and provide for when making our decision. None of those matters amount to a veto on the granting of consent. We consider, relevantly, that the matters of national importance include the natural character of lakes and rivers (s6(a)), protecting outstanding natural features and landscapes (s6(b)), the protection of significant indigenous vegetation and habitats of fauna (s6(c)), and the relationship of Maori with the environment and their ancestral lands (s6(e)).

351 In relation to section 6(a), we considered that the margins of the Ohau River appear to have been subject to significant work which has not, in our view, preserved the natural character of that river and its margins. Our findings in that regard are only relevant as relates to TD1 and TD2 and we have given it very little weight in our decision-making process of the wider proposal.

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<sup>6</sup> *Environmental Defence Society Inc v New Zealand King Salmon Company Limited* [2014] NZSC 38

- 352 We have identified section 6(b), which relates to outstanding natural features and landscapes. The area is identified as an outstanding natural landscape from a regional perspective. The Waitaki District Plan excludes the command area in its outstanding natural landscape overlay. Mr Craig, in response to questioning, identified at least one part of the existing environment to the west of the Ostler Fault as outstanding, or more correctly as having the “wow factor”. We do not consider that we have sufficient information before us to determine whether or not the landscape to the west of the Ostler Fault is outstanding. We do, however, take some guidance from the identification of the area in the 2010 Landscape Study. Whether or not Section 6(b) applies, we consider the landscape west of the Ostler fault is one worthy of protection.
- 353 Section 6(c) is, in our view, critical. It is clear on the evidence that all of the ecologists (other than Dr Espie) agree that there are significant areas of indigenous vegetation and habitat of indigenous fauna which will be lost if these consents were to be granted. We again note Mr Chapman's submission that no vegetation clearance consent is sought. That may be so. However, there appeared to be no dispute between the ecologists that the activity of irrigating itself, and the modification of vegetation in accordance with the permitted rules in the District Plan that would follow, would lead to the total loss of at least the agreed areas of ecological significance. The main debate related to the ecological significance of the other areas identified by Dr Ussher as not being significant. As we have found above, we consider that it is likely, or indeed it is probable, that other sites contain significant biodiversity values. We find that the granting of the consents would not protect the significant ecological values identified.
- 354 In terms of section 6(e), in light of our findings on the cultural values, we consider that the grant of consent would not recognise and provide for the relationship of Maori and their culture and traditions with water.

#### Section 7 Matters

- 355 In terms of the section 7 matters that we are to have “particular regard to”, we consider that the principle of kaitiakitanga has not been met.
- 356 In terms of the ethic of stewardship, we consider that likely adverse effects on waterways, effects on significant indigenous vegetation, and overall effects on the landscape are not consistent with stewardship.
- 357 In terms of efficiency, it seems to have been generally accepted that the increase in area using the same amount of water improves efficiency. We agree.

- 358 In terms of effects on recreation and amenity values, we consider those are likely to be significant, both in terms of water quality and for the many recreational users of this part of the basin, including those on the recently developed cycleways.
- 359 In terms of the intrinsic values of ecosystems, there is no doubt on the evidence that intrinsic values will be adversely affected by a grant of consent. In terms of the in-stream ecosystems, we consider that there is little proffered by the applicant which has regard to the intrinsic value of the aquatic ecosystems and protection of these values. Our findings in relation to the terrestrial ecology are relevant here.
- 360 In terms of the overall quality of the environment, it is our view, having considered all of the matters, that it will not be maintained.

#### Section 8 Treaty of Waitangi

- 361 We have had regard to that.

#### Section 5

- 362 In terms of the overall purpose of the RMA, it is our opinion, taking into account all of the issues which we have addressed above, that the granting of consent would not be consistent with the purpose of sustainable management. It may make a positive economic contribution to the farmers. There was no evidence led in relation to an overall regional economic contribution. There are some positive effects which we have addressed, but overall, the significant terrestrial biodiversity and the life-supporting capacity of the waterways will not, in our view, be protected.
- 363 We have of course considered the mitigation and conditions proffered. Overall, we consider that the proposed mitigation package is completely insufficient to go anywhere near addressing the significant adverse effects. There was, in our view, uncertainty in relation to some of the environmental effects and particularly in relation to the scale of such effects. It was clearly acknowledged, by Dr Ussher for example, that the timing of the site visits, and the nature of them, could not provide for any certainty in relation to the overall values. There was also considerable uncertainty in relation to groundwater and in relation to the surface water effects within the command area given the conditions proffered and whether the mitigations modelled are achievable scheme. In terms of groundwater in particular, there was considerable discussion about the lag period between the discharge and the effects becoming apparent. We were not convinced that the adaptive management conditions imposed were appropriate in those circumstances.



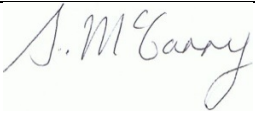
364 Overall, we are not satisfied on the basis of the evidence before us that granting consent would promote the purpose of sustainable management. We note this was a scheme wide proposal and our decision has been made on that basis.

**Decision**

365 Pursuant to section 104B of the RMA, we have a full discretion as to whether or not to grant consent. As addressed, we are of the view that this case is one where it is very appropriate to apply an overall judgment assessment. We have done this by taking into account the relevant matters identified, we have avoided consideration of irrelevant matters, we have given weight to the various matters identified, and we have considered the conflicting considerations, the scale of them and their relevance.

366 Overall, while there may be some minor economic benefits, and potentially environment benefits in terms of soil erosion and control of weed species, the adverse effects are significant.

367 Having fully considered the application documents, all of the submissions, considering carefully the evidence and submissions made during the hearing process, and again considering the relevant statutory documents, it is our conclusion that the purpose of the Act is best met by refusing the consents. Our decision, pursuant to the powers delegated to us by the Canterbury Regional Council is, therefore, to refuse the Application.

 <hr/> David Caldwell (Chair)	 <hr/> Hoani Langsbury
 <hr/> Sharon McGarry	

Dated 5 December 2016