

**TENURE REVIEW PRELIMINARY PROPOSAL: SIMONS PASS MACKENZIE BASIN  
UNDER PART 2 CROWN PASTORAL LAND ACT 1998**

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**STATEMENT BY DIANE JEAN LUCAS FOR ENVIRONMENTAL DEFENCE SOCIETY INCORPORATED IN  
RESPECT OF SUBMISSION ON TENURE REVIEW PRELIMINARY PROPOSAL: SIMONS PASS MACKENZIE  
BASIN  
(LANDSCAPE)**

**18 JULY 2017**

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## 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 based in Canterbury.
2. I have been engaged by the Environmental Defence Society Inc (**EDS**) to analyse the Preliminary Tenure Review Proposal for Simons Pass Station (**Preliminary Proposal**) to determine whether it enables protection of all areas with “significant inherent values”<sup>1</sup> with respect to the landscape and natural character values.
3. In summary:
  - a. The Preliminary Proposal does not enable protection of all significant landscape and natural character values inherent to the Simons Pass landscape and the wider Mackenzie Basin landscape. It is inadequate in addressing the core landscape of Te Wahipounamu. The Simons Pass lease lands involve substantial terminal moraine and outwash plain that together are an essential contributor to the Aoraki–Pūkaki land system. Landscape integrity and connectivity is imperative to protection of the significant inherent values;
  - b. The landscape culmination of the glacial system from Aoraki, the moraine and outwash on Simons Pass are assessed as having very significant landscape and natural character values;
  - c. Protecting only part of the younger moraine, the Preliminary Proposal is not adequate to protect or sustain the significant inherent landscape or natural character values on Simons Pass;
  - d. The significant inherent landscape values identified by the landscape architect in 2006<sup>2</sup> largely remain intact and highly significant, warranting Crown administered conservation management;

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<sup>1</sup> Meaning the inherent value of such importance, nature, quality, or rarity that the land deserves the protection of management under the Reserves Act 1977 or the Conservation Act 1987: s2 Crown Pastoral Land Act 1998.

<sup>2</sup> Report by Ann Steven 2006 informing Department of Conservation Resources Report. Other reports were also undertaken addressing botanical, avian, and invertebrate values. These are addressed by Dr Walker in her statement for EDS.

- e. With reduced naturalness elsewhere on the Mackenzie Basin moraine and outwash in the past decade, the Simons Pass landscape has become increasingly significant; and
- f. Subsequent to the Department of Conservation surveys in 2006, the areas proposed by Land Information New Zealand (**LINZ**) for protection on Simons Pass have been very substantially diminished and now fail to address the highly significant landscape values.

## **EXPERIENCE**

### **Professional**

- 4. I hold a BSc in natural sciences (Otago), a post-graduate Dip LA, and, a Master of Landscape Architecture in landscape planning (Lincoln University). My thesis involved: *Identifying acceptable vegetation change in high country landscapes*. I am a registered NZILA landscape architect and was made a fellow of NZILA in 1987. I have received several NZILA premier awards for landscape assessment.
- 5. I have worked extensively in New Zealand's high country environments and in the Mackenzie Basin:
  - a. As a member of the government advisory body<sup>3</sup> on environmental policy that authored the publication *Tussock Grasslands: Landscape Values and Vulnerability*<sup>4</sup>;
  - b. As a member of the Land Settlement Committee administering pastoral leases in South Canterbury, including in the Mackenzie Basin;
  - c. As chair of the Nature Heritage Fund (**NHF**) 1990 – 2017 which assists landowners in the protection of biodiversity on private land. The NHF has published regional strategies and protected several inter-montane basin areas. The Canterbury Protection Strategy specifically identified the importance for the Pūkaki Ecological District and the short tussockland, wetlands, and shrublands;

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<sup>3</sup> NZ Environmental Council: 1982-1988.

<sup>4</sup> Michael Ashdown & Diane Lucas. 1987, NZ Environmental Council, Wellington. 119pp.

- d. As part of a joint assessment project with Boffa Miskell in 1993 to identify outstanding natural features and landscapes (**ONL**) of the Canterbury region, my team developed the land typing for the region. The Mackenzie Basin floor was assessed in that study to comprise an ONL. I peer reviewed the later Boffa Miskell 2010 regional study which again assessed the Mackenzie Basin to comprise an ONL; and
- e. I have undertaken landscape assessments for Resource Management Act 1991 purposes in the Mackenzie Basin. I have undertaken landscapes assessments for Crown Pastoral Land Act 1998 purposes in other areas of Canterbury.

### **Of Simons Pass**

- 6. In 2009 I provided independent evidence to Environment Canterbury for Mackenzie Guardians regarding the 110 resource consent applications for irrigation in the Mackenzie Basin, including at Simons Pass.
- 7. In 2012 I was requested by Mackenzie Guardians to attend a site visit to Simons Pass to review the irrigation proposal that had been appealed by several parties. However I declined to attend as the conditions imposed by the applicant (leaseholder) on the sharing of any information I recorded on the visit were in my opinion inappropriate.
- 8. Following attendance at formal mediation, I was invited by Mackenzie Guardians to attend an informal mediation session with the applicant regarding the Simons Pass irrigation consent appeal. There I requested and undertook a site visit on 3 September 2015 with Mackenzie Guardians representatives, as their independent landscape expert, accompanied by the applicant. I subsequently attended further mediation. I respect the confidentiality of that process.

### **SCOPE OF STATEMENT**

- 9. I have been asked by EDS to provide a statement regarding the adequacy of the Preliminary Proposal for protecting significant inherent landscape values. Last month I undertook a site visit arranged by LINZ agents for this purpose, which the leaseholder also attended. My assessment below is based on this recent visit alone and on review of the Preliminary Proposal and supporting documents.
- 10. The following issues are addressed:

- Approach to landscape assessment
- Landscape assessment
- Significance assessment
- Conclusion and recommendations

## **APPROACH TO LANDSCAPE ASSESSMENT**

### **Background**

11. Underlying land is an important basis for determining landscape character. Bedrock mountains and hills, and deposition country below, form the basis of this basin landscape. The landforms, impounding water and overlain with land cover and land use activity, are the physical landscape. Landscape also involves perceptual and associative attributes.
12. 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 system typing**

13. As developed for my masters study, land systems provide a useful and timeless basis to landscape analysis. Land system typing is a nested hierarchy approach, enabling refining or grouping at different scales of interest.
14. Applied in the Canterbury Regional Landscape Study<sup>5</sup>, land system typing analysis demonstrated the Mackenzie Basin as the largest Intermontane Basin. 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

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<sup>5</sup> Boffa Miskell & Lucas Associates. 1993. *Canterbury Regional Landscape Study*.

- H7 Isolated Mountain (or roche moutonnée)

15. All are present in the Simons Pass landscape.

#### **LANDSCAPE ASSESSMENT**

16. Most of the Basin floor is classified as **H1, H3 or H4**. The natural characteristics of these very extensive floor lands are essential to the natural landscape value of the whole Basin. The naturalness of the floor is essential in providing the association with the surrounding ranges, and the integrity of the Basin for a natural landscape experience.

17. The floor lands include major areas of depleted short tussock grassland. Minimal tall tussockland remains. Indigenous shrubs, cushion and mat vegetation are variously interspersed with short tussock. This mosaic of vegetation underpins the scene-setter lands of the upper Waitaki Basin. Without the landscape integrity of these floor lands, the value of the Basin landscape overall is reduced, as is the value of the Mackenzie country character in total. Aridness, semi-desert character, tussocks, naturalness, and openness are important. The natural landforms with the subtle natural formative patterning evident, through varying substrate deposition and drainage patterns across the outwash, are crucial to the Basin's significant landscape values. The unique floor character of the moraine and outwash needs careful landscape protection.

18. **H7 Isolated Mountain Land Type** (or roche moutonnée) comprises 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.

19. The naturalness of the Basin floor lands is very highly valued. Whilst the mountain slopes may be more visually prominent, the broad, open, uncluttered, arid 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.

20. Within the Basin, the degree of naturalness of areas varies in response to management and season - the invasion and removal of wilding trees; 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 do not detract from the Basin's naturalness and tell of a layer of heritage to the Basin.

### **Simons Pass**

21. Simons Pass plays an important role within the wider Basin landscape. The shore of Lake Pūkaki and the terraces to the Pūkaki River, the terminal moraine sequence of the Pūkaki Glacier and the great outwash exhibit unique landscape connectivity. The moraine tells a glacial advance and retreat story that traverses millennia. The young moraine toward the lake, the oldest (some 70,000 years old) furthest in, protruding through the outwash plain. The landscape unit which extends alongside the Pūkaki i lake, from below the Mary Range, demonstrates the key landscape values of openness, aridness, and legibility of a series of moraine advances; of trough excavation and lake infilling, of waters channelling, of outwash deposition, and of river terracing.
22. The proposed protection addresses only part of the moraine sequence and not the older moraine, not the associated outwash channel or outwash plain, nor the length of river terracing. The Preliminary Proposal addresses only a component of the extensive important remnant landscape. Only the front edge.
23. Simons Pass lease extends from close to the lake of Pūkaki southwards. The State Highway snakes through the moraine complex, crossing outwash channels. The Preliminary Proposal does not address the important outwash complex that lies north of the highway.
24. Protection of the road corridor experience along SH8 is important for natural science, particularly geodiversity, as the highway enables the enclosure of moraine, the outwash channels, and the outwash plain to all be experienced to some degree. The proposed protection addresses only part of this road corridor.

## **SIGNIFICANCE ASSESSMENT**

### **Background**

25. The purpose of tenure review is to freehold land whilst retaining significant inherent values. This includes retaining significant inherent landscape values.
26. Expected methods of retention involve identification, retention as Crown-owned land subject to Crown control, or freeholding with conservation covenants in perpetuity with conservation management required.

### **Mackenzie Basin & Simons Pass: Aoraki-Pūkaki Land System**

27. The geological history of the Mackenzie Basin tells<sup>6</sup> of the uplift of the Alps to the west and the ranges to the east, and, the depression of the Basin floor as three separate troughs which were covered in sheets of gravel. Several cycles of glaciation followed, cutting deeply into the mountains and depositing glacial debris to create the moraines and wide, low-angle outwash fans present today. The glaciers then wasted away to tiny remnants in the Alps. The former glaciers had enlarged troughs which filled to form major lakes (Tekapo, Pūkaki and Ohau) and the rivers draining the lakes subsequently cut down into the glacial outwash floodplains.
28. At the height of the last glaciation (40,000 to 30,000 years ago), the Tasman Glacier extended several kilometres beyond the southern shore of Lake Pukaki. At this time, the ice was so deep that Mt Cook Village would have been buried under a 700m depth of ice.<sup>7</sup> That major glacial stage ceased 14,000 years ago, and the Tasman Glacier has retreated from its terminus located on Simons Pass more than 60 km toward Aoraki. Pūkaki is a lake of meltwaters.
29. The Aoraki to Waitaki River is a story through millennia, a story that is highly legible and written down the long valley landscape.
30. From the moraine and outwash of the glacial terminus, the full landscape of this system back to Aoraki is highly legible.

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<sup>6</sup> J. Soons & M. Selby. 1992. *Landforms of New Zealand*.

<sup>7</sup> L. Homer and L. Molloy. 1988. *The Fold of the Land*.

31. That story is written in this landscape. From the moist mountains above with the remnant wet glaciers, down to the gentle semi-arid flats of the outwash plain, is a grand and dramatic story at the heart of Te Waipounamu. At the heart of the South Island, at the heart of the Mackenzie Basin, and of Aotearoa. The Aoraki- Pūkaki land system includes a text-book sequence of events that remain highly natural, highly legible and highly significant as an iconic New Zealand landscape.
32. The landscape is huge, grand, dramatic and its raw youth and dynamism contribute importantly to the international importance of this place.
33. The history of the Pūkaki River carving through the outwash is evident as a terrace sequence within Simons Pass.
34. Experienced from the terminus and outwash, the origins of these lands from the highly visible source at Aoraki, can be viewed and are much enjoyed. The Pūkaki - Aoraki relationship, from mountain summit down to the lake, terminal moraine, outwash plain and river, are enjoyed as a grand landscape.
35. With the moraine and outwash plain being within a semi-arid environs, erosion of the topographic nuances is minimal. Whilst gentle terrain, there is a steep rainfall gradient from the Tasman Glacier terminus (approx. 10,000 mm/year) to the Pukaki outwash plain (around 400 mm/year). With such low rainfall, the outwash landforms retain high legibility at both the grand scale and at the micro-topographic scale. As is demonstrated in the geomorphological research<sup>8</sup> for landforms less than a few hundred years old, the size of the lichens growing on surface boulders is a key informer. For landforms up to several thousand years old, the thickness of weathered crusts on surface stones is an indicator of landform age. The amount and stratigraphy of soil developed on a landform provides further cues.
36. *“The excellent preservation of Late Otiran landforms around the Pukaki glacial trough results from the favourable geomorphologic setting: the glacier terminated in a broad*

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<sup>8</sup> D. Barrell, B. Anderson, G. Denton. 2011. *Glacial Geomorphology of the central South Island, New Zealand*. GNS Science Monograph 27

*intermontane basin, remote from sources or erosion or sedimentation by marginal tributaries.*<sup>9</sup>

37. The Tasman Glacier is retreating rapidly back to Aoraki. To stand on the natural outwash plain, or on the older Pukaki Glacier moraine that protrudes through it, and view up to the source, to Aoraki, is a profound experience. The story of this land system is clearly written in the land from our highest point in the land down to the plain below. Whilst some 70 kilometres distant, through the naturalness of the context from which it is viewed, the landscape is read in its totality. Viewing different parts from different places, the mind assembles the whole. The connectivity and interplay of the system's components, the importance and drama of the heartland locale, the quality and rarity of such a natural experience, are in my opinion of very high significance.
38. The naturalness of the outwash plain lands, the naturalness of the sequence of moraine complexes, the naturalness of the outwash channels and the river sequence, these together provide the context for the immediate significance of the Pūkaki Flat landscape, of the landscape of the Simons Pass lease lands, and of the complex of the grand lake and its source and enclosing landforms.
39. The Aoraki- Pūkaki land system traverses the Simons Pass lease. The landscapes of Aoraki Mt Cook National Park were carved by glacial ice. They are young landscapes – less than 20,000 years old<sup>10</sup>. The Tasman River drains the remnant glaciers into Pūkaki.
40. Down the lake to the older complex, as recognised in the geopreservation inventory<sup>11</sup>, the Lake Pūkaki Terminal Moraine is *“A classic example because of the scale of the moraine. Classified as an extremely well-defined landform of scientific/educational value.”* Scientists have variously proposed that the hilly Pūkaki moraines be set aside as scientific reserves for landscape interpretation and education on climate history.<sup>12</sup>

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<sup>9</sup> D. Barrell, B. Anderson, G. Denton. 2011. *Glacial Geomorphology of the central South Island, New Zealand*. GNS Science Monograph 27

<sup>10</sup> L. Homer and L. Molloy. 1988. *The Fold of the Land*.

<sup>11</sup> J. Kenny, B. Hayward. 1998. *Inventory and Maps of Important Geological Sites and Landforms in the Canterbury Region, including the Chatham Islands*. Geol. Soc. NZ Misc. Pub. 98.

<sup>12</sup> Alice Doughty, Brian Anderson, and Andrew Mackintosh, Victoria University

41. The scientific value of the Pūkaki moraine to glaciologists is important for dating the glacial history, in paleoclimate research. Scientists from various parts of the world are working on this resource and the interpretation is being used in climate change predictions. The form of the land surfaces is important in reading the history. In terms of management, boulders should not be moved, as their character, positioning, and the fine material trapped beneath them assists in reconstructing the history. The moraine landforms are a sensitive and internationally important resource that should be protected. The geoscience value contributes importantly to landscape and natural character value. The proposal however proposes they be protected only in part.
42. Landforms tell the story of the Aoraki-Pūkaki land system; of the Mackenzie Basin. They display natural processes. Their legibility is greatly assisted by the diminutive vegetation that belongs on the extensive gravel and thin-soiled landforms. New Zealand is a global attraction for the naturalness and legibility of its dynamic landscapes. The Mackenzie Basin landscape is internationally unique due to its geomorphic, ecological and heritage attributes. Because of its connectivity and sequencing Simons Pass plays a critical role in retaining the Basin's overall landscape value.
43. The great trough that provides for the Pūkaki lake is up to 1000 m deep. Whilst Lake Pūkaki was dammed and raised (9m in 1952, 37m in 1976) the terminal moraine remains the terminus to the lake. The lake is enclosed by the natural moraine above newly formed beaches. The Simons Pass lease involves most of this terminus. The lease has a 4 km long frontage to the highway that runs along above the Pūkaki shore.

### **Methodology**

44. A geomorphic approach is an appropriate basis for assessing landscape and natural character in the high country. The naturalness of the landcover and landuse can then be considered, in terms of the significance of natural patterns, natural processes and natural elements.
45. Each moraine marks the past position of the terminal edge to the Pūkaki Glacier.
46. The Necklace is a special chapter in this glacial landscape history. The Necklace very legibly marks the extent of the oldest glacier.

47. The protection proposed addresses only the young areas of the terminal moraine, and not the older land patterning. The glacial history is a very important contributor to this landscape and the natural character. The natural glacial processes, which continue today, need to be accommodated in the protection proposal. The chapters in this glacial history book deserve to remain legible to those who experience this landscape recreationally and for its natural science.
48. Having recently observed the natural science legibility on the ground, the proposal cutting through the middle of the moraine sequence is inadequate. The pages in this text book landscape are laid bare. The natural patterns, processes and elements are highly evident. They require protection from land use disruption by any overlay of contrasting patterns, processes or elements that would detract and distract from the natural character. These natural attributes exhibit highly significant inherent landscape values.
49. The oldest glacially derived landforms project through the outwash plain, forming the Necklace feature. In clear contrast with the glacial deposits, the plain demonstrates alluvial outwash patterns, processes and elements. It exhibits very significant inherent landscape values for the full width of the unit, from near the base of the Mary Range across to the Pūkaki River terrace.
50. The Pūkaki terraces are evident cutting down through the outwash plain to the River. Below the dramatic scarp, the broad lower terrace contributes a different and more confined landscape experience. The river corridor contributes importantly to the overall Pūkaki system experienced.

#### **Summary of significance**

51. The CPLA requires that significant inherent landscape values be protected. That is, it is not about landscape features, it is about the landscape. The Preliminary Proposal instead proposes protecting only part of the younger moraine feature and river terrace. This does not address the highly significant landscape values that extend fully across the moraine and across the outwash plain and along the length of the river corridor.
52. The geodiversity of the Simons Pass lease landscape exhibits high natural character, and contributes importantly as an appropriately scaled example of the geological processes at the core of New Zealand. It is real world, visible, and tangible evidence of ice ages, of

natural climate change and of mountain building and eroding forces well demonstrated. It complex straddles the state highway and extends to near Lake Pūkaki i and along the Pūkaki River. The dramatic and exceptional demonstration of natural character and natural landscape within the deposition lands of the Simons Pass lease is such that the area identified in the Conservation Resources Report as having significant inherent landscape values I also assess as appropriate to be protected. However, I consider the central area that was excluded (within LU3) should instead be included. The central enclave has very important landscape and natural character value in demonstrating the sequence to older moraine. The enclave is an essential part of the greater Aoraki–Pūkaki land system. I understand that a menu of protective mechanisms is available. Although crown ownership and control must still be given preference. It may be that because the central area is where farming has concentrated, an alternative protective mechanism is appropriate to address the landscape values. This would need to be carefully assessed.

53. Whether visiting via the highway, a commercial flight, a glider, a cycle, a fishers' 4WD, walking Te Awaroa Trail or the Bullock Trail, or visiting a nearby reserve, the Simons Pass lease lands are a significant area of the Aoraki-Pūkaki landscape sequence. The moraine and outwash formations contribute high natural landscape value. The simplicity of the outwash plain at the grand scale, with the alluvial patterning variously evident, contributes importantly to landscape experience. The moraine formations are dramatic features within the grand landscape.

#### **DOC significance assessment**

54. Considering the 2006 assessment by Ms Steven and the lands as visited last month, there appears to be little change in the areas she identified as having significant inherent landscape values deserving of protection. However, in my view, there is considerable naturalness and important landscape continuity and character in the enclave she excluded. There was evidence that shelter belts had recently been removed. This removal has assisted the natural landscape legibility.

## **CONCLUSION & RECOMMENDATIONS**

55. In my opinion, the landscape values are of such importance, nature, quality or rarity that the land deserves protection management under the Reserves Act or the Conservation Act.

Diane Lucas  
18 July 2017