

BEFORE THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF resource consent applications by various parties

to take and use water in the Upper Waitaki Catchment

Statement of Evidence of

Di Lucas Registered NZILA Landscape Architect

December 2009

INTRODUCTION

1. My name is Diane Jean Lucas. I am a landscape architect and director of Lucas Associates Limited, a landscape planning, design and management practice established in Canterbury 30 years ago. I work throughout New Zealand.
2. I hold a BSc in natural sciences, a post-graduate Dip LA, a Master of Landscape Architecture in planning. I am a Registered NZILA Landscape Architect and was made a Fellow of the New Zealand Institute of Landscape Architects in 1987.
3. In 1982 I was appointed to the government advisory body on environmental policy, the NZ Environmental Council, and in 1987 co-authored their publication "*Tussock Grasslands. Landscape Values and Vulnerability*".¹
4. In my role since 1990 in chairing the contestable fund for assisting landowners in the protection of biodiversity on private land, the Nature Heritage Fund (NHF), I regularly assess areas with respect to their ecological significance in terms of representativeness, the sustainability of their natural values, and their landscape and amenity values. The NHF recently published further regional protection strategies, including the Canterbury Protection Strategy² which identified for the Pukaki Ecological District the importance of the extensive depleted short tussockland on uncultivated outwash terraces of the Tekapo and Pukaki Rivers, the wetlands along Grays River; and, scattered shrubland and tussockland on moraines.
5. I have prepared land and ecosystem frameworks for various parts of New Zealand and undertaken landscape and natural character assessments, and, identified outstanding natural features and landscapes at district, regional and national scales. Our projects have received premier landscape planning awards since 1995 and the NZILA Landscape Planning Gold Award 2008.

¹ Michael Ashdown and Diane Lucas. 1987. *Tussock Grasslands. Landscape Values and Vulnerability*. NZ Environmental Council. Wellington. 119 pp.

6. The Canterbury Regional Landscape Study was undertaken jointly with Boffa Miskell for the Regional Council in 1993, to identify significant and outstanding natural features and landscapes of Canterbury. The Mackenzie Basin was assessed in that study to comprise an outstanding natural landscape (ONL).
7. I prepared for ECan an analysis of the landscapes of all of the Waitaki District (2004). I have undertaken assessments of a number of sites within the Mackenzie District, and of the whole District as it contributes to the regional landscapes. I was not involved in the Plan Change 13 hearings for the Mackenzie District Plan.
8. I have undertaken research in local, rural and high country areas, including for my masters thesis, *Identifying Acceptable Vegetation Change in High Country Landscapes* (Lincoln University. 1994) which involved an iterative high country case study. From this, development of pattern analysis and land systems approaches has become fundamental to my approach. I researched wilding tree spread and management and was inaugural chair of the Canterbury Wilding Tree Control Committee.
9. Whilst I have undertaken assessments under the Crown Pastoral Lands Act (CPLA) with regard to landscape values on pastoral lease areas, I have not undertaken any tenure review assessments in the Mackenzie Basin. In my evidence I identify significant values that have been identified under this legislation and recognise the CPLA and government policy (Appendix c).
10. I have been requested by Mackenzie Guardians to provide an assessment of the landscape and visual effects of the applications for land use permits in the Upper Waitaki catchment above Lake Benmore. I have labelled and refer to these as sites 1 – 40 (Appendix a). I note sites 1 – 19 are within the Mackenzie District and sites 20 – 40 within the Waitaki District, and all are within the Canterbury Region.

² M. A. Harding. 2009. *Canterbury Protection Strategy*. A Report to the Nature Heritage Fund Committee. p. 80

11. I have read, and agree to comply with, the Code of Conduct for Expert Witnesses and unless otherwise stated, all my evidence is within my expertise.

AMBIT

12. I provide a brief analysis of the landscapes associated with the application sites above Benmore. To address the physical landscape I provide a land type analysis as a basis, from broad to site scales.
13. I provide an overview of the character and relative significance of the physical and perceptual landscape and the vulnerability to the types of changes proposed.
14. I note the identification of the regionally outstanding natural landscape of the Mackenzie Basin and assess effects on this.
15. In the second part I address the 40 sites above Lake Benmore and Ms Steven provides assessments for sites 5 - 6 (Maryburn), 8 – 9 (Simons Pass) and sites 7, 10 - 11 (Simons Hill) in the Mackenzie District; plus sites 24 – 25, 34 – 37 and 39 (Killermont) in the Waitaki District (attachments 3 - 5).

LANDSCAPE

16. The underlying land is an important basis for determining the character. The landforms, overlain with land cover and land use activity are the physical landscape. However landscape involves the physical and the perceptual.
17. Landscape is the distinctive character of an area. The distinctive character is a result of both the physical and the perceptual landscape - the land, what is on it and how people relate to it, through their experience, their knowledge, the meanings and the associations. With different knowledge, experience, roles and expectations, people experience the landscape somewhat differently. With vastly different knowledge, experience and roles, those who associate with the Mackenzie Basin demonstrate it is a landscape which exemplifies such differences.

LAND TYPING

18. As identified in the methodology for the Canterbury Regional Landscape Study³, land systems provides a useful and timeless basis to landscape analysis. Land systems is a nested hierarchy approach, enabling refining or grouping at different scales of interest.
19. The study provided land typing for the whole region at a scale of 1:250, 000. The resultant land types were grouped as landscape types. The Intermontane Range and Basin was one identified type, of which the Mackenzie basin is the largest example (attachment 6⁴).
20. Grouping land types, the Canterbury Regional Landscape Study identified 10 landscape types, Intermontane Range and Basin Landscape Type (Land Types H1 – 7, 13 -15). The land typing demonstrates the Mackenzie Basin as the largest Intermontane basin.
21. The regional land types identified in the Mackenzie Basin include:
 - H 1 Major River, Valley Fill
 - H3 Glacial and Fluvial Basin Floor**
 - H4 Basin Floor Outwash Plains**
 - H7 Isolated Mountain
 - H15 Southern Subhumid to Humid Mountain Range
 - H17 Semi Arid to Humid Mountain Range

³ Boffa Miskell & Lucas Associates. 1993. *Canterbury Regional Landscape Study*.

⁴ Note. The “Green Dots” are indicative locations centred on application sites.

22. These land types were mapped out at 1:50,000 for the Waitaki District and specific areas of sites have been further mapped to delineate landform components (attachments 7, 8, 23, 25, 27 and 30).
23. Above Benmore, the 40 Mackenzie Basin sites under consideration are addressed in the context of their glacier-derived land systems, the Tekapo, Pūkaki, Ōhau and Ahuriri (Appendix a / Attachment 3).
24. The 40 sites being considered are primarily located on the H3 and H4 land types of the basin floor. These land types have been delineated and the application sites located (attachment 7 and 8). For a number of sites, the landform components have been delineated to provide their context for analysis (attachments 23, 25, 27 and 30).
25. **H3** Glacial and Fluvial Basin Floor Land Type. Fascinating and diverse glacial lands surround Tekapo and Pūkaki and spill over the wide southern front of Lake Ōhau to spread down around the low ranges on toward the Ahuriri (attachment 8). This H3 country of the upper Waitaki basin floor provides complex landscape patterning on the floor, representing a complexity of origin and of habitat (attachment 9). This broad basin floor country displays an array of depositional landforms from glacial and then fluvial processes. The array of kettle wetlands is fascinating in this stark, superficially barren landscape. The intimate detail of their biodiversity is important (attachment 10; Photo 43 and 44).
26. **H4** Basin Floor Outwash Plains Land Type. The most extensive basin floor lands in the Mackenzie Basin are the great outwash plains (attachment 8). The large-scale fluvial landforms continue on from the basin floor lands below the Tekapo and Pūkaki moraine, across the Ōhau River district boundary and through to Omarama and the south-west corner of the basin. Unlike the complex H3 lands of the basin floor, these H4 lands were not ice formed. Whilst not ice-derived, these floor lands also include an array of landforms (attachment 11). A distinctive dotted line of hills stretches from Lake Ruataniwha created from the Ōhau River at the district boundary,

through to Clay Cliffs at the Ahuriri River (attachment 12). The floor lands are at around 500 m. elevation. The hills are up to around 800 m. asl.

27. The natural characteristics of these very extensive floor lands are essential to the outstanding natural landscape values of the whole basin. With conversion to developed lands, lacking natural elements and patterns, with naturalistic grasslands removed and/or structures dominating, the basin ceases to read as a total landscape. The naturalness of the floor is essential if there is to be association with the surrounding ranges, if the basin is to be uplifting and invigorating as a natural experience. To develop the floor lands and divorce them from their naturalness is to relegate the mountains beyond to separate backdrop. It is to disassociate floor and walls.
28. These lands include major areas of depleted short tussock grassland. Minimal tall tussockland remains. Care is needed in the management of these the scene-setter lands of the upper Waitaki basin. Without the landscape integrity of these floorlands, the value of the basin landscape overall is reduced, and the value of the Mackenzie country character in total. The generic character, not just particular isolated, up-standing features, needs careful landscape protection. Tussockness, naturalness, and openness are important.
29. **H7** Isolated Mountain Land Type, or roche moutonnée. The over-ridden bedrock features that protrude through the moraine fields and outwash. For example the Mary Range that would have been overridden at the peak of glaciation and now forms the division between the Tekapo and Pūkaki systems (attachments 7 and 12).

ONL

30. The Canterbury Regional Landscape Study developed a methodology that forms the basis to what has become a widely accepted⁵ approach to landscape assessment. The Canterbury study utilised 6 factors - natural science values, legibility (expressiveness), aesthetic values, transient

⁵ Gannet Adventures v Hastings District Council

values, whether the values are shared and recognised, and, tangata whenua values. These were defined as:

NATURAL SCIENCE

Natural features and landscapes of at least regional importance for reasons of the rarity or representativeness of their particular landform and landcover. A natural feature may be a landscape feature or an element/component of the landscape. Under s. 6(b), geology and soils are elements of particular focus, as flora and fauna values are also considered elsewhere in the Act.

LEGIBILITY

The landscape (or natural feature) of regional significance should clearly express past natural and /or cultural processes. Some may have strong historical connotations and a distinctive sense of place.

TRANSIENT

The natural feature or landscape of regional significance providing predictable or regular experience of dimensions of nature other than landform or landcover e.g. concentrations of wildlife.

AESTHETIC

Landscapes (and natural features where applicable) that are of high aesthetic value determined on how memorable they are, on their naturalness, on their composition (coherence) and on other important aesthetic factors.

SHARED & RECOGNISED

There should be a substantial measure of agreement between professional and public opinion as to the value of natural features and landscapes, for example as reflected through writings and paintings or through favourite locations to cite or visit. The presence of existing protected sites is also likely to reflect shared and recognised values.

TANGATA WHENUA

The natural feature or landscape identified as having particular regional importance to tangata whenua.

31. In the Canterbury Regional Landscape Study, the Mackenzie Basin was identified (Vol. 1 p. 61) as *“the most extensive outstanding natural landscape in the region. It is also one of the most investigated, painted, written about, visited, eulogized and argued over landscapes in New Zealand.”* Some of the *“key quality attributes that support its outstanding status: include:*
- *the area contains numerous geological and biological sites of importance.*
 - *there are key features such as Aoraki, Tasman, Sefton etc on the divide.*
 - *the lakes of Ōhau, Pūkaki, Tekapo and Benmore are all different but add to the vastness of the landscape.*
 - *the formation of the land is expressed in many ways – moraines, roche moutonnée, hanging valleys, terraces and fans etc.*
 - *the history of the area is of significance to many*
 - *the openness and naturalness of the area*
 - *the character of the tussock grassland*
 - *the very visible details of the landforms*
 - *the coherence of the landcover and underlying landform*
 - *the Basin’s importance to tangata whenua.*
32. The importance of the vastness, the spaciousness, the tussock and natural desert landscape character of the basin floor was recognised in the review of *“Landscape Art in the Canterbury Region. a Pakeha Perspective”* undertaken by Campbell Grant Banbury for the Canterbury study. Images such as Margaret Stoddart’s *“In the McKenzie Country”* (1930), W. A. Sutton’s series ‘Grasses’, Esther Hope’s many paintings, Grahame Sydney’s such as *“Ben Ohau”*, *“From Ohau Downs”*, *“Sunset near Omarama”*, and, more recently Diana Adams as one of many artists who paint the naturalness of this landscape (Photos 11 – 13, 45 -6).
33. Addressing *“Landscape in the Pakeha Literature of Canterbury”* for the 1993 study, Stevan Eldred-Grigg addressed the differing attitudes to *“aboriginal and artificial”* and to *“gold and green”*. Along with tourism, recreation and

planning research, the art and literature analyses contributed to the investigation of whether values are shared and recognised.

34. Whilst Pakeha culture may primarily give pre-eminence to vertically challenging terrain, the broad and subtle terrain of the basin floor lands is very important in a national, regional and local sense. The natural characteristics that remain are subtle, extensive and vulnerable.
- 35.
- 36.
37. As has been identified in the cultural impact assessment undertaken for Ngai Tahu⁶, the regional study identified the importance to tangata whenua of the plains of this basin as well as of the lakes, and of Te Ao Omarama.
38. For the settler culture, the Upper Waitaki basin was explored and places were named in 1857, followed closely by settlement by runholders. On the flat near the Ahuriri Arm of Lake Benmore is the site of the 1877-79 heke and protest by tangata whenua at the 1848 purchase of so much of the South Island.
39. The natural science factors, legibility factors, aesthetic factors, tangata whenua values, and, the values being widely shared and recognised, were all assessed in 1993 to be 'clearly outstanding'. Recognising the regional scale, the Canterbury study (1993) identified all of the Mackenzie Basin floor, excepting a node around Twizel, as an outstanding natural landscape as per s.6(b), and hence a matter of national importance. My analysis endorses the basin as a regional scale ONL with an exemption for an area near Twizel.
40. Following the study, the Canterbury RPS recognises 4 factors for identifying outstanding natural features and landscapes – aesthetic, expressiveness, transitory values plus natural science factors. As stated in the RPS,

Explanation

It is useful when making these assessments to reduce the many diverse considerations to a small number of broadly similar groups, or categories. Thus the values most closely associated with visual appreciation are grouped

⁶ Cultural Impact Assessment of New and Existing Irrigation in the Upper Waitaki, Gail Tipa and Kyle Nelson, of Tipa and Associates, with Runanga input, February 2009

as aesthetic values. Likewise, those that reflect (or express) physical formation and long-term ecological processes are called expressiveness values. The things that come and go within the landscape – the lighting, the seasonal changes to plants and trees, the movements of wildlife - are termed transitory values. Landform, geology, and soil heritage values are grouped as natural science factors.

In applying this policy, the Regional Council, when acting as a consent authority and considering Matters under section 104 of the RM Act, is not restricted to considering only natural features and landscapes that meet the relevant criteria in sub-chapter 20.4(1).

1. Aesthetic values with regard to natural features and landscapes are gauged by things such as:

- (a) how memorable they are;*
- (b) their naturalness; and*
- (c) their composition (how their elements fit together).*

2. Expressiveness (the ability of a landscape or feature to legibly portray or express the formative processes from which they evolved) comprises:

- (a) the underlying geology;*
- (b) topography;*
- (c) vegetation and wildlife present; and*
- (d) human influences past or present.*

3. Transitory values represent qualities separate from those of the landform or land cover. They include:

- (a) Wildlife occurrences or behaviour that are associated with places and impart distinctive qualities that although transitory are a noted characteristic, and*
- (b) Characteristic moods arising from local weather patterns.*

4. Natural science factors include aspects of special interest to geologists and other students of earth features. They comprise:

- (a) landforms;*
- (b) soil properties; and*
- (c) their related active physical processes.*

These factors, and the active physical processes involved, contribute to an understanding of the geological and biotic evolution of the region, and its particular character.

Effects on natural science factors result from earthworks (including modifications to the beds of rivers, lakes and the foreshore), construction, and cultivation.

41. The RPS states the Principal Reasons for these assessment factors are *“For the protection of natural aesthetic values, expressive natural landscapes and features, Transient associations with landform and land cover, and important natural science dimensions for the continuing benefit of present and future generations.”* I have therefore assessed the landscapes associated with the sites with respect to these factors.

42. Since the drafting of the RPS, the Court has identified (180/99 WESI v QLDC) that natural science factors should also involve ecological dimensions. It is not an arithmetic approach and ‘double counting’ between sections of s.6 is not an issue. Historic associations were added as a further factor.⁷

43. Thus in my opinion, assessment of the proposals appropriately addresses:
 - RPS assessment matters.
 - s.6a with regard to effects on the experience of natural character in association with lakes, rivers and streams.
 - s.6b for all sites in relation to the regional ONL of the Mackenzie Basin.
 - s.6c regarding the significant indigenous vegetation and significant habitats, some of which are addressed by Dr Walker.
 - s.6f regarding the important and multi-dimensional historic heritage of the basin.
 - s.7c the amenity values of the basin, including the characteristics contributing to aesthetic coherence, and to recreational and cultural attributes.

NATURALNESS

⁷ C180/99 WESI v QLDC

44. In all the versions above of landscape assessment factors, “aesthetic” values specifically include naturalness. My interpretation of naturalness recognises the guidance of the Court in stating that the criteria of naturalness under the RMA include:
- relatively unmodified and legible physical landform and relief,
 - the landscape being uncluttered by structures &/or obvious human influence,
 - the presence of water (lakes, rivers, sea), and,
 - vegetation (especially native vegetation) and other ecological patterns.”⁸
45. That is, naturalness is not to be assessed only ecologically, as a natural science value, but as naturalness in terms of the character experienced. The aesthetic of naturalness.

GRASSLAND NATURALNESS

46. In considering the sites I have utilised a scale as a general indicator of naturalness of the grasslands character relevant to this Mackenzie Basin landscape. I utilise a generalised naturalness rating for the various grasslands under consideration, and associated areas that involves a 5-point scale from:
1. natural tussock grassland;
 2. semi-natural grassland, with some remaining biodiversity, degraded or ‘improved’;
 3. cultivated dryland;
 4. cultivated & irrigated; to,
 5. intensive cultivated and irrigated (with infrastructure).

39. These grassland naturalness categories are defined further as:

1. Natural tussock grassland - Extensively grazed tussock grasslands that have not been oversown, fertilised or drilled on a regular basis and still contain indigenous biodiversity. Tussock grasslands contain short and tall tussock species, mat and cushion plant communities and shrublands. Retain high natural character typically.

⁸ A078/2008 Long Bay-Okura Great Park Society vs. North Shore City Council, para. 135

2. Semi-natural grassland - Extensively grazed tussock grasslands that have been oversown, fertilised or drilled on a more regular basis but still contain indigenous biodiversity and a moderate-high natural character, or that have been significantly degraded through grazing to diminish grassland species.

3. Cultivated dry land - Land that has been cultivated and converted entirely to exotic pasture or fodder crop but is not irrigated. Has moderate natural character consistent with extensive pastoralism, typically being restricted to the 'home paddocks'.

4. Cultivated and irrigated - Land that has been cultivated and converted entirely to exotic pasture or fodder crop and is irrigated. Area concerned is of moderate scale.

Irrigation typically border dyke, K line or spray guns. May be enclosed within shelter belts. Has low-moderate natural character.

5. Intensive cultivated and irrigated - Land that has been cultivated and converted entirely to exotic pasture or fodder crop and is irrigated by centre pivot boom irrigators. May support dairying activity (dry and milking stock). Involves clearance of any tall stature vegetation over large areas. Scale of development is extensive. Has low natural character with more of a rural-industrial appearance.

47. The naturalness ratings recognise that lands that have been cultivated but not irrigated can have varying naturalness, such as the contrast between new cultivation and green-feed crops (such as shown by Mike Steven's attachments (Simons Hill & Simons Pass figures 6a, 7 and 8) with cultivated lands that have browned off with the seasons and over time. These cultivated drylands contribute very differently in terms of aesthetic values, both in terms of memorability and naturalness with extensive, intensively irrigated and managed lands.

48. From my field work I have provided a preliminary rating for sites in terms of the landscape character evident from some public places (Charts Appended).
49. As has been evident in science, in art, in research and in widespread comment and record, the naturalness of the Basin floor lands is very highly valued. Whilst the mountain slopes behind may be more visually prominent, the broad, open, uncluttered grassland landscape of the basin floor is the scene-setter. It is the floor that is passed through, that is overviewed, and that is widely recognised as an exemplary experience of a distinctive landscape. The naturalness of the floor lands, their broad natural patterns and their detail, are enjoyed in association with the mountain lands beyond. The floor and wall lands together form a basin that is experienced as highly natural. With the highly natural land surfaces and vegetation patterning, the mountain lands draining to the lakes and to the outwash below are clearly legible as the pathways of former glaciers.
50. Within the Basin, the degree of naturalness for areas varies in response to management and season - the invasion and removal of wilding trees pulses; the seasonal and periodic flush of new pastures, of crops and of lucerne. Responding to seasons and time, localised incursions into the grassland landscape that are of limited scale and intensity, and that read as supporting the surrounding extensive natural landscape, can form legible activity nodes that tell of a layer of heritage in the Basin.
51. The proposals involve extensive and intensive areas of irrigation through the Basin, within the Tekapo, Pūkaki, Ōhau and Ahuriri systems of this broad landscape.
52. Whilst I agree the landscape would remain 'rural', my assessment does not support that of Mike Steven (para. 90) that the upstanding mountains and hills will outweigh the prominence of extensive and intensively irrigated basin floor lands and their effects on the naturalness of the basin landscape experience.

53. New Zealand is a land of little landscapes,⁹ with distinctly different types of country that people are able to pass rapidly between. It is highly unusual to be able to easily and variously access a vast enclosed landscape of such naturalness as the Basin and in such strong contrast to the adjoining landscapes coastwards. The relevant characteristics that contribute to the distinctiveness are therefore addressed individually and cumulatively for each system and for the Basin as a whole.

⁹ J.A. Hayward & K. F.O'Connor. "Our Changing 'Natural' Landscapes. NZILA Conference Wellington, 1981, *New Zealand, Where are you?*" p. 36.

VISIBILITY

54. My field assessment supports that of Mr Chris Glasson (S.42A Report para. 42) that *“the treatment of the immediate and distant road environs are vitally important for the impression the traveler forms of their journey.”*
55. Mr Glasson states (para. 40) that the *“Visibility of the upper Waitaki catchment can be most easily appreciated from SH80, SH83 and the other minor roads.”* From my assessment, the visibility of the catchment from SH8 provides very important visual access to the upper Waitaki, and cannot be considered a “minor road”. In particular SH8 provides highly valued access to the Tekapo system and to the Pūkaki system below the lake, neither of which are accessed by SH80 or SH83. Also, south of the Ōhau turnoff, SH8 passes through a length of the Ahuriri system which is not viewed from either SH80 or SH83.
56. I have provided a viewshed map for SH8 and SH83 which is based on interpolated 20 m contour data (attachment 17). The mapping involves terrain only, and hence trees and buildings might screen areas that would otherwise be visible. The map plots and colours (pink) the land NOT visible from the highway. Distance bands are plotted showing 5, 10, 15 and 20 km distances from the highways. Considering application sites 1 to 40, almost all are shown as visible in whole or in part, and field-testing confirms this.
57. As well as highway and other road views, there are public views available from the lakes, the river corridors, reserves and public access routes. Mr Glasson has not allowed for these. Some are shown at attachment 19. Various locations provide for elevated overviews, such as skifields and conservation parks (Photo Book cover).
58. Avoidance of irrigation of some sites plus reduction and refinement on others is necessary to enable the visual, landscape and amenity values to be sustained as enjoyed from public places, on both lands and waters.
59. In addition, the importance of aerial views needs to be considered. With Omarama as an internationally important centre for gliding, the enjoyment of the Basin landscapes from aerial views is an important consideration. Commercial flights, such as from Christchurch south to Queenstown and

Wanaka, overfly the Basin and provide for important experiences of the Basin landscapes. I assess that it is not appropriate to consider the proposals merely in terms of views from roads or other public land and water-based places. In this grand landscape that in total is of national importance for its outstanding natural values, the effects on natural science, legibility, aesthetic, historic associations and tangata whenua values must be considered. Due to the extensive and intensive landuse changes sought, the effects on the ONL as experienced aerially are assessed to be highly significant and adverse.

60. The area is very regularly over-flown. Whilst under-taking my field-work, as occurs typically in the Ōhau – Ahuriri, gliders quietly passed above. The regular flights south from Christchurch cross the Basin. The scale and contrasting character of the land use change is such that there is visual prominence from elevated views for some kilometres (Photos 9 and 18).
61. As stated by Mr Glasson (para. 36), *“Past management methods has predisposed many types of grassland to hawkweed invasion such as heavy grazing by stock and rabbits and burning.”* The *Hieracium* is merely an opportunist, occupying available bare ground. As shown by the grazing trails, in more moist years there is greater hawkweed cover, in drier years the native vegetation has greater cover.¹⁰
62. Having first worked in the area more than 30 years ago, I have recently investigated and assessed areas in the central North Island - their desert landscapes. Whilst previously extensive and intensive in scale of infestation, it is impressive to find that the Army has removed all of the wilding conifers from the extensive lands they administer around Waiouru. The previous cattle grazing have been removed. The army has instigated a management plan to restore and sustain the natural values and the management is most impressive.
63. I have tested Mr Glasson’s suggested buffers (para. 109). For a site such as 23, a 100 m lake setback, a 300 m road setback, and 50 m stream and

¹⁰ Meurk, C.D.; Arnold, G.; Espie, P. 2003: *A decade of grazing management—results from field trials and observations in the Mackenzie Basin*. Landcare Research Contract Report LC0203/112 (unpublished). Landcare Research, Lincoln, New Zealand. 67 pp.

terrace riser setbacks, would not adequately mitigate the effects of this proposal on the landscape integrity of the Ōhau System. The suggested buffers do not address landscape integrity; not landscape effects in an holistic sense.

SITE ASSESSMENTS

64. I provide a preliminary consideration of most of the 40 application sites above Benmore. Sites are referenced by my site numbering for each of the four systems as mapped in my Appendix a, and throughout my attachments, the Map Book and Photo Book:

Tekapo	Pūkaki	Ōhau	Ahuriri
1	9	22	26
2	11	23	28
3	15	24	29
4	16	25	30
5	17	27	31
6	18		32
7	19		33
8	20		34
10	21		35
12			36
13			37
14			38
			39
			40

65. As well as an overview I describe some sites and Anne Steven and Susan Walker describe some in more detail. Due to terrestrial-based effects in terms of ecology, landscape and visual values, some applications should be declined in their entirety. For others there is very limited terrestrial site information. With respect to terrestrial ecology and landscape values, surveys are non-existent or cursory. Very little spatial information has been provided.

66. When considering the terrestrial dimensions only, and not the individual or cumulative effects on the waters, where irrigation may be appropriate on parts or all of a site, I provide a recommendation that if approval of consents is to be contemplated, a multi-stage process is necessary. For some sites, in whole or in part, where lands are rated a 2 or 3 in terms of naturalness, there may be ecological values on site or associated that require consideration. Consideration is required of natural systems and natural processes, so that proposals can be adequately confined, designed and managed to avoid, remedy and mitigate effects. For some sites there are values off-site that are potentially affected by the proposed irrigation, in terms of ecological, landscape, heritage and amenity, as well as water quantity and quality dimensions that I have not addressed.
67. For any sites for which consent is contemplated, detailed survey by a specialist dryland plant ecologist and invertebrate scientist is needed to inform the layout and management.
68. Considering effects on the natural character of the lakes, rivers and streams, the outstanding natural landscape, the historic heritage and the amenity, the site and the contribution to the greater basin and particular features requires consideration.
69. Effects on the ONL need to be avoided, remedied¹¹ and mitigated. The natural character of the lakes, rivers and streams, including their settings, needs to be protected. Thus, for any site for which some area is to be consented for irrigation, a Landscape Plan, prepared by a Registered NZILA Landscape Architect, together with ecologists, should be developed to be included as a condition of consent. The Plan needs to address both spatial and temporal dimensions, so that an appropriate layout, implementation and management can be assured.

¹¹ see final Map Book attachment for a sketch model by ecologists regarding remediation elsewhere. Colin Meurk and Graeme Hall. 2006. "*Options for enhancing forest biodiversity across New Zealand's managed landscapes based on ecosystem modelling and spatial design*". New Zealand Journal of Ecology 30: 131 – 146.

70. For sites currently cultivated and sites currently irrigated, the proposed expansion in scale and in intensification has potential to result in highly significant adverse effects. Thus their effects on natural character, landscape, heritage and amenity need to be addressed. Where areas have reduced naturalness and amenity value through existing development, the opportunity is available for remediation of effects.

TEKAPO SYSTEM SITES

(site locations – Attachments 21 – 25; Photo Book frontispiece to Photo 10)

Site 1. Lilybank. CRC071786. 476 ha.

71. Located on the true left of the Godley River above the junction with the Macaulay River, the Lilybank sites are primarily on fans within the Major River, Valley Fill Land Type (H1). The site is partly natural and part developed, with 63% converted and site overall has moderate ecological value (Dr Walker, see my Tekapo Chart, Appendix d). (attachments 5 and 21; Photo Book, Photo 1).
72. The site would extend and intensify the existing farm node at Lilybank. Andrew Craig's Photographs 2 and 4 suggest the already cultivated area would have a naturalness rating of 3 as cultivated drylands. However the balance of the area under application is highly natural, and rated as 1.
73. The site is across the Macaulay River from the road up the eastern shore of Lake Tekapo. The location is at around 800 m asl and up the Godley valley above Lake Tekapo, at the junction of the natural Macaulay valley. The upper valley landscape is vulnerable to landscape effects from extension of developed land and the intensification of the extensive site as a result of irrigation.
74. As pastoral lease lands, requiring consent from LINZ for cultivation, shelter belts would be recommended. Increasing the scale of the farm node, the shelterbelts would exacerbate the effects of the landuse intensification.
75. In this mountain valley upstream of the Basin, the natural character, the wildness and naturalness, are important landscape attributes. The

naturalness of the upper valleys is an important attribute of the Mackenzie Basin ONL.

76. I agree with Mr Glasson (page 83) that the site is sensitive due to the remoteness and naturalness of the context. I also agree that the proposal would have significant adverse effects in relation to the hills above and the rivers below. I note Mr Glasson recommended greater buffering from the rivers, and lowering on the hillslope. I do not consider such buffering would adequately address the adverse effects. I assess that the irrigation consent is not appropriate.

Site 2. Godley Peaks Station/Lone Star Farm. CRC031175. 544 ha

77. These lands are already mostly developed (76%, Appendix d) and are rated moderate in ecological significance (Walker) and as predominantly cultivated drylands, with some irrigation, thus they rate 3 - 4 in terms of landscape naturalness.
78. North over the Cass River, this extensive site across several landforms is associated with the northern extremity to the glacial and fluvial lands adjoining Lake Tekapo (attachment 8). These more gentle deposition lands below the Hall Range exhibit a cultural character with shelterbelts and paddocks clearly evident.
79. As recognised by Mike Steven (para. 17), part of the site involves lake margins. At para. 22 he misinterprets the identification of the regional status of the Basin. The site is within the Mackenzie Basin ONL as assessed in 1993, and this is a matter of regional significance – ‘a s.6b landscape’. Assessment for categorisation as ONL is appropriately at the landscape scale, not the paddock scale nor that of the landscape unit.¹²
80. The area proposed for irrigation would markedly expand that currently occurring, and extend onto elevated lands. The area is substantial such that the expansion and intensification would be clearly evident when viewed from off site, such as the Round Hill skifield (M. Steven Figure 12)

¹² fn22 [2000] NZRMA 59 at para (105)

81. As identified by Mr Glasson, adverse effects are anticipated on the natural character experienced in association with Lake Tekapo, and the Cass and Mistake Rivers. Mr Glasson proposes (page 83) buffers be required as mitigation. Substantial, natural buffering fitted to the landforms, is likely necessary for adequate mitigation.
82. A full Landscape Plan is necessary to avoid, remedy and mitigate effects on the natural character, natural landscape and amenity values of the lake, rivers and their context landscape.

Site 3. Glenmore Station. CRC052502. 165 ha.

83. The site extends to Lake Tekapo and is calculated to be 73% developed and overall of moderate ecological concern (Appendix d). Primarily cultivated drylands they rate 3 – 4 in terms of naturalness.
84. To protect the natural character of Lake Tekapo, at least buffering from the lakeshore through reduced area and setback would be necessary, as Mr Glasson proposes (page 79). A Landscape Plan is sought to avoid, remedy and mitigate effects on the natural character, natural landscape and amenity values of the lake and the context landscape.

Site 4. Irishman Creek Station. CRC-11845. 41 ha.

85. The site is already entirely converted, and already irrigated. The site has 'least' ecological value and is rated a 4 in terms of naturalness (Appendix d). As with Mr Glasson, I have not identified any adverse landscape effects from this proposal.

Site 5. Maryburn Station/ Classic Properties. CRC063106. 411 ha.

86. The site involves two outwash terrace areas alongside SH8 that exhibit the classic beloved natural aesthetic of the Mackenzie country (Photo Book, Photos 2 and 3 from Viewpoints (VP) 1 and 2; attachment 8), and includes naturalness ratings of 1, 2 and 3 – that is, from relatively intact tussock grassland to cultivated drylands. Some 21% of the site has been converted and is assessed to be of greatest ecological concern (Appendix d). From aerial photographs last summer, attachments 22 and 23 shows the natural outwash terrace sites.

87. The site is entirely in close view from the highway (attachment 18). An important contributor to the natural landscape experience of the Mackenzie, the proposed irrigation would very significantly reduce the naturalness of this site and of the experience of the outstanding natural landscape of the Basin.
88. As pastoral lease land, in receiving a cultivation consent, establishment of shelterbelts would be recommended.¹³ Such plantings would exacerbate the adverse effects on landscape and amenity values.
89. The site has been assessed in detail by Ms Anne Steven and Dr Walker. The site has been identified to involve very important biodiversity, including habitat for two of the most threatened plants in New Zealand (*Myosorus* NZ and *Leptinella* 'Clutha') as well as important natural landscape value. Mr Craig illustrates the "compelling scenery" opposite (photograph 2). These vales are enjoyed together as a grand landscape experience with high naturalness.
90. Recent cultivation has intruded into the natural landscape values. Whilst visually vivid from the recent conversion, if left un-irrigated, with time the cultivated dryland would visually mellow. Ms Steven identifies the natural values and recognises the northern area is cultivated and not an SIV.
91. The proposal would significantly adversely affect the outstanding natural science, aesthetic and legibility values of the Tekapo basin landscape. Heritage and amenity values would be significantly adversely affected. The attributes contributing importantly to the ONL would not be protected.
92. Analysis supports that of Mr Glasson (page 76) that the application would appropriately be declined.

Site 6. Maryburn Station/ Classic Properties. CRC070406. 439 ha.

93. Located on the outwash terrace adjoining the Mary Range, across SH8 west from site 5, this site is already 80% converted and ecologically of least concern. From aerial photographs taken last summer, attachment 22 shows the cultivated state of most of the site.

¹³ LINZ officials *pers.com*. December 2009

94. The site is viewed from SH8 over across the Mary Burn. Photo 4a-b shows a view across to the site and beyond to the roche moutonnée of the Mary Range. Photo 5a-b views across the site and beyond north to the Southern Alps. Whilst largely cultivated, and with some irrigation, the site is an important contributor to the experience of the Basin landscape.
95. Located in the highway corridor near the crossing through the roche moutonnée band between the Tekapo and Pūkaki systems, the openness and vast expansive views across naturalistic lands is very highly valued. The riparian lands associated with the Mary Burn are in evident contrast to the very dry lands close alongside. Due to the pivotal location in the highway corridor, the intensity of development at this node adjoined with that of Site 7, has reached a visual threshold for absorption into the broad basin landscape. The utilities associated with landuse intensification would further detract from the relationship between the outwash terrace and the hill slopes. The expansion and intensification of land use would adversely affect the aesthetic and amenity values enjoyed on the highway corridor. Even with a 440 m setback, further shelter belts and structures would exacerbate the visual effects of the intensified landuse, as is evident on the adjoining lands (Photo 6b). The site is Pastoral Lease, cultivated and not an SIV (attachments 14, 16 and 20).
96. Mr Glasson proposes a tussock grassland buffer between the highway and the irrigated land which would benefit the highway corridor. However the evident intensified landuse beyond would reduce the visual amenity values.
97. Mr Craig illustrated the existing cultivated land close beside the highway and the homestead node (Photographs 3a and b). The developed node has traditionally been tucked against the base of the hill. Cultivated drylands mellow out seasonally and over time. With greater extensiveness and intensiveness as proposed the landscape character of the highway corridor would be affected.
98. Transforming the intricacy of this developed landscape, to a larger scale and more intensive regime would affect the visual and amenity values enjoyed. Changed management of the site has the potential to affect the

experience of the wider basin landscape. The adequacy of the mitigation proposed by Mr Glasson is questioned.

99. A full Landscape Plan is sought to avoid, remedy and mitigate effects on the natural character, natural landscape and amenity values of the highway corridor landscape and the association between the Mary Range and outwash terrace lands of the site, as important contributors to the ONL.

Site 7. Simons Hill Station. CRC 062824. 471 ha.

100. Located to straddle from the roche moutonnée slopes down across the young fans and out onto the outwash terrace (attachments 8, 11, 12 and 23), the site involves visually prominent lands at close range (Photo 6a-b, and 9). The site involves lands of varying naturalness, with more than 80% cultivation and with some irrigation and the site is thus rated 2, 3 and 4 (attachment 22).

101. Recent cultivation and sowings display characteristic early vividness contrast strongly with the naturalness of the adjoining slopes, and un-irrigated they would mellow seasonally and with time (Photo 6a and Mike Steven Figure 7). Extension and intensification of landuse, along with the infrastructure, across these lands is likely to continue to be visually prominent and distract and detract from the valued aesthetic of the Basin ONL.

102. Irrigation should be confined to the lower lands of the site, and naturalness to the highway corridor maintained and enhanced.

103. A Landscape Plan is sought to avoid, remedy and mitigate effects on the natural character, natural landscape and amenity values of the highway corridor landscape and the association between the Mary Range and outwash terrace lands of the site

Site 8. Simons Pass Station. CRC062867. 222 ha.

104. Across the highway located on the fan and hill lands to House Hill, the site has 32% converted and Dr Walker assesses this site as of greatest ecological concern (Photos 7 and 9). Anne Steven assesses this site and concludes the irrigation is inappropriate. Mr Glasson recommends the

proposal be reduced and refined (pp.89-90). I support Ms Steven's conclusion.

Site 10. Simons Hill Station. CRC062842. 397 ha.

105. Located on the other side of House Hill down on the outwash plain close to the Tekapo River, this site has 20% converted and under centre pivot (Photos 8 and 9). However the remainder is of greatest ecological concern as described by Dr Walker. The site is variously visible from SH8 (attachment 18).

106. The irrigation should not be expanded or intensified.

Site 12. Grays Hill Station. CRC042661. 1540 ha.

107. Located on outwash terrace country close alongside the Grays River and crossed by the Edwards Stream (attachments 24 and 25), the site has only 19% converted, and overall a naturalness rating of 2 (Appendix d). Dr Walker assesses this site to be of greatest ecological concern.

108. The site is overviewed from the Mackenzie Pass, from Mt John, and variously from Haldon Road. It forms part of the vast, open naturalistic basin landscape as also viewed from SH8 in the north and in the east (viewshed map, attachment 18). The scale of the site, its open and seamless character to the basin has long been celebrated in art (Photos 11 to 13).

109. The introduction of the extensive irrigation development would dramatically change this landscape. As Pastoral Lease, shelterbelt establishment would be recommended with cultivation consent. The shelterbelts would exacerbate effects on the ONL, heritage and amenity values.

110. The buffering of riparian areas as proposed by Mr Glasson is inappropriate mitigation. I assess that due to the extensive and intensive landuse change proposed, the proposal is inappropriate.

Site 13. Grampians Station/N A Hope. CRC041543. 147 ha.

111. Adjoining Haldon Road, as shown at attachments 24 and 25, the site spreads over the fan and down over the backswamp to the Grays River (Photos 10a-b). Half of the site is already cultivated, and the naturalness is

rated a 3. However Dr Walker assessed that it is of greatest ecological concern. Shrublands are evident on the fan around the Snowy River and examples of plants present (Photo 10b).

112. The aesthetic values of the naturalness of this area and its visual connections to the wide open Basin landscape have long been valued (Photo Book 11 – 13, Esther Hope paintings).

113. The site contributes importantly to the open and naturalistic character of the Haldon Road corridor, which is an important recreational route, to Benmore. Intensive irrigation development, and likely associated shelterbelts, close to the road would considerably reduce the ONL and amenity values experienced.

114. Mr Glasson recommends the proposal be relocated. I agree that it is appropriately declined in this location.

Site 14. Grampians Station / N A Hope. CRC041542. 234 ha.

115. The two sites adjoin the Haldon Road on the piedmont fan (attachments 24 and 25). There are ephemeral streams associated with these sites and the northern one close to the meander floodplain and backswamp. Whilst half of these sites are already cultivated, and the naturalness rated as 3, Dr Walker assessed them of greatest ecological concern.

116. The northern site is opposite the Grampians driveway and contributes importantly to the Haldon Road corridor. The aesthetic values of the naturalness of this area and its connections to the wide open Basin landscape have long been valued (Photo Book 11 – 13, paintings).

117. Mr Glasson recommends the proposals be relocated. I agree that they should be declined.

PŪKAKI SYSTEM SITES

(site locations – Attachments 26 – 28; Photo Book - opposite Photo 14 to Photo 19)

Site 9. Simons Pass. CRC062867. 3752 ha.

Site 11. Simons Hill. CRC062842. 2075 ha.

118. Adjoining SH8 in the north, site 9 spreads over the Pukaki terminal moraine, a geopreservation site. It extends down over glacial outwash terraces and minor moraine dumps (H3 attachment 9) which include an existing development area. Some 28% of the site has been converted. The bulk of the very extensive sites 9 and 11 spread across the fluvio-glacial outwash plain down the true left of the Pukaki River (attachments 11, 26 – 27).
119. Dr Walker assesses this site as of greatest ecological concern and she and Anne Steven have assessed and describe it. The existing development on site 9 is spatially confined (Mike Steven Figure 10) or low key cultivated drylands.
120. The sites are located on the very important terminus and outwash to Pukaki. The extensive natural system between Pukaki and Benmore need to be considered in total (attachment 26). The extensive natural patterns, processes and elements of the Pukaki moraine and outwash are in total an outstanding natural feature of the natural drylands of the Basin. Their natural and landscape integrity is important to the Basin ONL.
121. As identified by Mr Glasson site 9 is very visible from SH8 and this is demonstrated on attachment 18. However I do not agree with Mr Glasson that mitigation by buffering of either site 9 or site 11 would allow these proposals to be appropriate. The sites are core areas of the Pukaki drylands basin.¹⁴

¹⁴ Parliamentary Commissioner for the Environment. 2009. *Change in the High Country: Environmental stewardship and tenure review.* supported a 'drylands park' concept (Pukaki-Tekapo Basin mapped attachment 18). This could be managed somewhat akin to a UK national park, in a planning framework with lands having agreed protection and enhancement objectives.

122. Intensification and expansion of the cultivated areas on site 9 is assessed as not appropriate in terms of protection of the ONL. The development of site 11 is assessed as inappropriate. The naturalness of this major system should be protected.

Site 15. Glentanner Station. CRC83609. CRC071362. 427 ha.

123. Located on the Pukaki terminal moraine and geopreservation site (attachment 13 and 28), extending down onto the floodplain and riverbed (attachments 26 - 27). Part of the site has been converted (and rated 4), and with an overall natural landscape rating of 2.
124. The upper areas of the site are highly visible from the highway (attachment 18) and from associated public areas, such as leading to the Kettlehole reserve, which allows an expansive view of the dryland basin, with the sequence from moraine features to broad outwash. Sites 15, 16 and 17 are overviewed. The moraine is recognised as a geopreservation site. The riverside route also provides visual access to the site. The great boulders deposited by the glacier are clearly legible.
125. Located on the prominent and important moraine to Pukaki, intensified and extended land development is assessed as not appropriate on this important natural landform sequence.
126. Mr Glasson recommends not allowing irrigation on the moraine. I agree. He recommends buffering the river and refining the boundaries. I assess this is not adequate to protect the natural science, aesthetic or legible landscape values. The lake setting, the river corridor, the moraine and the whole outwash system below require comprehensive landscape recognition as a feature of the ONL. The application would be appropriately declined.

Site 16. High Country Rosehip Orchards. CRC071833. 985 ha.

127. Lying between the Twizel River and Ohau Canal (attachment 3), the fluvio-glacial outwash plain (attachment 26) is entirely uncultivated and assessed by Dr Walker as of greatest ecological concern. The site is viewed from SH8 at the Ohau crossing.

128. The site is part of the broad Pukaki outwash (attachments 27). Most of the site is visible from SH8 (attachment 18) as well as being overviewed from an accessible location at the Falston Road junction (Photo 14) and the roading and lookouts associated with Ohau Power Station C (Photo 15a-b; Photo 16).
129. The highly visible site is evident as part of the greater outwash system that defines the basin floor. The irrigation proposal would devalue and detract from the greater ONL.
130. Mr Glasson proposes buffering the highway and rivers. I assess this is inadequate as the landscape integrity would remain adversely affected. In my opinion the application would have significant adverse effects on the natural science, legibility and aesthetic values of the Pukaki system and should be declined.

Site 17. Rosehip Orchards. CRC021749. 893 ha.

131. Located on the fluvioglacial outwash plain lying between the Twizel River and the Pukaki and Tekapo Rivers (attachment 26), the site extends down onto the meander floodplains and backswamp lands of the Twizel River at the delta to Lake Benmore (attachment 27).
132. The site has an area converted with a centre pivot irrigator (attachment 26). The remainder is assessed by Dr Walker to be of greatest ecological concern.
133. The site is at the culmination of the Pukaki outwash system and is visible from SH8 (attachment 18) as well as from the canal roading and Ohau C Power Station (Photo 17). The location provides a superb view over Lake Benmore and up over the dryland basin to Aoraki Mt Cook.
134. The existing development has disrupted the outwash landscape unit. Expansion across the proposed site would exacerbate the effects. Mr Glasson recommends buffering to the rivers, the terrace risers and the delta. In my opinion the buffering would not provide adequately for the protection of the integrity of the natural landscape values. The existing irrigation within the landscape unit is a legible disruption which with expansion would

threaten the integrity of the natural landscape values. The application would be appropriately declined.

Site 18. Haldon Station. CRC042561. 187 ha.

135. The application involves two sites extending from Haldon Road toward Lake Benmore (attachment 3). Both areas involve fluvio-glacial outwash plain lands (attachments 26 and 27).

136. From SH8 there are views all the way to Lake Benmore, and these sites are within these broad vistas (attachment 18). They are also highly visible from Haldon Road, the much used camp ground, lake and river access route. Very little of the sites have been cultivated (attachment 16) and they exhibit high naturalness (Photo 19). One unfenced adjoining the road, these sites enable enjoyment of the semi-arid landscape of the Basin. Irrigation and intensification of landuse would significantly alter the landscape and amenity values of the road corridor to Lake Benmore.

137. Mr Glasson recommends a buffer to the road and a less geometric shape. I assess these measures are not adequate to protect the ONL. The application is inappropriate.

ŌHAU SYSTEM

(site locations – Attachments 29 – 31; Photo Book - opposite Photo 20 to Photo 29)

138. Fascinating and diverse glacial lands spill over the wide southern front of Lake Ōhau. This H3 (Glacial and Fluvial Basin Floor Land Type) country provides complex landscape patterning on the floor (attachments 29 and 30). This broad basin floor country displays an array of depositional landforms from glacial and then fluvial processes. The array of kettle wetlands is fascinating in this stark, superficially barren landscape (Photo 22).
139. The extensive H3 floor lands are part of the ice-moulded Lake Ōhau system (Photo 20). The great scale of the landform and intricacy of the patterning within it, are such that sustaining the landscape integrity of the system is desirable through minimising landscape change that masks and detracts from the diversity and overall relationships.
140. Any 'tussockness' is precious, not just tall, intact areas, but depleted short tussock areas also, in contributing to the natural landscape values. The naturalness of landform, water body and vegetative elements, patterns and processes needs to be sustained for the retention of the integrity of the Lake Ōhau landscape. Landscape management mechanisms are necessary to enable the outstanding landscape qualities of Lake Ōhau and its associated lands to be sustained.
141. Whilst not ice-derived, the great outwash plain (H4) land from Ōhau also includes an array of landforms. The natural characteristics of the very extensive floor lands are essential to the outstanding natural landscape values of the whole basin.
142. Whilst flowing in to the Ōhau Canal, Lake Ōhau is exceptional in the Mackenzie as the one major lake with entirely natural shoreline. The glaciated origins of Ōhau are legible. The land typing is shown at attachments 7 and 8.

143. The Ōhau Basin (attachment 18) sits apart from the main experience of the Mackenzie Basin, in being largely invisible from SH8. It is a special place apart, visited as a destination.

ŌHAU SYSTEM SITES

Site 23. Ōhau Downs/Five Rivers. 3915 ha.

144. This very extensive site is spread across moraine and fluvio-glacial outwash to Ōhau and adjoins Lake Ōhau Road (attachments 29 -30). The site adjoins the Swan Lagoon and QEII covenant area (attachment 31).
145. The site involves the containing lands to Lake Ōhau (attachments 23 and 29). Whilst some of the site has been cultivated, and presents a fresh flush of vivid green (Photo 23), this would mellow seasonally and through time. Dr Walker rates it as of high ecological concern.
146. The landscape overall character is of high naturalness and of an important contribution to the overall natural character of the Lake Ōhau context and setting. The site is overviewed from up on Ben Ōhau and the Ōhau Skifield (Photo 28) as well as various conservation areas, such as the Ōhau Wetlands Moraine Complex (Photos 29). The site is also variously visible from other public and private places including Glen Lyon Road (Photo 27) and the Ōhau village.
147. Mr Glasson recommends (page 78) the proposal be significantly reduced and refined. He recommends the irrigation not occur on the moraine, and I agree (attachment 30).
148. The great outwash plain is a significant natural feature (Photo 20). Whilst some cultivation has been undertaken, natural landscape values are exceptional. The contribution of these lands to the Ōhau Basin as an ONL at all scales of consideration needs to be recognised. The proposal would not protect the legible, natural science and aesthetic values of the Ōhau Basin. The application is assessed as inappropriate.

Site 24. Southdown Holdings. CRC040835. 434 ha.

149. This site located on the Ōhau moraine and adjoins the Ōhau Moraines Wetland Complex (attachments 30 and 31) and is overviewed from this and the Ahuriri Conservation Park (attachment 19, and photo 29a). Elevated on the moraine, the site is visible from SH8 (attachment 17).

150. The site has not been cultivated¹⁵ and is assessed by Dr Walker as of greatest ecological concern. The site displays important natural character and natural landscape value (Photo 21, Fig.1). The site includes several streams.

151. The site is a very important contributor to the natural landscape values of the Ōhau Basin. I agree with Mr Glasson that mitigation is not adequate and that the application be declined.

Site 25. Southdown Holdings. CRC040835. 381 ha.

Site 26. Southdown Holdings. CRC040835. 2500 ha

Site 27. Marie Horo. CRC042025. 392 ha.

152. These 3 sites are on moraine (site 26 crosses the Ōhau watershed into the Ahuriri) and are mostly somewhat developed as cultivated dryland. They adjoin the Quailburn Conservation Area (attachment 31) and the Wairepo Creek. Irrigation would intensify the effects on natural landscape values. Site 27 is visible from SH 8 (attachment 18) and they are overviewed.

153. In these important moraine lands, Mr Glasson recommends site 25 be declined and I agree and also consider the others inappropriate.

¹⁵ not mapping error in attachment 16

AHURIRI SYSTEM SITES

(site locations – Attachments 34; Photo Book - opposite Photo 30 to Photo 46)

Site 30. Willowburn/ McAughtrie. CRC011940. 854 ha.

Site 31. The Glens/ D W McAughtrie, T& J Cooke Greenfield Rural.

154. Both on outwash surrounding and including the softrock hill slopes (attachments 5 and 32, 33) the sites are predominantly converted and partly developed (Photo 31). Site 30 involves the Willowbank Saddle to the hill and flat below, north-west of the stream. This is a geopreservation site (attachment 34), the oldest recognised surface of the Ostler Fault zone, displaying an 80 m. vertical displacement over more than 120,000 years (Photo 32; Diana Adams painting at Photo 45).

155. The site includes that upslope and the existing wetland areas (Photos 32, 33, 34, 35). The landform complexity and the prominence on the highway corridor and from Quailburn Road, means that a reduction and redesign is appropriate to avoid, remedy and mitigate effects and avoid effects of over-expansion and over-intensification on the landscape corridor with the wetland and dryland contrasts of the valley floor, and of the natural geomorphological feature.

Site 34. Killermont Station. CRC041331. 224 ha.

Site 35. Killermont Station. CRC041777. 557 ha.

Site 36. Killermont Station. CRC041798. 107 ha.

156. The grand outwash between SH8 and the Ahuriri River site 34 is referred to by others as the Pebbly Block and associated with Clay Cliffs opposite. Both the Ostler Fault zone, The Knot, is within the sites sought and the Clay Cliffs opposite are part of the Omarama Badlands, recognised geopreservation sites on either side of the Ahuriri River (attachments 33 and 34). The Know displays a 90 degree bend in the Ostler Fault trace and is of international importance.

157. For the Killermont sites, I endorse my colleagues regarding the landscape character experienced, as summarized by Anne Steven at para. 192. There would be a large loss of naturalness, spaciousness and of the wild and remote desert landscape character of the semi-arid lands.

158. Ms Steven has provided evidence regarding the landscape values of the Killermont sites
159. The sites are a major entry to the open basin as approached from the Lindis Pass. Sequence from the Pass important. Retain naturalness and grandeur of the uncluttered and undeveloped lands. Photo 36 – 39 and aerial oblique Photo 40- 41. Glasson proposes site 34 be relocated. I agree it be declined.
160. I agree with my various colleagues that the proposal for the development of the Pebbly Block to intensive land use for some 4 km alongside SH8 is inappropriate. There are also other roads and routes accessed. It is an area highly valued by visitors, as evidence by the many 'cairns' regularly constructed on the roadside, and the plethora of images recorded by travelers, including from within buses.
161. The landscape is an important area of the grand Ahuriri River corridor, as it emerges from the upper valley onto the broad outwash plains.
162. The area is very frequently overflowed (Photo 40). The grand natural landforms, the natural patterns, processes and elements that are evident, would be very significantly degraded by the proposed development of the suite of
163. The viewshed map (attachment 17) shows the visibility of the full width of the plain across sites 34 and 39. Within sites 35 and 36 there are areas not visible from the highway
164. For the landscape, amenity and heritage values, retention of the broad naturalness across the outwash plain, that is variously experienced as river corridor and as highway corridor, is important. Confining and defining any irrigated areas is desirable to avoid apparent environmental creep.
165. If any part of these three sites were to be consented, a Landscape Plan would be necessary to confine and design this area as a homestead node that avoids, remedies and mitigates effects on the ONL.

Site 39. Southdown Holdings/ Williamson Holdings Ltd CRC073115, CRC041788. 1165 ha.

166. On the adjoining area of outwash plain, as well as other facilities including three large cow barns, some 9 centre pivot irrigators are proposed with development up to the road boundary on a currently large and undeveloped area.

167.

168. I am not convinced by the buffering proposed by Mr Glasson. The experience is more than that indicated by the simulation Figure 3.8.3. It would be evident that there was merely a roadside strip undeveloped. The landscape would have reduced integrity. A more holistic approach would be appropriate.

SUMMARY

169. Cumulative landscape effects on the Mackenzie Basin are a major issue with the suite of applications being considered. The Mackenzie Basin, Te Manahuna, is considered by many peoples and for many reasons to be in total a very special place.¹⁶ Within there are special features and relationships. An holistic approach is needed. Incremental change is already threatening what is valued. As identified by the NZ Tourism Industry Association statement¹⁷, a vision is needed for this special place.

170. Mr Glasson identified (para. 111) adverse effects can arise not just from the “greening” but also from, what I refer to as, the irrigation infrastructure. I agree with Mr Glasson (para. 114) that combined and sequential visibility need to be addressed. But also it’s not just like ‘frames in a film’, for additional information is obtained and processed by the brain.

171. The landscape involves seeing with experience, with memory, with knowledge. It is not merely seeing frames and printing them on to a “blank canvas” in the brain. For New Zealanders at least, there is knowledge and expectation of views and journeys through and various experiences within

¹⁶ Speights are one of many products that position in the Mackenzie to benefit from association with the highly valued landscape character

¹⁷ Tourism Industry Association NZ statement November 2009, to hearing for Mackenzie Guardians

the Mackenzie that will be endorsed or countered by what is seen on any particular visit and in any particular part of that visit. Evident change in particular locations or of particular type, intensity or scale, can affect the experience and appreciation of the greater Mackenzie landscape. The landscape character can be significantly adversely affected by such change.

172. I recommend a number of the applications be declined. For others, if approval of some or all of a site is contemplated, then a Landscape Plan should be included with the consent that comprehensively addresses avoidance, remediation and mitigation of effects of the development on natural, landscape, visual, heritage and amenity values.

ATTACHMENT EXPLANATIONS

APPENDICES

Appendix a Canterbury Regional Policy Statement excerpts

Appendix b Consent Application Sites Location Map

Appendix c CPLA Policy

Appendix d. Charts:

- Tekapo Systems Sites
- Pūkaki System Sites
- Ōhau System Sites
- Ahuriri System Sites

MAP BOOK - attachments 1 – 33 (format - A3 portrait, double-sided, bound on left)

PHOTO BOOK - Photo 1 – 46 (format - A4 landscape, double-sided, bound on left)

PHOTO BOOK has sections for each of the 4 systems.

Each begins with a site location and viewpoint (VP) location map, then photos and art images.

- **Tekapo System** (Photo 1 – 13)
- **Pūkaki System** (Photo 14 – 19)
- **Ōhau System** (Photo 20 – 29)
- **Ahuriri System** (Photo 30 – 46).

MAP BOOK

Land Typing Undertaken by geomorphologist and soil scientist Ian Lynn, Landcare Research, from broad scale mapping at 1:250,000 in 1993, to various refinements at 1:50,000 and modelling, and indicative landform components December 2009. Various map scales are shown (attachments 6 – 8, 23, 25, 27 and 30) and models (attachments 9, 11 and 12).

SIV

The Basin SIV map (attachment 14) is incomplete. The SIV areas identified in Pastoral Leases are those on runs that were assessed or reviewed by Anne Steven (Maryburn, Simons Hill, Simons Pass, Killermont, The Wolds and Godley Peaks). However professional tenure review assessments undertaken in the Basin such as for Mount Hay, Sawdon, Quailburn, Ribbonwood and Ben Dhu have not been accessed for the compilation of this map. In addition, as identified by Ms Steven some development has since occurred in areas previously identified with natural values; for example, since the 2001 survey of Simons Hill (A. Steven para. 76).

Cultivation Map (attachment 16)

The map is developed as an indicative distribution of areas known from field experience and desktop analysis. I have not relied on these delineations for my assessments.

I recognise grazing as a permitted activity; but that under the Crown Pastoral Lands Act (CPLA) cultivation is a privilege on Pastoral Lease land (attachment 20); and, that removal of indigenous vegetation is constrained by district and regional policies, plans, rules and strategies.

Viewshed Map (attachment 17) Map created in *armcap* using *spatial analyst*. For this viewshed a series of points at 1000 m intervals was used to speed up calculation times. the view height was assigned at 1.8 m above the ground surface. Output resolution is 200 m.

Plan

The final attachment is a plan by ecologists suggesting some types of measures that should be addressed in a Landscape Plan.

Colin Meurk and Graeme Hall. 2006. "*Options for enhancing forest biodiversity across New Zealand's managed landscapes based on ecosystem modelling and spatial design*". New Zealand Journal of Ecology 30: 131 – 146.

credit

Thanks are due to Xiaodi Zhu (Judy) who assisted me with field work and assembled the Map Book. This work on the Mackenzie Guardians evidence was undertaken over the last 6 weeks as an office-based project to complete her Bachelor of Landscape Architecture at Lincoln University.