

THE
**MACKENZIE
BASIN
LANDSCAPE:**

character & capacities



prepared for
**MACKENZIE
DISTRICT
COUNCIL**

by

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NOVEMBER 2007

Prepared for



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MACKENZIE



outstanding
landscape



atmosphere

tourists



MACKENZIE

working
landscape



*yeh, right!
And who does
all the work?*



MACKENZIE

shelter
from
wilderness



hydro power



1 BACKGROUND

- 1.1 This report presents the outcome of a series of investigations, earlier reports and consultations and is intended as background for a Plan Change which the Council wishes to introduce.
- 1.2 In February 2007 the Council circulated my previous discussion paper '*Landscape Values of the Mackenzie Basin*' and in April and May 2007 I accompanied the Mayor and various Councillors and Council officers in visiting 26 of the station owners or managers. This represents the majority of stations, but not all of them, a few being unavailable. The intentions was both fact-finding and to gauge reaction to the discussion paper.
- 1.3 The Council subsequently met with various other stakeholders and now intends to prepare and publicly advertise its Plan change.
- 1.4 The issues herein represent my own professional opinion and should not be taken as an expression of Council or any other opinion or policy.

MACKENZIE BASIN DEFINITION

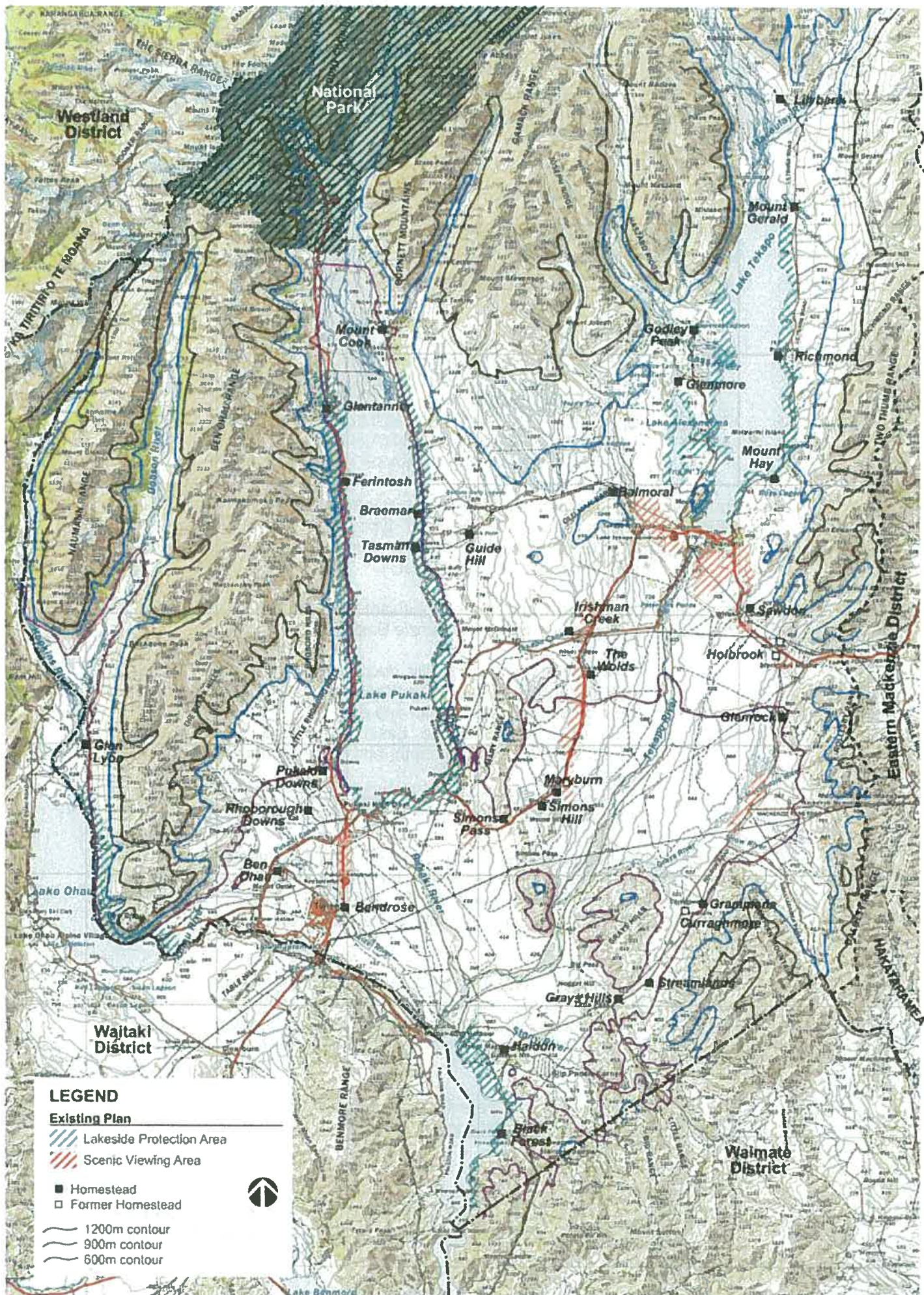
- 1.5 'Mackenzie Basin' refers to the area of Mackenzie District west of the Two Thumb Range, Dalgety Range and Rollesby Range watersheds, and west of Burke, Mackenzie and Hakataramea Passes. This forms the bulk of the high country part of the District.
- 1.6 The 'Mackenzie Basin' thus is distinguished from 'Eastern' or 'Lower Mackenzie' which comprises the lowland areas around Fairlie, Albury and Raincliff, and other upland areas of North Opuha, Four Peaks and Mount Peel Ranges.
- 1.7 The 'Mackenzie Basin' also should be distinguished from the 'Waitaki Basin'. The Ohau River and Lakes Ohau, Ruataniwha and Benmore form the boundary between Mackenzie and Waitaki Districts, and indeed between Canterbury and Otago traditionally. Thus although visually and conceptually 'Mackenzie Basin' for many people, the 'Waitaki Basin' south of Twizel and the Ohau River is in Waitaki District and is excluded from this report.
- 1.8 Aoraki/Mount Cook National Park is excluded from this study, being largely managed by the Department of Conservation.
- 1.9 **Map 1** shows the areas included within this study.

CHANGE TO THE DISTRICT PLAN

- 1.10 The Operative Mackenzie District Plan incorporates various measures for managing development and conservation in the Mackenzie Basin. These were

extensively discussed between residents, interested parties and the Council during the Plan review, and were either accepted by them or at least are an agreed balance between the various interests.

- 1.11 However problems have developed for the Council in the unforeseen numbers of applications for subdivision and housing in rural parts of the Basin, and further pending applications it is aware of. Also, the unforeseen number of tenure review applications that potentially could change the balance established under the existing Plan mechanisms, which were established generally with the leasehold farming system in mind. The Council therefore is considering what measures it may need to add to or amend in the Plan in view of these changes.
 - 1.12 The Council recognizes the existing Plan represents a considerable energy input of from various groups and individuals. It has not embarked on the current review lightly. However it is satisfied the magnitude of the pressures justifies the further effort.
 - 1.13 This report discusses landscape issues for consideration in this process.
-



Mackenzie Basin Landscape Map 1
MACKENZIE BASIN, TOPOGRAPHY, BOUNDARIES
 December 2007

2: MACKENZIE BASIN CHARACTER

PHYSICAL LANDSCAPE

- 2.1 The Landcare Research study '*Land Types of the Canterbury Region*' (Ian Lynn, for Lucas Associates, 1993) sets out following land types within the Mackenzie Basin:

H1	MAJOR RIVER, VALLEY FILL
H3	GLACIAL & FLUVIAL BASIN FLOOR
H4	BASIN FLOOR OUTWASH PLAIN
H7	ISOLATED MOUNTAIN
H15	SOUTHERN HUMID TO SUBHUMID MOUNTAIN RANGE
H17	SEMI ARID TO HUMID MOUNTAIN RANGE
H20	SOUTHERN MAIN DIVIDE & ASSOCIATED RANGES

These types are described in Appendix A while **Map 2** shows their distribution within the Mackenzie Basin. The land types systematise the underlying landform differences throughout the Basin and are one basis for the Landscape Character Areas that will be described later.

- 2.2 In addition to the land types, three significant gradients affect the landscape character and productivity of the Mackenzie Basin:
- i. RAINFALL: which generally decreases from north-to-south and with distance from the Main Divide, from the 'humid' north and west, to the 'semi-arid' south and east;
 - ii. ALTITUDE: which in the basin floors and valleys generally decreases from north to south, and in the mountains from west to east;
 - iii. SOILS: which reflect the rainfall gradient, with drier, shallower soils of generally lower fertility in the south and east
- 2.3 Combinations of these gradients, along with differing sun orientations and wind shelter, lead to significant differences in character and productivity throughout the Basin. The *Waitaki Basin Land Use Study* (Dept of Lands & Survey 1978) interprets these variables in a Climate Zone map, reproduced as **Map 3** herein.
- 2.4 The two most limiting factors are altitude, which dictates growing season and frost characteristics, and soil moisture, which dictates potential for plant or crop growth. With reasonable soil structure, growing season and water (natural or irrigated), the potential exists for farm development and intensification of the traditional extensive pastoralism.
- 2.5 The study indicates greatest potential for productive development in the arc Tekapo – Twizel – Benmore of the lower Basin.

Landscape Character Areas

- 2.6 A development of the above for the present purposes is shown in **Map 4** Landscape Character Areas. This shows a three-fold division into 'Basin', 'Hills'

and 'Mountain' areas according to land type, with a secondary subdivision of into areas of separate local interest, generally based on the lake/valley systems at right angles to the land types.

- 2.7 The Landscape Character Areas are useful for this study in allowing analysis to occur in areas of relatively homogeneous common interest.

LAND USE

- 2.8 Traditional land use in the Mackenzie has comprised high country extensive leasehold grazing, or 'runholding'. In the unforgiving conditions this has comprised a fine balance between man and nature with an emphasis on conservative operations to endure inevitable periodic snow, storm, wind or drought events.
- 2.9 Not all practises have been sustainable. Rabbits, heiraceum and wilding trees are drains on many properties, but the network of high country stations has endured as the traditional focus of land management throughout the Mackenzie Basin.
- 2.10 The 'natural' grasslands seen today thus are a modified working landscape whose grazing management by station owners has enabled self-funded maintenance of both the iconic scenic landscapes and the distinctive high country society that has evolved.

Towns

- 2.11 Before 1950, the Mackenzie Basin had two 'towns', Lake Tekapo and Lake Pukaki, comprising a pub and a very few other buildings at the river crossing to each lake outlet. A third 'town', and probably the most populous, was the Hermitage, comprising the tourist hotel and staff accommodation.
- 2.12 With the initial raising of the lakes in the early 1950's, the original Tekapo and Pukaki towns were removed. Tekapo was relocated up the hill and augmented by state employee housing while Pukaki was removed, and a new temporary construction town established at Twizel. Operations at the Hermitage grew in size in the 50's and 60's. In the last 15 years Twizel and Tekapo have become sizeable holiday and recreation towns.
- 2.13 The Basin thus has a tradition of two small towns as remote centres serving the even more remote and dispersed rural homesteads.

Power

- 2.14 Since the 1950's, hydro electric land use has been grafted into the grazing landscape. This comprises the damming and raising of lake levels at Tekapo Pukaki, Ohau and Benmore, and construction of massive power canals through the central basin. Many original settlements and land patterns thus have been lost and new hydro society introduced. Many runs were dismembered or re-arranged in the process, or lost good flats to the lake. Time has healed the considerable scars but the rivers are 'controlled trickles' compared to their former qualities.

Tourism

- 2.15 Tourists have been visiting the Mackenzie for well over 100 years. Mount Cook has its own long-standing alpine mystique, associated with other sight-seeing, skating, skiing, fishing and hunting passtimes. The Mount Cook and Southern

Lakes Tourist Company was a South Canterbury institution, along with guides and mountaineers such as Mannering, Bowie and du Freyer, to name but a few.

- 2.16 Holiday-making has diversified this pattern since the 1950's, with a growth of recreation and pastimes such as fishing, boating, tramping, hunting and skiing. The public now penetrate further throughout the Mackenzie Basin, and in greater numbers and frequency, than in earlier generations.
- 2.17 International tourism, while it always existed, also has increased greatly in numbers and frequency. Many tourists travel in tour buses, but independent campervans and rental cars also are a constant presence throughout the Mackenzie Basin landscape.

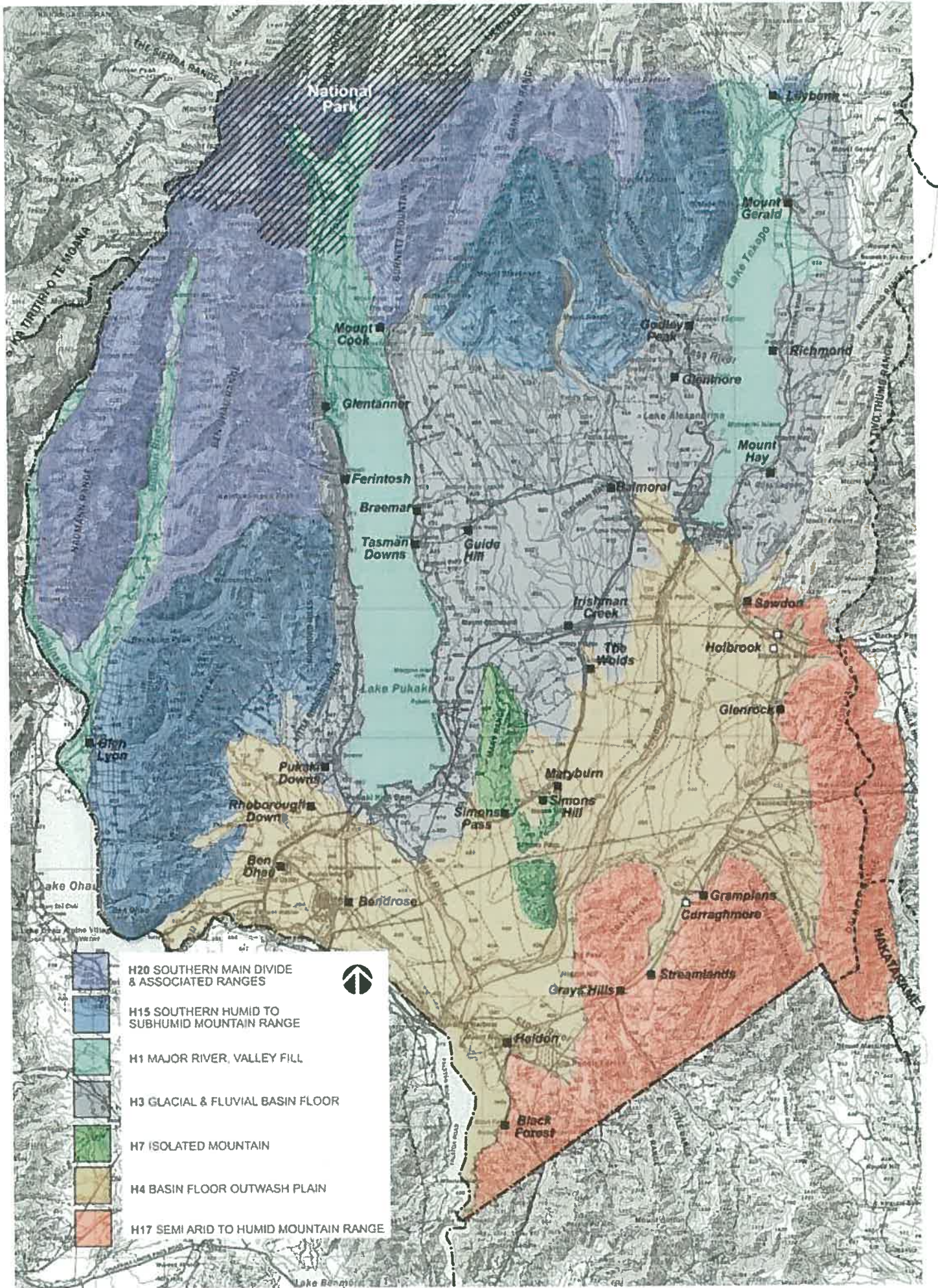
Conservation








- 2.18 In its differing manifestations, conservation has been practised throughout the Mackenzie Basin for more than 100 years. Early in the 20th Century it comprised the reserving of alpine areas as scenic reserves and later national parks, to maintain core areas in their then-existing natural state, and avoid further burning or grazing.
- 2.19 From the 1920's to 50's it also included attempts at afforestation under T.D. Burnett and R. St Barbe Baker at Mt Cook Station, and measures to combat the rabbit plague which was decimating the ground cover.
- 2.20 From the 1940's to 70's, conservation assumed a research and science component, with central government agencies, catchment boards and universities undertaking extensive studies of soils, landforms, climate, vegetation, rivers and erosion. Much of this work was background support for runholders, and led to various improvements in land management, such as avoidance of burning, retirement of erosion-prone land, and modification of grazing regimes.
- 2.21 Other activities concerned management of rivers for recreational fishing and dealing with problems of mountain erosion and hunting through a population explosion among introduced deer. It also concerned the altering of river and lake regimes for hydro electric generation, including flooding of the best lowlands of several lake-side stations.
- 2.22 Essentially in this period 1940's – 1970's, conservation was seen as a tool for deriving greater knowledge, towards implementing wiser land use
- 2.23 Conservation today assumes greater imperatives towards maintaining scarce resources and ecosystems of the planet and the Mackenzie, native ecosystems in particular. With increased numbers, spread and mechanisation of land uses, attention has been focussed on preserving endangered ecosystem components such as wetlands, birds or reptiles. The issue of landscape character has also arisen – that is, of a desire among some parties to maintain areas as representatives of particular landscape types. Meanwhile changed systems of government operations have lessened the free availability of 'research' to assist land managers.
- 2.24 These various changes often have put 'conservation' and 'grazing' into competing camps in recent years, as opposed to the previous co-operation. Market, land tenure and resource competition factors have led to a lessened

capacity of run holders to naturally adopt various conservation management balances that previously occurred in their day-to-day management.

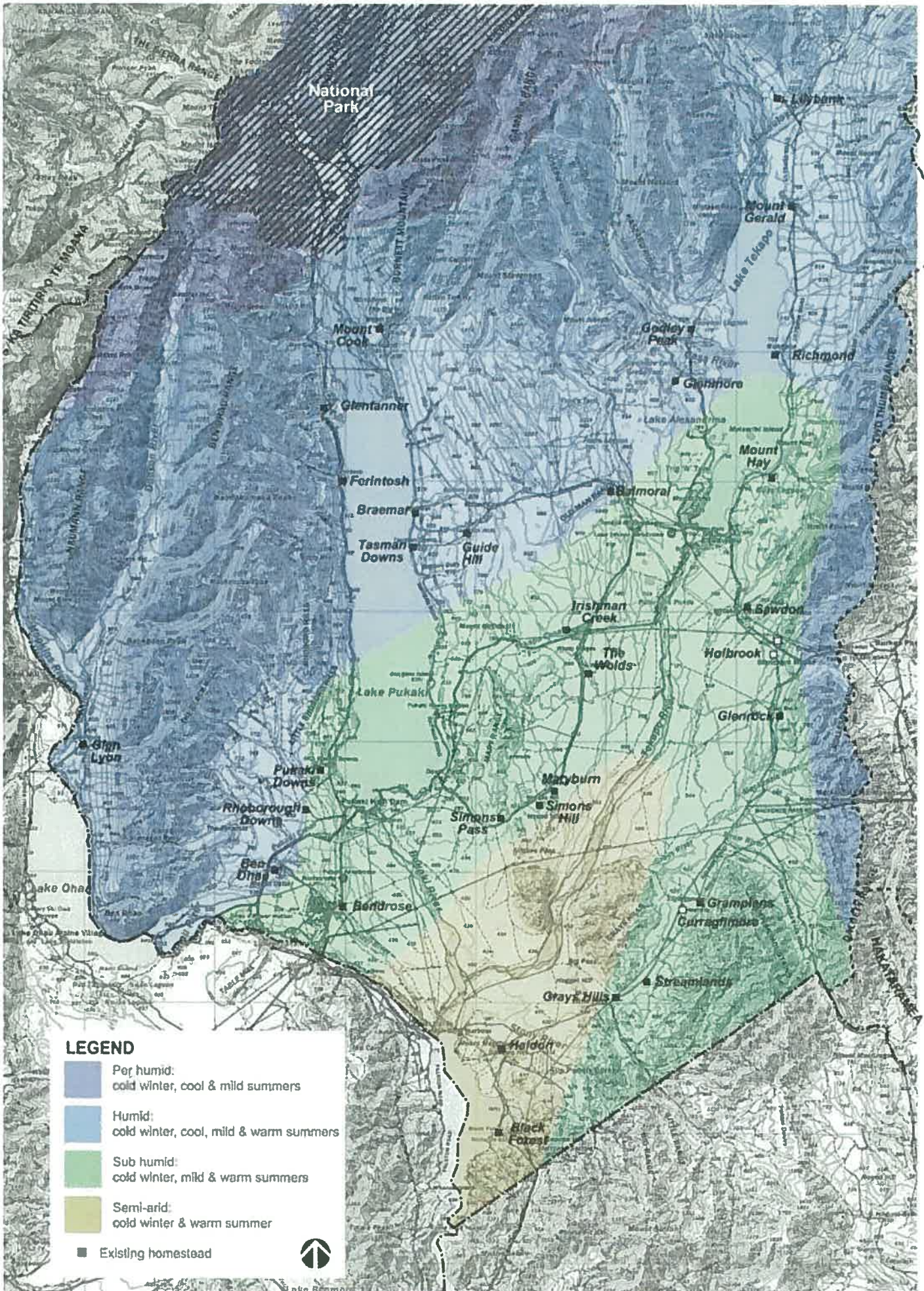
SOCIAL CHARACTER

- 2.25 Mackenzie has a distinctive traditional social pattern based on isolated, dispersed stations and homesteads. Each forms a small nucleus of domesticity and community within the vast, wild landscape. A strong pattern of self-reliance, responsibility and resilience, along with the physical isolation and grandeur of setting, has led to a South Canterbury mystique of names, places, deeds and family 'dynasties', some now fourth or fifth generation in the Basin.
- 2.26 Onto this have been grafted more recent communities of hydro staff, holiday makers, adventure tourists, and commercial operators who bring urban-based patterns to the Mackenzie. These often are less specifically 'Mackenzie' in character, but take on various elements of the mystique, depending on situation.
- 2.27 Timaru was traditionally the urban hub for shopping expeditions and boarding schools and the Mackenzie mystique was a proud component of the South Canterbury society. To arrive from beyond Burkes Pass in a dust or snow covered vehicle spoke to Timaruvians of men and women engaged in heroic deeds in a beautiful but demanding landscape.
- 2.28 CWF Hamilton epitomises this mystique, having the self-reliance and ingenuity to develop a workable jet boat at Irishman Creek. A visit to Burkes Pass Cemetery will show where CWF and Mrs Hamilton are laid to rest, among a wide range of kindred settlers and mountain people. The gravestones remind us the Mackenzie has exacted a harsh toll but also tell of people deeply immersed in the vivid culture and environment of the Mackenzie.
-



-  H20 SOUTHERN MAIN DIVIDE & ASSOCIATED RANGES
-  H15 SOUTHERN HUMID TO SUBHUMID MOUNTAIN RANGE
-  H1 MAJOR RIVER, VALLEY FILL
-  H3 GLACIAL & FLUVIAL BASIN FLOOR
-  H7 ISOLATED MOUNTAIN
-  H4 BASIN FLOOR OUTWASH PLAIN
-  H17 SEMI ARID TO HUMID MOUNTAIN RANGE





LEGEND

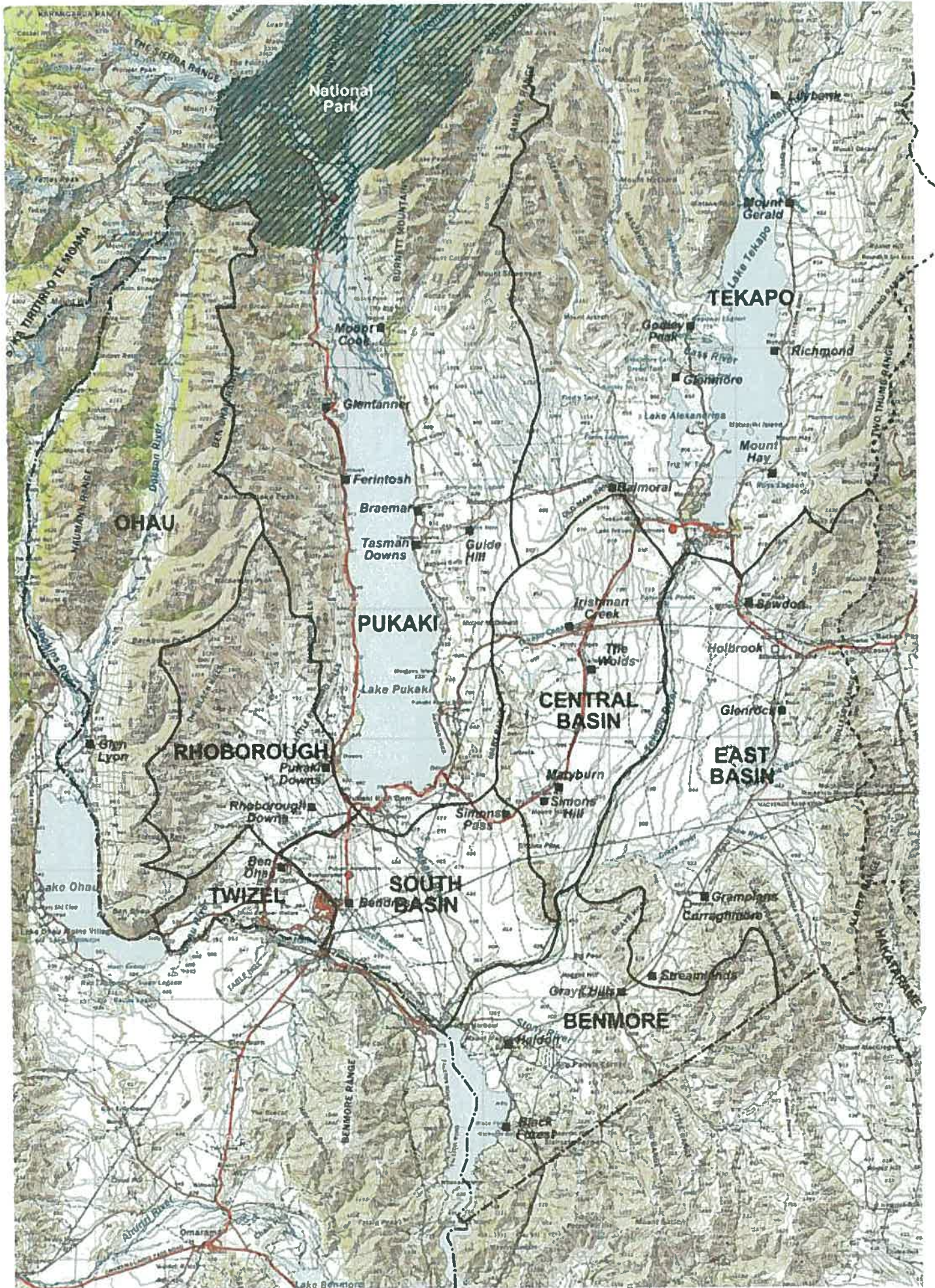
- Per humid:
cold winter, cool & mild summers
- Humid:
cold winter, cool, mild & warm summers
- Sub humid:
cold winter, mild & warm summers
- Semi-arid:
cold winter & warm summer
- Existing homestead



Mackenzie Basin Landscape Map 3
CLIMATE ZONES

(source: Waitaki Basin Land Use Study, Lands & Survey 1978) December 2007





Mackenzie Basin Landscape Map 4
LANDSCAPE CHARACTER AREAS

December 2007



3: LANDSCAPE VALUES

- 3.1 The Mackenzie Basin is a modified and managed landscape of specialized 'extensive-pastoral' land use. For 150 years of European history the land use system has maintained a fine balance between productive return and environmental conservation.
- 3.2 Despite its modified and managed land surface, virtually the entire Basin is 'outstanding' in terms of landscape values. This is because of the uniqueness, natural and visual qualities of the high-mountain basin environment, lakes, landforms, land use, society and Mackenzie identity. Until recently it also has been because of the extensive areas of minimally-modified land surface.
- 3.3 The landscape value of the Mackenzie Basin to date thus has resulted particularly from its natural landscape character, but also partly from its low levels of modification and from the cultural factors of land use (methods of land use), social pattern (settlement patterns) and identity ('mystique').
- 3.4 RMA practice equates the highest 'outstanding' values most often with a lack of modification ('pristine-ness'), and generally assigns 'significant' value to more modified areas where high naturalness is retained. RMA values thus are biased towards less-modified lands.
- 3.5 However this is paralleled by popular perceptions of New Zealand's 'wilderness' areas being 'rugged' (less-modified) and different from the intensively-farmed lowlands.
- 3.6 It thus has to be concluded that an element of the Mackenzie's landscape value is its distinctive forms of cultural modification and its different-ness from lowland New Zealand, and not solely its naturally-derived values.
- Earlier Studies**
- 3.7 An study entitled '*Landscape Change in the Mackenzie/Waitaki Basins*' was conducted for the Council by Boffa Miskell Partners Ltd in 1992. Its ultimate assessment was of 'visual vulnerability' of different landscape compartments of the Basin to change. The findings retain validity today and a redrawn version of the 'Visual Vulnerability' Map is reproduced as **Map 5**.
- 3.8 Regarding landscape character, the '*Landscape Change*' study concluded that the Mackenzie Basin, despite modification, retained a vividness, intactness and coherence that are strongly valued by large numbers of New Zealanders. It also concluded that the Basin was '*a very special place*'.
- 3.9 '**Coherence**' as a landscape terminology refers to
'the degree to which the visual resources of a landscape form a coherent, consistent pattern.' (quoted from Canterbury Regional Landscape Study, see below).

Case law refers to coherence as 'congruity' or consistency' and 'the harmonious connection of several parts of a system'.

- 3.10 That is, if a high country vista has few man-made elements, it will have high coherence levels. However also if it has man-made elements that fit the landscape with a consistent cultural pattern, then it also will have high levels of coherence. This study interprets the Mackenzie cultural patterns of homestead nodes and isolated roads as maintaining the high levels of coherence that result from the underlying natural harmony.
- 3.11 It is agreed that the Mackenzie Basin landscape has high coherence levels.
- 3.12 '**Intactness**' is a related but not identical concept of how much the sense of the natural landscape features remain or have been lessened by development. A feature of the Mackenzie Basin is its continuous high levels of intactness over wide areas of extensively-grazed land.
- 3.13 My interpretation of '**Vividness**' stems from the dictionary definitions of '*strong, intense, vigorous*'. Applied to the Mackenzie Basin, the colours and events are intense and ever-changing, through sky, land and lake colours, weather changes, wind buffeting, intense heat or cold, bright stars or rich sounds and smells.
- 3.14 If 'tame' or 'placid' are opposites of 'vivid', nobody would regard the Mackenzie as a tame or placid place. My interpretation is that it is a very vivid landscape and the description of the '*Landscape Change ...*' study is supported.
- 3.15 The '*Canterbury Regional Landscape Study*' was prepared for the then Canterbury Regional Council by Boffa Miskell Ltd and Lucas Associates in 1993. It established the component criteria by which landscape later came to be assessed in RMA proceedings as the 'Pigeon Bay criteria'. The *Canterbury Regional Landscape Study* remains valid today as a framework for landscape values at a regional level. The portion of its findings covering the Mackenzie Basin is reproduced as **Map 6**.
- 3.16 A perusal of Map 6 will show that the Canterbury Regional Landscape Study classified only the basins and lowlands of the Mackenzie, and Mount Cook National Park, as regionally outstanding landscapes but the mountains as regionally significant. That is, the mountains are of lesser landscape value than the lowlands.
- 3.17 My opinion is that at a district level the entire Basin constitutes an outstanding landscape and that the mountains are an integral part of the total landscape. This is not inconsistent with the regional study. It is accepted practise that local, district and regional-level evaluations may arrive at differing conclusions, depending on the scale of land covered.

Landscape Characteristics

- 3.18 Characteristics leading to the traditional Mackenzie Basin landscape being a 'very special place', are:
- i) *Long open views over brown grasslands (not necessarily native), unbroken over long distances through the general infrequency of trees or intensive improvements, particularly in the Basin floor [Openness, Naturalness];*

- ii) *A consciousness of the beauty of landform, through the unbroken grassland covering [Legibility, Naturalness];*
- iii) *Dramatic visual backdrop of the Southern Alps, including Aoraki/Mount Cook and 14 others exceeding 3000 metres [Vividness];*
- iv) *Other lesser encircling peaks and ranges such as Ben More, the Dalgety Range and Mount John, forming an interesting skyline and variable focal points;*
- v) *Alpine-oriented valleys of grand scale and dramatic mountain views, running from the main basin into the Alps proper, many with forested sides;*
- vi) *Elongated main lakes in these alpine valleys, with vivid and unique blue-green colour in certain light conditions [Legibility, Vividness];*
- vii) *Glacially-deposited rocks and landforms, such as u-shaped valleys, roches moutonnes moraines and erratic deposited rocks ;*
- viii) *Sense of naturalness due to the extensive land use practices;*
- ix) *Light brown landscape colour;*
- x) *Periodic nodes of black-green shelter trees around homestead of each run, containing home paddocks, farm and equipment sheds, main homestead and secondary houses, shearers quarters etc;*
- xi) *The hydro canals, lake outlet structures and lake margin drawdown pattern;*
- xii) *Harsh summer heat and prolonged winter cold, summer dryness, driving storms, strong wind from a variety of directions, and periodic conversion to a white landscape after winter snow;*
- xiii) *Vivid and frequent 'transitory' effects from clouds and atmospheric patterns, wind patterns on grass, storm fronts, fogs, hoar frosts, sunrises and sunsets, low-sun colours, moonrise and moonset.*
- xiv) *Astonishing brightness of stars and night sky (to outsiders);*
- xv) *Noise environment of silence, wind, birdlife and farm stock, away from roads and lakes;*
- xvi) *A spiritual mystique, allied to the mountains, rivers, weather and those who have farmed them;*
- xvii) *A mountain mystique, from generations of climbers, guides, rangers and tourists;*
- xviii) *Sense of different-ness from lowland New Zealand;*
- xix) *Small, well-separated towns;*
- xx) *simple road pattern and road margins.*

Future Values

- 3.19 The Council finds itself stretched between interests wishing to develop and capitalise on the Basin's resources, who would let the landscape values become whatever may eventuate following their actions, and those who would wish to take a highly cautious approach to change, to ensure the landscape values remain intact, despite many resources capable of development. Of course there are many shades of grey between the two.
- 3.20 The Council cannot ban all further development in the Basin or regard the current environment as a museum piece. It must maintain a viable society and economy to occupy and sustain the land. It must therefore consider allowing for appropriate modern development and land management, and for economic and social growth. The challenge is to achieve this while also maintaining essential

landscape values, landscape character, social character, and environmental stability.

- 3.21 The Mackenzie Basin is among the group of landscapes most qualified for 'outstanding' status in New Zealand. However the landscape varies markedly throughout the Basin and the Council needs to ensure its rules guards strongly against inappropriate development in the particular, variable locations, while continuing to encourage appropriate developments. This will be undertaken by a statement of values and capacities for each sector of the basin in turn.

Landscape Character Areas

- 3.22 For this study, the Land Types in Map 2 have been modified, to form a series of Landscape Character Areas. These are shown in Map 4 and are as follows:

- 1) Tekapo
- 2) Eastern Basin
- 3) Central Basin
- 4) Benmore
- 5) Pukaki
- 6) Southern Basin
- 7) Rhoborough Valley
- 8) Twizel
- 9) Ohau

- 3.23 Some areas have reasonable capacity to absorb such change whereas others have very little capacity for it.

high vulnerability: areas with little capacity for change – that is, the existing values are 'vulnerable'.

Medium vulnerability: areas with some capacity for change under strict controls

Low vulnerability: areas with freer capacity to absorb change without damaging the landscape values.

- 3.24 A map of this 'vulnerability to change' is shown on **Map 7**. This shows the extent and location of the various areas to be discussed below.

- 3.25 Each Landscape character Area will now be discussed in turn, as regards its capacity to absorb change without changing the outstanding landscape character.

1. TEKAPO LANDSCAPE AREA

- 3.26 This area comprises the watershed of Lake Tekapo, from its headwaters in the north to the moraines behind Tekapo village in the south, and from the Two Thumb Range summit in the east to the Gammack Range in the West. It also extends to the Fork Stream area near Balmoral Military Camp and the Balmoral Station.
- 3.27 This area contains Lilybank, Mount Gerald, Richmond, Mount Hay, Mount John, Balmoral, Glenmore and Godley Peak stations. Land has recently been freeholded at Richmond, but Glenmore also contains considerable lakeside

freehold areas that have existed in an undeveloped state for more than 100 years.

- 3.28 The outwash and moraine surfaces at the foot of the Two Thumb Range, (along the eastern side of Lake Tekapo), at the lake outlet (surrounds of Tekapo village), and south of the Hall and Gammack Ranges (west of Tekapo), are in my opinion generally very vulnerable to change. This is because they comprise sloping, widely-visible, continuous land facets which also are in a very unchanged, open, continuous natural state, unbroken by overt development. These surfaces are part of the superb lake setting and are very sensitive to change
- 3.29 However incised creeks cross the surfaces east and west of the lake, creating small bands across the slopes which are sunken from sight, and less vulnerable to change. This refers to creeks south of Mount Gerald homestead on the east side of the lake and between Godley Peak, Glenmore and Balmoral homesteads west of the lake.
- 3.30 From Godley Peak to Glenmore homesteads is an area of developed river fan with low vulnerability for change away from the shoreline, that is, inland from the public road. The 'low vulnerability' area has been drawn to exclude several Sites of Natural Significance on this fan.
- 3.31 Shoreline indentations and broken topography around and north of Mount Hay homestead are shown as 'medium vulnerability', with some ability to absorb change. However the eastern and western shorelines of Lake Tekapo generally are highly vulnerable to change.
- 3.32 In my opinion vulnerability classifications of the eastern side of Lake Tekapo in the 1991 study are inappropriate in that they significantly underestimate the vulnerability. This refers particularly to the lakeshore, which it classifies as low vulnerability. My opinion is that these areas are highly vulnerable to change except for small areas within the incised streams.
- 3.33 In fairness to the authors of that study, it was at that time addressing the issue of forestry conversions, not development generally.
- 3.34 Sites of Natural Significance occur in the Round Hill area east of the lake, west of Mount John, and in the Sunday Tarn – Irishman Creek headwaters areas west of the lake.
- Tekapo Headwaters**
- 3.35 The alpine riverbed and valleys above Lake Tekapo, that is, the Godley and Macauley Rivers, are highly vulnerable to change due to their openness and naturalness. The river beds, flats and adjacent slopes form a continuous areas of highly natural, highly visible, iconic open high country lands. The Godley and Macauley River beds are Sites of Natural Significance. The alpine valleys above Lake Tekapo are among the most sensitive areas to change of any in the Basin.
- Homesteads**
- 3.36 Confined areas of plantations, farm buildings and developed rural land surround 7 of the 8 homesteads in this area. The eighth, Mount John homestead, has now been absorbed by the growth of Tekapo village. The homestead areas have low vulnerability to change within their planted areas.

Small Lakes

- 3.37 Lakes Alexandrina and MacGregor form a small independent land unit set below the general land surfaces west of Lake Tekapo. Outside their established crib settlements these lakes are very vulnerable to further change, because of their coherent, open natural setting..

Mountain Areas

- 3.38 Raised uplands occur in the Hall Range north-west of Lake Tekapo, the Two Thumb Range east of the Lake, the isolated upstanding Mount John, and in unnamed hills south of Balmoral homestead. These are uniformly very vulnerable to change due to their wide visibility over long distances and very high levels of naturalness. All are over 900 metres and unlikely to be subject to agricultural development.

Tekapo Village

- 3.39 The Tekapo Village built-up area is significantly modified but the setting surrounding the town is sensitive to change. This refers particularly to the eastern and western flanks of the lake leading north from the town, to the flanks of Mount John, the environs of the state highway, and the moraines that form the south boundary of the town.
- 3.40 Forested land east of the Lilybank Road turnoff has low vulnerability to change, and within constraints of the highway viewing corridor and Ecan land ownership, is suited to future development.
- 3.41 An extensive Site of Natural Significance exists on the moraines south of the village.
- 3.42 It is important that the landforms surrounding Tekapo village be maintained in a natural state, if a strong sense of the alpine setting and 'Mackenzie character' is to be maintained. In particular, town development should not straggle over the town surrounds, but should be maintained as a sharp urban-rural cutoff.

State Highway Corridor

- 3.43 An area of moraines and hills south east of Tekapo village, towards Sawdon station, is very vulnerable to change due to its proximity to and prominence from the town and state highway. Some but not all of this vulnerable area is included in the Scenic Viewing Areas of the District Plan, shown on Plan 1.

Mount John Optical Area

- 3.44 The area surrounding Mount John is shown as 'high vulnerability' due to the high standards of light spill avoidance the observatory calls for.
- 3.45 The areas and vulnerabilities as described are shown on Map 7.

2. EASTERN BASIN LANDSCAPE AREA

- 3.46 This area comprises the open land between Tekapo Village in the north and the Grays Hills upland in the south, and from Burke, Mackenzie and Hakataramea Passes and the Rollesby and Dalgety Ranges in the east to the Tekapo River in the west.

- 3.47 This area contains the Sawdon, Holbrook, Glenrock and The Grampians homesteads, and also parts of Rollesby, Mt Dalgety and Grays Hills stations, but not the homesteads (the Rollesby and Mt Dalgety homesteads are outside the Basin).
- 3.48 The bulk of this landscape area comprises an extensive open semi-arid outwash basin which generally is very sensitive to change due to its continuous, flat or steeply uplifted, undeveloped topography with little variation or surface incisions.
- 3.49 The bulk of the area is uniformly open over very wide expanses of 20 – 25 kilometres, giving a vast, magnificent grandeur as foreground to the Main Divide mountains to the west. The fans east of the Haldon Road and raised bulk of the Rollesby/Dalgety Ranges are widely visible over long distances, being elevated to view. The continuous grassland surface, largely devoid of trees, is a component of the areas high vulnerability, because changes are widely visible.
- 3.50 The visibility of this landscape area from State Highway 8 as it enters the high country, is an added factor of its vulnerability. Because of its impact as the first high country seen by travellers on the tourist route to the mountains and southern lakes, and also the first views of the Main Divide mountains, including Aoraki/Mount Cook, this is an iconic area of landscape.
- 3.51 Small areas of low landscape vulnerability occur around the edges of this basin, where the ranges and hills intersect with the basin floor. Here, the indentations of small valleys, spurs and creeks offer opportunities for change that do not affect the wider plains. Developments around the edges of the basin surface would have less widespread effects than those in the centre.
- 3.52 Visually the incised Tekapo River corridor also is less vulnerable to change, but the entire area is a Site of Natural Significance, leaving only occasional areas of low vulnerability within the margins of the valley but outside the SNS areas.

3. CENTRAL BASIN LANDSCAPE AREA

- 3.53 This area comprises the basin between Tekapo in the north and Simons Hill in the south, and between the Mary Range skyline in the west and the Tekapo River in the east. It contains the homesteads of Irishman Creek, The Wolds, Maryburn and Simons Hill stations, as well as portions of Balmoral and Simons Pass land.
- 3.54 As State Highway 8 traverses this area, the visibility of the land from the highway forms an important component in vulnerability ratings. Although in many respects similar to the Eastern Basin, this area is more topographically varied, therefore having less-vulnerable portions. However only small areas are rated as of low vulnerability, where removed from outlook of State Highway 8. The Mary Range, while lower than the hills of the Eastern Basin, nevertheless are mostly of high vulnerability because of their proximity to State Highway 8.
- 3.55 An extensive Site of Natural Significance occurs east of SH 8 on what is believed to be Maryburn land. Another, also mentioned in relation to the Eastern Basin, covers the entire Tekapo River within this landscape area.

Scenic Viewing Areas flank most of State Highway 8 from the Tekapo Canal to near the Simons Hill homestead (see Map 1).

- 3.56 The vulnerability pattern of this landscape area is similar, but not identical, to that of the 1992 study.

4. BENMORE LANDSCAPE AREA

- 3.57 This area comprises the parts of the Mackenzie Basin south of the Grays Hills landform and bounded by the lower Tekapo River, Lake Benmore and south to the district boundary between the Kirkliston Mountains and Lake Benmore.
- 3.58 Four homesteads, Streamlands, Grays Hills, Haldon and Black Forest are included in this area, plus the former Curraghmore, which is believed to have been amalgamated with Streamlands.
- 3.59 This landscape area is in several respects the least-typical of the Mackenzie, being the lowest and driest area, and being isolated by virtue of its being 20 – 40 kilometres from the state highway on a no-exit road (no exit if the restricted-access Benmore Transmission Line Road is not considered).
- 3.60 This landscape area has its own particular very strong landscape values: a) its sublime views to the Aoraki/Mount Cook Main Divide mountains directly to the north; and b) the surface, shoreline and setting of Lake Benmore which, although man-made, is an outstanding landscape feature in its own right. Lake Benmore is both a visual and recreation asset for this area.
- 3.61 Vulnerability is high on the flats between the Haldon Road and the Tekapo River, except at the edges where those flats meet the Grays and Haldon Hills, where it is moderate. Vulnerability is also high on the raised landforms of Grays Hills, the Grampian-to-Ross Stream Mountains, and the Beacon Hill mountains backing the Black Forest homestead.
- 3.62 Vulnerability is moderate from the Grampians to Grays Hills homesteads, which is an enclosed valley, and low on the lowlands south of the Haldon Road, from Grays Hills to Black Forest homesteads, excluding the Lakeside Protection Area, which is moderately vulnerable.
- 3.63 A Lakeside Protection Area exists around Lake Benmore, as seen in Map 1. This is wide on the Haldon – Black Forest Flats, but continues south around the Benmore shoreline to the district boundary as a narrow band. The hill land flanking Lake Benmore south of the Black Forest homestead is generally very vulnerable to change because of its simple, continuous grassland covering, apart from small lowland gullies, which are of moderate vulnerability. This land is not much seen from Mackenzie District but is widely prominent from the west side of the lake, within Waitaki District.
- 3.64 This assessment for the Benmore Character Area accords reasonably well with that of the 1992 vulnerability ratings.

5. PUKAKI LANDSCAPE AREA

- 3.65 This area includes the watershed of Lake Pukaki, from Mount Cook National Park in the north to the lake outlet and moraines in the south, and from the Ben Ohau Range in the west to the Mary Range – Gammack Range summits in the east.
- 3.66 Within this area are 6 homesteads – Mount Cook, Braemar, Tasman Downs, Guide Hill, Ferintosh and Glentanner. Also included is land of Irishman Creek, The Wolds, Maryburn, Simons Pass, Roboro Downs and Pukaki Downs stations, but not the homesteads. Additionally, part of the Army training area extends into the eastern margins of the Pukaki area.
- 3.67 This is a large area, with classic, iconic views extending 60 kilometres from the lake outlet to Mount Cook. It also includes the land of more stations than any other landscape area, and is central to the hydro electric interests of Meridian Energy.
- 3.68 The Pukaki Landscape Area is of central importance to the NZ tourist industry. Visually, it provides iconic views and access up the lake to Aoraki/Mount Cook and encapsulates one part of the 'beautiful New Zealand' image that brings tourists to this country.
- 3.69 Views from the two state highways, 8 and 80, and the landscape they pass through, are of importance in this area. Other aspects of importance are the lake flanks (both sides), the Tasman River, the eastern and western surrounding ranges (Ben Ohau, Mary and Gammack-Burnett), and the hydro canals.
- 3.70 High vulnerability is accorded in general to:
- all aspects of the lake, lake shore and flanking hill/mountain slopes;
 - the Mary Range skyline and slopes facing the lake, generally;
 - the Braemar – Tasman Downs slopes and skyline in general;
 - the Tasman River;
 - the moraines that impound the lake, where visible from the lake or state highway;
 - the margins and immediate surrounds of the state highway up the west of the lake and local road up the east side, and in general to all land between those roads and the lake;
 - the outlook from State Highway 8 as it reaches the lake from the east (Tekapo) side, including in particular, the visible surfaces above the lake and eastern road, and extending approximately to the extent of the existing Lakeside Protection Area;
 - the southern margin of Lake Pukaki as traversed by State Highway 8, from the lake shore to the skyline;
 - the wide surfaces of Army and Braemar land below the Gammack Range.
- 3.71 Medium Vulnerability is accorded to:
- incised gullies and recessed land in the upper Braemar surfaces and including Army land;
 - Exposed surfaces in the same areas where the wilding issue needs continued active management;
 - The planted and wilding forests of Mount Cook station;

- Hilly, wilding-infested land on Rhoborough and Pukaki Downs between State Highway 80 and the lake;
- Localised areas of gentler-sloping fan or terrace west of the Tasman River on Ferintosh and Glentanner stations.

3.72 Low vulnerable is accorded to:

- selected small localities in hummocks, depressions and hidden areas of the eastern hills, from the Mary Range to Braemar;
- small indented areas above the eastern shoreline road;
- occasional small points above the Mount Cook Highway (west side of lake), and one point on the lake side of the highway where hidden by topography;
- Moraine surfaces below the lake outlet where they do not look onto the lake

3.73 This assessment differs from the 1992 study, which showed very little high vulnerability land in the Pukaki landscape Area. The current assessment holds that this iconic and highly visible belt of land is of high vulnerability

3.74 It is accepted that areas of medium and low sensitivity exist within the Pukaki Management Area, and are capable of accommodating development. However this current study generally rates the main surfaces and 'background level' of the Lake Pukaki and its setting as of 'high vulnerability', and accords medium or low rating to small localities within this general area.

6. SOUTH BASIN LANDSCAPE AREA

3.75 This area comprises the open outwash plains between Lakes Pukaki in the north and Benmore in the south, and between the Ohau and Tekapo River lower reaches in the west and east. It also contains a small segment of the uppermost shoreline of the Lake Benmore. In the east this area contains the Simons Hill landform to its summit line.

3.76 Within this area are the homesteads of Simons Pass and Bendrose stations, and land but not the homestead of Simons Hill station.

3.77 This land is generally of high vulnerability to change, being mostly flat, visually open, and traversed in part by State Highway 8, which contains a Scenic Viewing Area as it enters the Pukaki Moraines (see Map 1).

3.78 High vulnerability areas are:

- the entire basin flats area from SH8 to Lake Benmore;
- the raised flanks of the Simons Hill landform, extending to SH8;
- the SH8 outlook both east of Pukaki (Simons Pass area) and between Pukaki and Twizel;
- the outlook from Twizel town generally, east of SH8 and between the Twizel to Ohau Rivers;

3.79 Medium vulnerability areas are:

- Moraine areas south of Pukaki where out of view of SH8;
- Ohau River bed;

- 3.80 Low vulnerability areas are:
- Pukaki River bed;
 - Treed areas of Twizel River and Bendrose Stream below SH8;
 - Treed areas of Fraser Stream from Pukaki Canal to SH8;
- 3.81 Extensions of the Twizel urban area north of the Twizel River, including recent holiday homes and airport development north of the river, is an issue for the rural character of this landscape area. These developments are highly visible from the state highway the recent airport development in particular successfully eliminating any semblance of high country or Mackenzie character.

7. RHOBOROUGH VALLEY LANDSCAPE AREA

- 3.82 This name has been coined for the valley area of the Twizel River above the Pukaki Canal. It was so named to distinguish it from the area around Twizel town. It extends from the Ben Ohau summits in the west to State Highways 8 and 80 in the north and east, and the Pukaki Canal in the south
- 3.83 This area contains the homesteads of Rhoborough and Pukaki Downs and land of Ben Ohau station.
- 3.84 Of high sensitivity are:
- The middle and upper mountain flanks in west and north;
 - Open river flats west of Rhoborough homestead;
 - Open outlook west of State Highway 8 near the Rhoborough entrance.
- 3.85 Of medium sensitivity are:
- Flats and lower slopes west of upper Twizel river;
 - Upper Twizel River headwaters;
 - Wilding forests west of SH80 on Pukaki Downs and Rhoborough stations;
- 3.86 Of low sensitivity are:
- Plains and lower slopes from Dry Stream to Darts Bush Stream (north of The Pyramid);
 - Areas of enclosed valley east of upper Twizel River and eastwards to Pukaki Downs homestead, where these are low in the landscape;
 - Localised terrace areas of Pukaki Downs station west of SH80.
- 3.87 In this landscape area an extensive wilding problem exists from the upper Twizel River to SH80, and extending north and east into the Pukaki Landscape Area, along SH80.

8. TWIZEL LANDSCAPE AREA

- 3.88 This landscape area includes Twizel village and its surrounding developed lands, from SH8 in the east to the Lake Ohau outlet in the west, and from Lake Ruataniwha/Ohau River in the south to Glen Lyon Road and 'the Pyramid' ridgeline in the north.

- 3.89 This area contains the Ben Ohau homestead and the lands of the now extinct Ruataniwha station, as well as the 'former construction town-turned respectable', Twizel, which is the largest urban settlement in the Mackenzie Basin. It also contains the most-established rural-lifestyle areas in the Basin, along the northern shoreline of the man-made Lake Ruataniwha, and at Manuka Terrace west of the Pukaki Canal.
- 3.90 The Mackenzie/Waitaki District boundary runs within Lake Ruataniwha on the course of the former Ohau River, but also follows the Ohau River above the lake where this is still flowing.
- 3.91 High vulnerability areas are:
- Skyline and flanks of 'The Pyramid' ridgeline;
 - Pukaki Canal and adjacent landforms near Mt Ostler;
 - Lake Ohau outlet, north side (the south side is in Waitaki District)
- 3.92 Medium vulnerability areas are:
- Ohau River bed and flanks above Lake Ruataniwha;
 - Ohau Canal vicinity;
 - A small area west of State Highway 8, approaching the Ohau River bridge (Ruataniwha dam) from the north;
 - Any parts of Fraser Stream north of Glen Lyon Road, where not in the Southern Basin Landscape Area;
 - Mt Ostler – Ben Ohau homestead area
- 3.93 Low vulnerability areas are:
- Rural margins of Twizel, from the west boundary of the town to the vicinity of the Pukaki Canal;
 - Southern margins of Twizel to, and including, Lake Ruataniwha margins;
 - Rural lifestyle area bounded by Pukaki and Ohau Canals and 'The Pyramid' ridge.
- 3.94 This is the area of the Mackenzie basin with the highest levels of development and lowest levels of naturalness. However within this very changed environment remain areas of high importance for the character and naturalness of this locality. This refers in particular to remaining parts of the upper Ohau River, its outlet from Lake Ohau, and the enclosing ridge which forms the southern termination of the Ben Ohau Range.
- 3.95 This assessment should not be taken as implying the rural margins of Twizel are not of landscape value. It makes the point that the areas south and west of the town no longer possess the open high country character of the basin generally, due to rural subdivision and development, plus the influences of the nearby town. The margins of Twizel are of value in creating a rural and as far as possible alpine setting for the town and should be planned for those rural values. However this will not be of the low density, remote character found in most of the rest of the Basin. The Council should continue to plan for a controlled edge and linkages between Twizel and its western and southern surrounds.

9. OHAU LANDSCAPE AREA

- 3.96 This area includes the south and western flanks of the Ben Ohau Range, descending to the shoreline of Lake Ohau. It also contains the valley of the Dobson River, which runs 45 kms north to the Main Divide, the east side of the Hopkins River valley which also runs to the Divide, the intervening Neumann Range, and the west side of the Ben Ohau Range.
- 3.97 The Mackenzie/Waitaki District boundary follows the eastern shoreline of Lake Ohau (the lake itself is in Waitaki District), and thence the Hopkins River to the Main Divide.
- 3.98 There is one station in this landscape area, Glen Lyon, which is run in association with Huxley on the Waitaki side. Access to Glen Lyon is via the east shoreline of the lake.
- 3.99 This whole area is remote and in a very natural state. It is assessed in its entirety as of high vulnerability, except for the immediate homestead vicinity, which is of medium vulnerability.
- 3.100 This differs from the 1992 study which assessed large areas of the river flats and valley floor as of moderate vulnerability.

LAKES AND MARGINS

- 3.101 The Mackenzie Basin as defined contains two of the South Island's 10 'Southern Lakes', Lakes Tekapo and Pukaki. It also contains the smaller Lake Alexandrina and parts of Lakes Benmore and Ruataniwha. Also the eastern shoreline of a third 'Southern Lake', Lake Ohau, although not the lake surface itself, which is in Waitaki District.
- 3.102 Although modified and in two cases man-made, these lakes are the jewels of the Basin, and are of particularly outstanding value. Pukaki and its setting are tourist icons, both visually and as the approach to Mount Cook/Aoraki. Tekapo is visually similar, but without the public access at the head of the lake. Pukaki and Tekapo are unique in continuing to be glacier-fed, possessing a distinctive turquoise colour in sunny conditions. Ohau is similar in importance among the Southern Lakes, and its margins within Mackenzie District should be considered in the same terms as those of Tekapo and Pukaki.
- 3.103 Lake Alexandrina is of smaller scale and different character, but is a much-valued fishing lake, also iconic of its type. Lake Benmore, while man made, has a scale and ruggedness of outstanding value. Although the shoreline within Mackenzie District is gentler and less dramatic than much of the rest of the lake, the totality of Lake Benmore dictates that those parts of the lake and its surrounds within Mackenzie District should be considered outstanding.
- 3.104 The landscape values of the lakes arise from the naturalness, vastness, glacial colouration, legibility, scenic and visual unity of both the lake surfaces themselves and their surrounding settings. The totality of lake and setting portrays the formative processes to high standards of legibility, but also are highly 'scenic' in lay terms.
- 3.105 In the existing District Plan the Council recognised the value of the lakes by establishing 'Lakeside Protection Areas' in parts of the surrounds. These are

shown in Map 1. However the Protection Areas are in some cases proving neither extensive enough nor the rules robust enough to afford the necessary protection, particularly in view of the potential freeholding of further tracts of the lake margins.

- 3.106 The District Plan provisions require an urgent rethink, regarding both immediate lakeshores and the wider settings of lakes, to ensure their landscape values are not compromised by development. It is envisaged that if the Council adopts the approaches mooted in this study, there would be no need for continuance of the Lakeside Protection Area system. This is because equivalent levels of control would cover the rural high country areas generally, including lakeside areas.

SUMMARY VISUAL VULNERABILITY

- 3.107 From the above, areas of particular or high vulnerability to development can be summarised as:

- the wide basins;
- lakes and lakesides, including shorelines and lakeside hill and mountain flanks;
- raised mountain ranges, hills and isolated mountains;
- river corridors;
- particularly pristine areas of continuous natural grassland, low development levels and visual vividness;
- sites of natural significance;
- state highway margins and viewpoints;
- tourist 'icon' points;
- town settings, outlooks and backdrops;
- Mount John optical area.

- 3.108 It is envisaged that areas of high vulnerability should be areas where development is not contemplated by the Council or property owners. It is emphasised that 'development' in this context refers more strongly to subdivision and residential building than to bona fide farm development, although farm developments also will have its own thresholds of effect on the landscape values.

- 3.109 All landscape character areas contain locations with low vulnerability to change, meaning that it would be possible throughout the Mackenzie Basin to provide for economic and social development, while still maintaining the main landscape values.

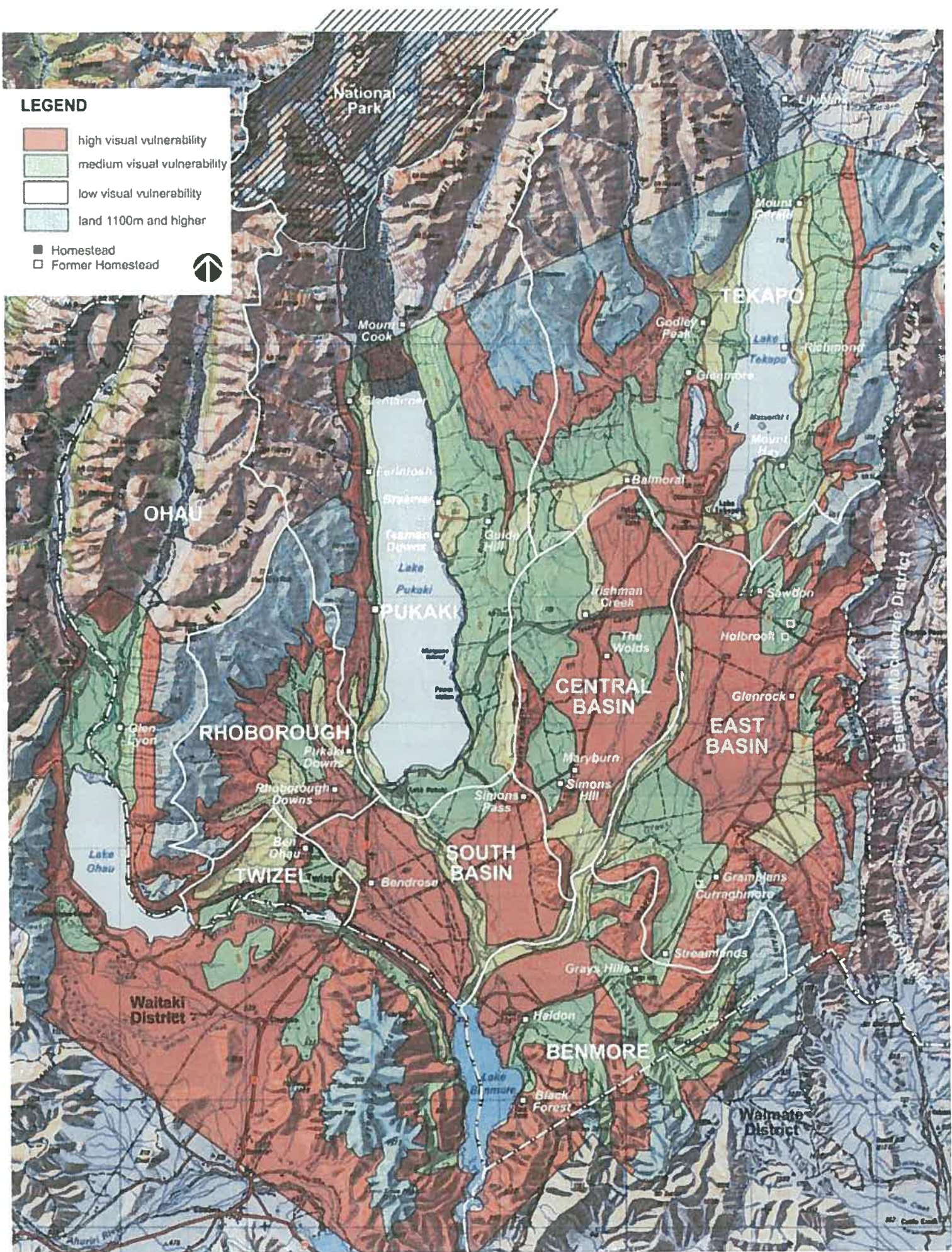
- 3.110 Areas of low vulnerability to development include:

- Recessed valleys at the meeting point between plains and surrounding hills;
- Valleys and gullies incised below the generally-seen surfaces;
- Recessed gullies and indentations back from lake shorelines;
- Areas of tree shelter and buildings in existing homestead nodes;
- Areas of existing subdivision and rural-residential development near Twizel;

- 3.111 In general it is in the low vulnerability areas that future building and residential developments should be provided for, in order to keep the pressure off highly or moderately vulnerable areas.
- 3.112 A third category between the above two extremes comprises areas of 'moderate vulnerability'. These are areas which remain vulnerable to change, but are not highly vulnerable by being less prominent to view or having more existing 'development' such as tree growth or land surface disturbance.
- 3.113 These are areas where modest or light developments may be considered but should not be extensive and should be configured to fit into the landscape with a high degree of conformity.
- 3.114 The Mackenzie Basin possesses strong landscape values, some of which are common to the Basin as a whole and others which vary distinctively between areas.
- 3.115 Continued uncoordinated and random development risks unnecessary loss of the Basin's special landscape values. The Council would be negligent to not seek coordination of future developments through the District Plan, in order to maintain as much as possible of the Mackenzie character for future generations, and also in view of its obligations under the Resource Management Act.
- 3.116 The Basin strongly needs ongoing land and community development where appropriate, so the Council has to be realistic about pressures driving landowners and community change.
- 3.117 This is a working, occupied landscape and further landscape change cannot be avoided. This study attempts to devise better definitions of appropriate and inappropriate development, to allow for appropriate development where specified, and for more clear-cut avoidance of development where not appropriate.

CAPACITY TO ABSORB DEVELOPMENT

- 3.118 It was stated in 3.24 above that Map 7 summarises the above vulnerability assessments. Map 7 shows specifically the medium and low vulnerability areas, mapped within Landscape Character Areas. It is emphasized that the uncoloured areas, which make up the bulk of the land surface, are the areas with high vulnerability.
- 3.119 Map 7 also can be interpreted as a map of 'capacity to absorb development'. That is, it shows where the least vulnerable areas are, with the greatest capacity to absorb further development. Implicit in this assessment is a judgement as to capacity to absorb while not bringing about major change to the unique character and values of the existing landscape. Uncontrolled change could of course occur anywhere, but this study attempts to demonstrate where it could occur while still maintaining landscape values.
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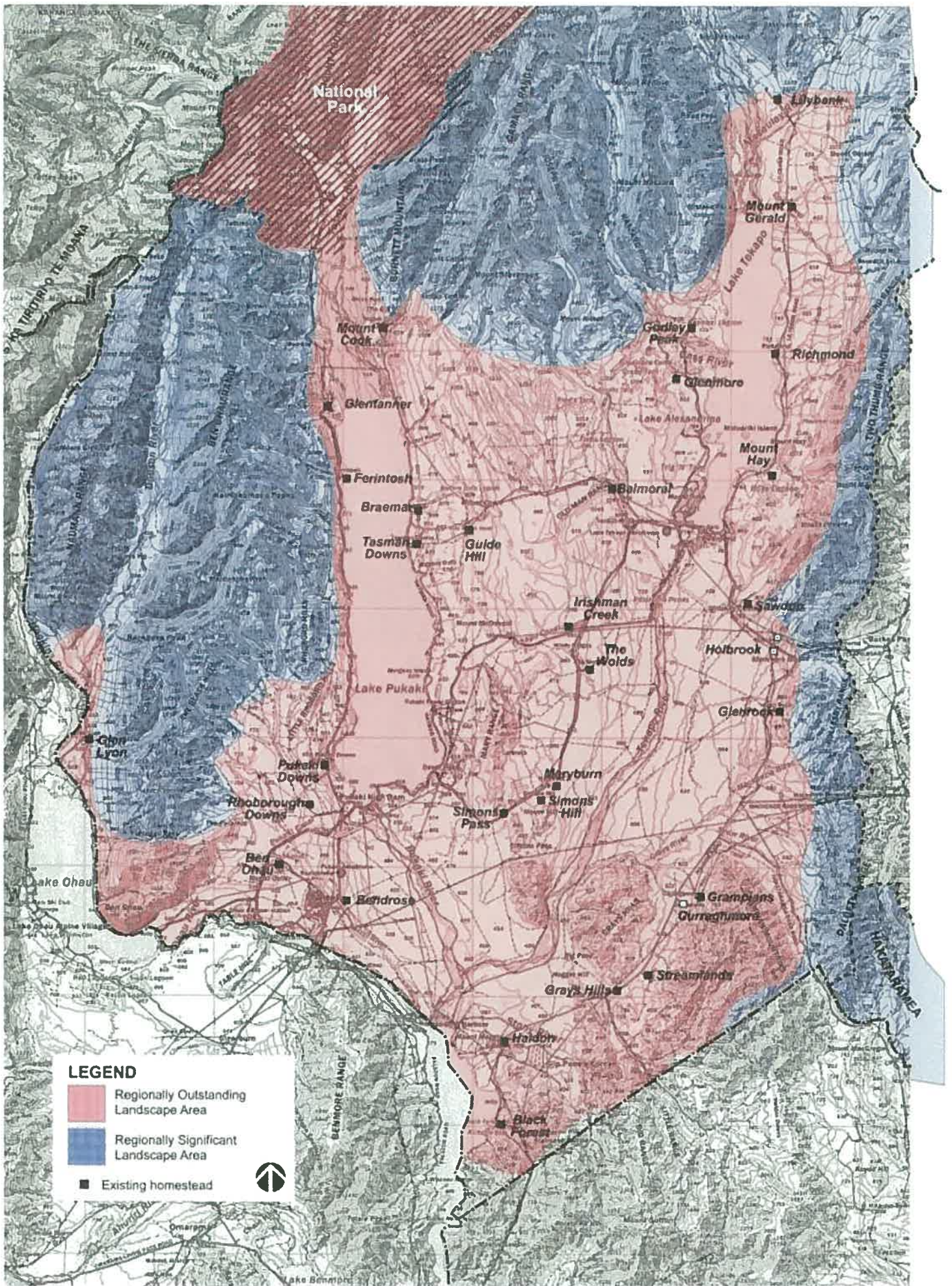


LEGEND

- high visual vulnerability
- medium visual vulnerability
- low visual vulnerability
- land 1100m and higher
- Homestead
- Former Homestead

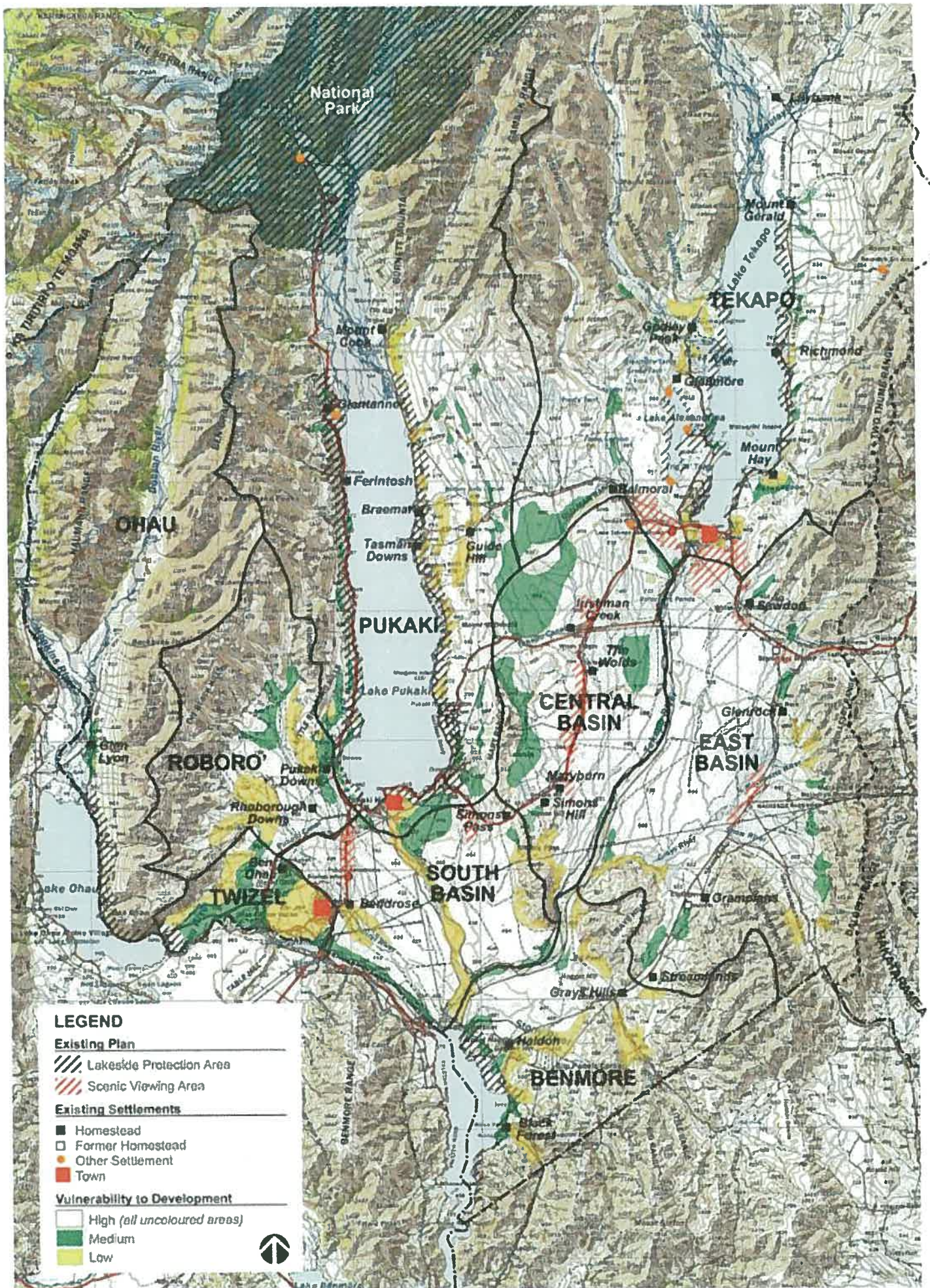
Mackenzie Basin Landscape Map 5
VISUAL VULNERABILITY
 (Boffa Miskell, 1992)
 December 2007





Mackenzie Basin Landscape Map 6
REGIONALLY OUTSTANDING & SIGNIFICANT LANDSCAPES

(source: Environment Canterbury 1993) December 2007



MAP 7: Capacity to Absorb Development

December 4, 2007





EASTERN BASIN

Long views, uninterrupted grassland, mountain backdrop. Farm improvements extend from right. View from Stenckers Mound, Holbrook on right.

1



CENTRAL BASIN

State Highway 8 traverses open grassland (left), and developed farmlands (right) between Tekapo and Pukaki. Always the

3



2



CENTRAL BASIN

Tekapo Canal traverses the open plain between Tekapo and Pukaki. Inishman Creek in trees.

4

MACKENZIE BASIN 1



EASTERN BASIN
If buildings could be located in side valleys, openness of the main basin flats could be maintained.
 (Glen Rock)

5



CENTRAL BASIN
Pasture development in side valleys enables character of the main basin flats to be maintained.
 (Simons Hill)

6



7



Does pasture development devalue the landscape character?



Pasture development would be less visible if kept off hillslopes.

MACKENZIE BASIN 2



10 Iconic high country, remote, highly natural, vivid and beautiful. Homestead node forms an island of domestication in the vast wilderness. (Lilybank)



11 Flanks of Lake Tekapo should be kept clear of buildings and development to maintain iconic tourist views.



13 Places for limited developments occur in indentations to the shoreline and incised gullies below the main slopes.



14



15



12



15

BRAEMAR ROAD
Open surfaces offer little scope to conceal developments. Army may be more effective than the Council in discouraging developments? (Balmoral right of centre).



16



17

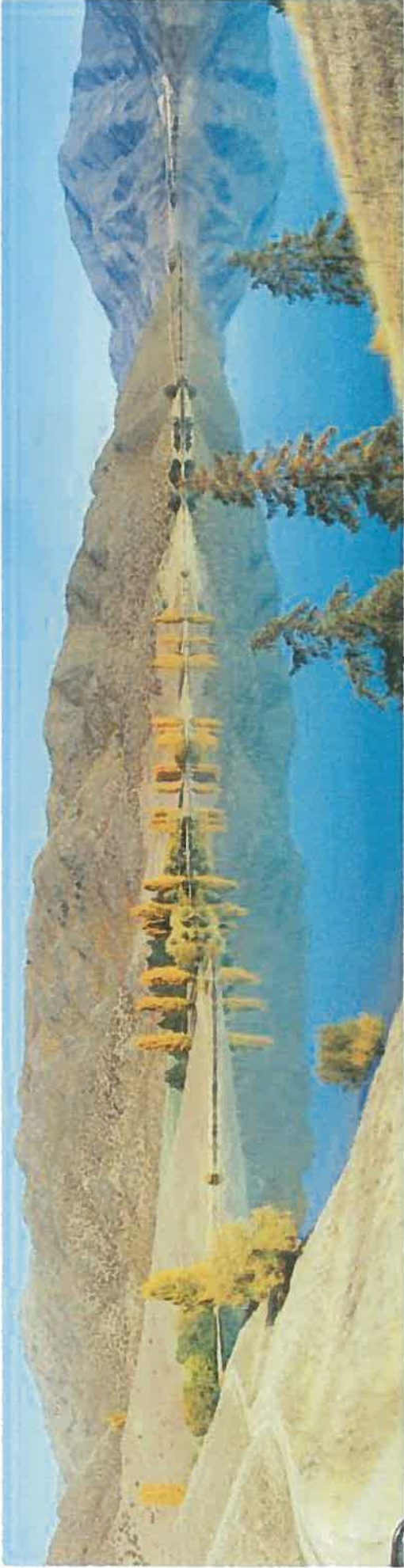


18



19

WEST OF TEKAPO



20



21

LAKE BENMORE

The driest and lowest part of the basin. Long views exist north to Mount Cook. Although man-made, Lake Benmore with its surroundings, constitute a vivid and outstanding landscape. Limited development opportunities exist back from the shoreline (Black Forest, 20, 21, with Haldon in the distance, 21).

BENMORE



22



23

EASTERN PUKAKI

Mount Cook is the last station before the National Park (22, right centre). Eastern shoreline has locations for limited developments in gullies, back from the shoreline and below the skyline (24&25, Braemar Road). Wilding trees (23) include conifers on the skyline and deciduous amenity trees along the shoreline.



25



24

PUKAKI 1



26



27

WESTERN PUKAKI

State Highway 80 to Mount Cook has high tourist value but has capacity for small developments (eg 27, Pukaki Downs). A complex wilding problem exists in this area.

PUKAKI 2



28

SOUTHERN BASIN

Wide vistas extend to Dalgety Range (left distance), Lake Benmore (right of centre), and Benmore (right, with clouds). Twizel is within the area of dark trees right of centre and Ben Ohau homestead right foreground. The open extensive plains at left offer little scope for development.



29

SOUTHERN BASIN

View west from State Highway 8 to Pyramid Hill and the Ben Ohau Range. The southern limits of the Mackenzie Basin.

SOUTHERN BASIN 1



30



31

SOUTHERN BASIN

Two views of the pastoral edge near Twizel. Unimproved areas have high natural character but suffer management problems from Hieracium, wildings, dryness, and soil loss from wind blow. Pastoral development is a viable management response where water is available (Bendrose).

SOUTHERN BASIN 2



32

OHAU
 Ben Ohau forms a massive bulk from the Waitaki side of Lake Ohau (near Lake Middleton, 32). The Hopkins Valley above Lake Ohau marks the boundary between Mackenzie and Waitaki (33, view from Glen Lyon Road). This is a remote and beautiful extremity of Mackenzie District.



33



34

TWIZEL
 Westerly view of Twizel hinterland, looking along Ohau Canal. Area on right is subdivided for rural residential development. Wilding spread can be seen.

TWIZEL & OHAU

4. LANDSCAPE CHANGE

LANDSCAPE CHANGE

- 4.1 Traditional management practices in the Basin have been destabilised by:
- i) market trends and economic viability of individual stations;
 - ii) land management problems such as rabbits, hieracium, wilding trees and erosion;
 - iii) changed methods of water ownership, allocation and usage;
 - iv) changed land use possibilities from irrigation;
 - v) changed tenure management and rental values of leasehold land;
 - vi) competition from urban or overseas money for 'cheap land' for holiday/tourist/recreational uses, as opposed to farming uses.
- 4.2 In particular, an increase in applications for subdivision of rural land in the Basin has prompted the Council to review its District Plan policies. These subdivisions constitute a new form of land use which, if widespread or poorly managed, have strong potential to lessen landscape values of the Basin.
- 4.3 In preliminary consultations, landowners almost universally expressed a view that they just wanted to get on with farming, and be free of 'town planning'. This is understood, and the Council for its part would like as far as possible to do the same. It is aware that landowners have devoted large amounts of private energy to past plans, strategies and hearings, and many feel 'consulted out'.
- 4.4 However in view of the number of potential applications, the Council believes it cannot adopt a 'do nothing' approach to its Plan provisions. Without ongoing intervention a responsible balance between private freedoms and public interests will not be maintained.
- 4.5 If it does not adequately plan for a range of issues, including landscape values, the Council will be liable to challenge and possible censure in the Environment Court. In the Mackenzie Country, where the values are strong and widespread, the Council is treading a fine line between 'too much' and 'too little' public interest.
- 4.6 The private interests of property owners are acknowledged, and their contribution to the development and maintenance of the Basin. The Council should be promoting, not stifling, good land use and community development, through policies and rules that allow owners to manage their land as freely as possible. Where limitations may be called for, these should be for clearly established reasons.
- 4.7 In our preliminary discussions most landowners professed modest intentions for development or change on their properties, if at all. However all maintained the right to develop if necessary to maintain viable properties and businesses.
- 4.8 The Council for its part also has to take account of wider possibilities that do from time to time occur. For instance, when an attractive high country property comes up for sale, perhaps through retirement or illness of the owners, outside

investors are quite as likely to see the development opportunities as the farming ones. The existing productive capacity, conservation management and social pattern of the land thus can become secondary to outside commercial aims, which may or may not be sensitive to the long term needs of the Mackenzie Basin.

- 4.9 The Council's therefore needs 'safety net' provisions in the District Plan to rule out the wider range of inappropriate aims that a minority of outsiders or owners may have. These provisions may seem needless restrictions on existing owners, and may lessen their property values by ruling out some potential buyers. However the Council has to look to the long term stability of the Mackenzie Basin, not just short term returns.
- 4.10 A workable balance between public and private interests is achievable, and that the preliminary discussions between Council and were a positive step towards it.

DRIVERS OF CHANGE

- 4.11 One prime cause of change is the marginal economics of traditional extensive practises. Market returns for sheep and fine wool products have lately not been high, while those for dairy products have boomed.
- 4.12 At the same time tenure and rent reviews have undermined confidence in the traditional leasehold system and dramatically increased rental costs with no corresponding increase in productive values.
- 4.13 The water resources of the Basin, traditionally scarce and shared, have lately been the subject of contested applications, resulting in land users having to compete or face losing out.
- 4.14 Ongoing and new land management problems such as rabbits, hieracium, wilding trees and soil erosion add to management costs and lessen both productive returns and farmer morale.
- 4.15 Pressures from outside the Basin further destabilise a landowner's ability to plan for his land, namely frequent and sometimes arbitrary changes in central, regional and local government policies, competition from other land users such as the power and leisure industries, and from urban capital that see the Basin more as cheap development land than the traditional productive-conservation balance.
- 4.16 Since World War 2 society, rural and urban, has become vastly more mobile, with improvements to roads and vehicles. The high country, once remote and serene, now is increasingly penetrated and affected by an increasing range of outsiders, many unaffiliated with or in direct competition with, the traditional runholder-manager.
- 4.17 Earlier partnerships in land, conservation and management research are today less evident as government or academic bodies have had to compete for research funding or gone out of existence.
- 4.18 The South Island high country in general, and the Mackenzie Basin in particular, are no longer the isolated, marginal back country lands they once were. Today accessible and in demand from competing interest groups, the

Basin has lost its simplicity and 'naivety'. The landscape, once serene and accommodating, now requires conscious coordination between parties if its values and character are to be maintained.

- 4.19 The previous section concluded there were localities where change might be contemplated, and others where it should not be contemplated. These will now be discussed in relation to the two main drivers for change; 1) land subdivision and residential developments; and 2) farming and land use.
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5. SUBDIVISION & BUILDINGS

RURAL LAND SUBDIVISION

- 5.1 Traditional occupation of the Mackenzie Basin comprises periodic station 'nodes' of shelter and development (shelter trees, home paddocks and yards, farm sheds, houses, seasonal accommodation) within an otherwise vast, open and highly undeveloped landscape.
- 5.2 In this pattern, the developed 'nodes' are small points of civilization, far outweighed in area by the natural 'landscape'. Thus the sense of extensive areas of highly natural landscape is maintained in the traditional Mackenzie Country land use pattern.
- 5.3 Rural lifestyle subdivisions have the potential to lessen this 'sense' by dispersing developments over wider areas of the Basin, thus breaking up the existing very strong natural dominance.
- 5.4 If poorly sited, the traditional landscape values of the Basin thus could be significantly and needlessly changed and diminished by the infilling of empty rural areas by rural lifestyle developments.
- 5.5 To retain as much traditional landscape value as possible, while providing for housing and building growth, further residential and building developments, including holiday, accommodation and recreational developments, should occur as one of the following:
- i) as small expansions of existing station nodes;
 - ii) as small new nodes unobtrusively sited in low vulnerability areas of the rural landscape, including associated roads, services, gardens, activities, and effects on landscape character. It is envisaged that there be generally no more than one or two new nodes on any given station property in the 10 – 20 year period;
 - iii) as conventional Rural Lifestyle Subdivisions in a defined area west of Twizel, as discussed in s.6 following;
 - iv) as tourist, holiday accommodation as discussed in s.6 following;
 - v) as recreational Hut Settlements at selected locations servicing rivers and lake shores;
 - vi) as towns, as discussed in s.6 below.
- 5.6 Outside the above planned areas, standards for rural subdivision should be tightened markedly, to indicate that the Council wishes further development to occur in defined nodes, and not dispersed throughout the rural Mackenzie.
- 5.7 The Mackenzie Basin thus would differ from Eastern Mackenzie District and lowland Canterbury.
- 5.8 The idea of a 'nodal' approach to development, as opposed to dispersed subdivisions of lifestyle lots along rural roads, was either strongly supported or accepted by almost all landowners visited. While retaining development options

for an owner it also would retain the essential landscape character of the Mackenzie, which is valued by the rural community.

- 5.9 There was however debate as to how large a node might be, their frequency (i.e how many an owner might promote), and how to define criteria for their locations.

DEVELOPMENTS WITHIN EXISTING HOMESTEAD AREAS

- 5.10 It is proposed that every existing station, as identified in x, should be allowed expansion within their existing node, within normally-defined limits of building size, number, type, design, and servicing capacities. These limits need not be draconian, but should aim to avoid excessive or unsuitable developments.
- 5.11 Homestead areas already serve as social centres within the high country and additional development within them would strengthen their economic diversity while being in accord with both the social and landscape pattern of the high country.
- 5.12 The definition and characteristics of a node are listed in 3.X below. Essentially, a node should be seen from the outside as a discrete 'oasis' of shelter planting within the wider open high country landscape. This planting absorbs visual effects of the buildings and activities within.
- 5.13 Existing nodes appear to range in area from about 5 to 15 hectares, including home paddocks and farm working areas.
- 5.14 In all of the following, 'expansion' is envisaged as occurring on freehold land.

EXPANSION OF EXISTING NODES

- 5.15 Each property should be allowed to marginal, but not wholesale, expansions of its homestead node. This should be at Council discretion, to ensure expansion is not more than 10% of the existing treed area, and that the proposed development cannot be accommodated within the existing node. Also to ensure the expansion does not occupy a prominent location, ridgeline, or lake shore or a significant river bank or identified natural site.

ESTABLISHING NEW NODES

- 5.16 There is some, but not widespread, scope for establishing new nodes throughout the Mackenzie Country. In some areas the open, unvarying topography could accommodate few such additions without major change to the landscape character, whereas in broken and wooded areas there is more capacity to visually absorb such additions.
- 5.17 The consensus of landowners was that there is unlikely to be wholesale expansion of new nodes in most cases, although the Council is aware of a few possible exceptions. In its forthcoming review the Council should allow on a discretionary basis for one new node to be established on each property. 'Property' in this context refers to a station entity as a whole, as shown on Map not to individual parcels of freehold within a station.

- 5.18 Map 12 shows the capacities of different stations to absorb new nodes. Mostly, this provides for 1 or 2 new nodes per station. From our landowner interviews, this would appear to cater for the development needs of most properties in the forthcoming planning period (10 years). For the minority of owners who this might not suit, a formal application could be made for their alternative proposal.
- 5.19 Council discretion regarding new nodes should be more robust than in existing nodes. In particular it should consider the siting, size, form, purpose, and visual and landscape impacts of the node, including access roads and other constructions or effects (eg tyre marks, walking tracks and access to previously inaccessible places.). Given the reason for a nodal policy is to retain existing high country character between nodes, it is essential that new developments do not disrupt the sense of tranquility and wilderness existing in most places.
- 5.20 In this specialized environment, the effects of a new node to be considered by the Council are more than just visual. They also should include such esoteric matters as the change in character and atmosphere from having a hitherto empty area colonised by new users. If the essential characteristic of the high country is a sense of isolation and untrammelled nature, the introduction of urban 4WD's or concentrations of cars, urban dogs, jet skis, chain saws and weed eaters, kids motor bikes, mountain bikes, campervans or tour buses would create major change to the atmosphere of many parts of the Mackenzie high country.
- 5.21 For these reasons I believe the Council should be very judicious and measured in allowing for new nodes. However I believe there is scope for further nodes of appropriate kind in appropriate locations.

SHAPE OF NODES

- 5.22 Ideally a node should comprise an area approximately as wide as it is deep. Except in specific cases discussed elsewhere, it should not comprise a liner 'straggle' of buildings.

HIGH COUNTRY RURAL LAND

- 5.23 As a corollary to the allowing of development within selected nodes, the District Plan will need to strengthen its policies and rules against subdivision and housing developments in remaining high country rural areas. This is to ensure these areas retain a maximum of their existing landscape qualities.
- 5.24 This refers to residential buildings. Small farm buildings such as musterers huts and hay sheds have been a traditional part of the high country. There should be no need to limit such traditional structures in the rural area so long as they are in fact small (40m² suggested), and are sited to avoid widespread visual impacts. Such small, low impact farm buildings should be allowed as of right. It also should apply to stock yards, which have traditionally been dispersed about high country properties but have low impacts.
- 5.25 This allowance should not extend to isolated baches disguised as farm sheds. Nor should it extend to large farm barns as could be envisaged for wintering of stock, dairying or other industrial type farming. These structures, if required, should be confined to existing nodes or extensions thereof.

- 5.26 The Council should not waiver on this issue. If subdivision or building development is allowed to disburse randomly through the rural high country, diminution of the landscape values will rapidly follow.

SELL OR LEASE?

- 5.27 The question has been mooted that land in rural nodes should not be subdivided and sold to third parties, but should be retained in the ownership of their host station. This is so the ownership of high country wealth and responsibility for the land is retained in local control, not dispersed to interests beyond the Basin.
- 5.28 Land for recreational structures within a node, for instance a bach or recreation operation, therefore would be leased on long term conditions rather than sold. This has the added effect of eliminating the speculative element from the high country area and reducing demand to genuinely interested parties. It has the disadvantage that a short term capital injection is not received by the station but would be in the long term interest of the Mackenzie economy and community.
- 5.29 Although perhaps a 'wacky' view, we were surprised in our discussions how many owners agreed, although not all. It is therefore included in this statement as an issue for further discussion.

CRITERIA FOR NODES

- 5.30 High country stations traditionally are based on a sheltered homestead area or node containing shelter planting, home paddocks, races, yards, buildings, workshops, garages and kennels, a homestead and other resident and seasonal workers housing, gardens and orchards. It is the sheltered working core within the generally exposed station landscape.
- 5.31 For the Councils planning purposes a node should be defined as an area of shelter trees within the overall exposed high country landscape, and within which is contained all buildings and developments contemplated in a particular area. A node is therefore envisaged as a concentration of buildings into one group, as opposed to scattering them throughout the high country landscape. It is envisaged that traditional small farm buildings such as musterers huts, hay shed and the like would not be subject to this policy, below a stated size.
- 5.32 The purpose for limiting further development into nodes is to retain the bulk of the Mackenzie Country landscape in its unchanged, low-development state. Therefore outside of specified nodes, the Council should maintain very strong controls against subdivision.
- 5.33 Existing nodes are envisaged to continue as mixed working/residential areas, with the possible addition of further holiday, residential or recreational uses. These currently appear to range in size from 5 to 10 hectares, occasionally up to 15 hectares. In occasional cases, the node is very spread out, but still forms a sheltered nucleus or oasis within the wider exposed working landscape.
- 5.34 New nodes are envisaged as small residential or recreation communities of 5 – 15 buildings, occupying an area of 2 – 5 hectares.

- 5.35 New nodes should not assume the size of a small town, nor contain commercial activities such as shops, service stations or industrial/service operations (eg truck haulage premises). These latter should be located within the towns of Mackenzie District. New nodes may however contain commercial recreation operations such as a kayak company that might operated from a woolshed or similar.
- 5.36 Further building development outside urban areas of the Mackenzie Country shall occur either as extensions to an existing node or as the establishing of a new node within the Councils stated criteria.
- 5.37 Landscape criteria for determining suitability of existing and new nodes should include:
- i) *Definition: Nodes of high country stations traditionally are areas containing shelter plantings, home paddocks, races, yards, sheds, buildings workshops, kennels, homestead, worker housing, temporary accommodation, gardens and orchards. It is the sheltered working core within the generally exposed station landscape;*
 - ii) *When viewed from outside, nodes typically appear as an area of exotic tree plantings within the open high Basin landscape;*
 - iii) *Nodes are envisaged as a nucleus within which all buildings and developments occur, as opposed to dispersing such developments about the property. Where owners may wish to establish further farm structures, rural enterprises, holiday or rental accommodation, these should be located within the farm node;*
 - iv) *A node may be extensive or compact, but should read as an 'oasis' of trees within the surrounding openness of the property;*
 - v) *Nodes are envisaged as small residential and recreation communities. They should not assume the size of a small town nor contain commercial operations such as shops, although they may contain commercial recreation operations, such as might operate from a converted woolshed;*
 - vi) *Generally, developments should occur by additions to existing farm or station nodes. However a new node may be established where it can be demonstrated this will fit into the landscape pattern, as below;*
 - vii) *It is envisaged that most properties might contain one or two nodes in addition to their existing homestead node, referring to a typical extensive station as a 'property';*
 - viii) *Generally nodes should be widely separated from each other, for instance by several kilometers, both within each property and between neighbours, so the sense of isolation within the wider landscape is maintained;*
 - ix) *New nodes should be visually inconspicuous and should fit into the landscape;*
 - x) *New nodes should be located away from the main landscape surfaces, ridgelines or skylines of the landscape, and should be on landscape lines or change points such as the toe of a slope, stream course or forest edge;*

- x) *Nodes should be absorbed visually into their setting by thoughtful siting and by tree planting such as has occurred around homesteads in the past;*
- xii) *Plantings should not include species prone to wilding spread, as listed in the District Plan;*
- xiii) *Nodes should be sited a substantial distance back from, and away from significant visibility of, the shoreline of any lake or from road boundaries, including the state highways;*
- xiv) *Nodes should not be located on or near sensitive environmental sites, or where the functioning of such sites will be affected;*
- xv) *Buildings within nodes should be visually small, unobtrusive and not more than two-storied in height;*
- xvi) *Buildings should be within an area of trees, planted or natural, that visually absorb, but not necessarily totally obscure, them from outside view;*
- xvii) *Access roads and earthworks should be minimized, should be sited to avoid visual or environmental impacts and should be reinstated following completion;*
- xviii) *services such as water supply, septic tanks or aerals should be sited within the node, should be visually unobtrusive, and should not interfere with the functioning of natural systems.*

5.38 Where a new node is proposed, the applicant must demonstrate that it fits into the landscape pattern in the above ways.

5.39 The aim of these policies is for as much as possible of the rural Mackenzie Basin to be maintained in its existing open state, while allowing for ongoing development and investment in specified nodes. Therefore as well as allowing for nodes the Council should institute strong controls against subdivision of rural land beyond each node. A key aim is the retaining of long vistas and the simple open landscape character between nodes.

NUMBER OF NODES

5.40 Earlier sections concluded that suitable locations for further development exist throughout the Basin. It was suggested this be in the form of development nodes, with strengthened controls against development in surrounding rural areas. It remains therefore to determine how many nodes might be contemplated in various areas before they begin to alter the landscape values,

Thresholds

5.41 The effects leading to any alteration of landscape values would have a visual component and a landscape character component. Therefore the threshold at which unacceptable change occurs needs to be measured against each of these two components.

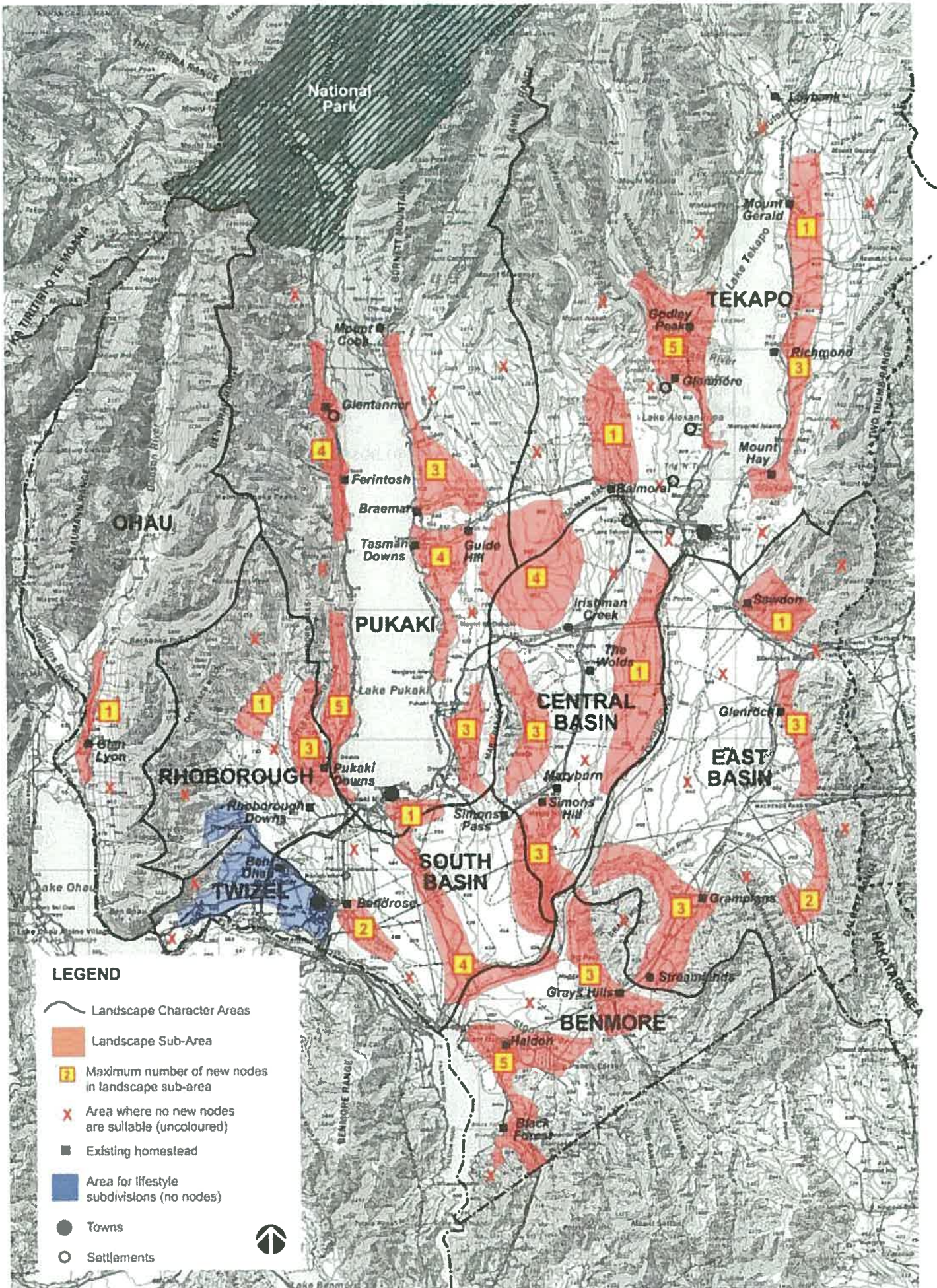
- 5.42 Visually, the threshold will be reached when the numbers of nodes visible from any point begins to compete with the visual impacts of the surrounding open landscape. Given the very low levels of modification characteristic to the Basin, the visual ratio of node to landscape for any threshold would be correspondingly low. It is contemplated that in most scenes probably only one additional node is likely, and that in areas of high vulnerability, none would be appropriate.
- 5.43 Regarding landscape character, there is a very low threshold at which effects would start to be detrimental to the values. This is because with the distinctly low levels of human modification, the range of effects of additional traffic, noise, electrification, access roads, dog nuisance, accidental fires, numbers of occupants and diversified activities, the landscape character will quickly be affected, if more and more nodes were added.
- 5.44 For example, were there say 100 additional houses accessed via the Lilybank Road, either the road would have to be sealed or the dust nuisance would become continuous and unbearable. Were there say 20 additional houses, the existing road character could probably survive. At some point in this increased usage, the remote, alternate character of the high country road would become irreversibly changed, it coming to assume the character of any rural road in lowland Canterbury.

CAPACITY FOR ADDITIONAL NODES

- 5.45 On the basis of the above thresholds, and considering as well the types of areas identified as being of low or medium vulnerability in Map 7, a recommendation has been prepared as to the numbers of additional nodes the Council might contemplate throughout the Basin without prejudicing the existing landscape character and values. These recommended numbers are shown in **Map 8**.
- 5.46 Map 8 identifies a series of sub-areas within each Landscape Character Area, and these are the basic context area for each estimate of capacity. A sub-area is a collection of areas within usually two or more stations, which are the general outline areas within which the sites for new nodes should be located. Thus by cross-reference between Maps 7 and 8, specific sites for possible new nodes can be identified. The 'maximum number' in Map 8 is this study's estimate of the point beyond which adding more and more nodes would begin to change the outstanding landscape character of that area.
- 5.47 Of particular importance are the areas where no nodes are recommended. These are the areas of high visual vulnerability, which should be avoided in choosing development sites. In recommending the numbers of nodes shown in Map 8, important balancing requirements are:
- i) that some areas should have no development;*
 - ii) that areas surrounding each be excluded from further development.*
- 5.48 Also of importance is the Council policy against creating new urban or town areas. It is assumed in Map 8 that any nodes arising from these

recommendations will be small simple residential communities and will not develop into the size or functions of a town.

- 5.49 It would have been easier to aggregate the sub-area maximum numbers to a single overall number for each Landscape Character Area, but this would not have guaranteed a suitable distribution of new nodes throughout the Character Area. It also would have been possible to state the maximums per property, but this was felt would be too prescriptive on the Council's part.
 - 5.50 It is believed that by stating the maximum number of new nodes per sub-areas a reasonable distribution of development over the next 10 – 20 years should be achieved.
 - 5.51 It is emphasized that 'development' refers to housing development and subdivision, not agricultural development.
 - 5.52 It also is emphasized that the figures refer to possible additional nodes, and do not include existing nodes.
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Mackenzie Basin Landscape Map 8
CAPACITY FOR NEW NODES

6. EXCEPTIONS TO THE NODAL POLICY

- 6.1 Section 5 proposed policies for discouraging widespread subdivision and housing development throughout the rural areas of the Mackenzie Basin. This section now discusses various other types of housing and building developments, and proposes that the Council should cater for these demands in appropriate places other than the open rural areas.

TOWNS

- 6.2 The existing towns of Twizel and Tekapo should be the main location for 'own-your-own' holiday houses and residential housing. In this way, influences that would tend to devalue the pristine rural environment are concentrated into the alpine towns.
- 6.3 The Council should maintain character guidelines to ensure the growing towns develop a coherent alpine style of architecture, streets, parks and businesses and are distinct from lowland towns. There is no reason why housing sites in the alpine town environments should be less satisfying for holiday makers than dispersed rural sites.
- 6.4 To maintain a sense of difference from lowland New Zealand, towns also should have generous open space provisions, including along roads, and policies for generous plantings of landmark and environmental trees.

Pukaki

- 6.5 The 'paper town' at Pukaki was frequently referred to in our discussions. There would be no particular landscape reasons against a third 'Mackenzie' town being re-established here in time, so long as it did not occupy the faces overlooking Lake Pukaki or the state highway, and did not straggle unduly eastwards of the lake outlet.
- 6.6 Current plans for the unbuilt town appear to include the moraine slopes facing Lake Pukaki and overlooking the state highway, in the vicinity of a single existing stone house. This location would be highly undesirable to the alpine rural character of the highway and lake surrounds. This is one of New Zealand's prime iconic viewing areas and if it should wish to countenance a third town, the Council would need to devise a basic town concept fitting the importance of the setting.
- 6.7 A town sited back from the lake-front faces, oriented more towards the Pukaki River but with views to the lake and accessed from the direction of the river, would create less impacts on the critical scenic environment of Lake Pukaki.

TOURIST ACCOMMODATION

- 6.8 This refers to commercially-oriented accommodation, typically although not exclusively providing for overseas tourists and groups and short term stays.

- 6.9 In the course of our visits, the differences in landscape and social conditions on the western side of Lake Pukaki, from most of the remaining Mackenzie Country, became obvious. This is the area traversed by the Mount Cook highway, and refers to three properties, Pukaki Downs, Ferintosh and Glentanner.
- 6.10 Generally this is a distinctive and visually important part of the Mackenzie, with stunning views over Lake Pukaki. Where they face the lake, these properties, particularly Ferintosh, contain very little flat land for farming. Much of what existed was lost in raising the lake level for hydro power. There therefore are not widespread farm development opportunities.
- 6.11 There also are almost continuous scenic views over Lake Pukaki, and a constant flow of tourist traffic on the no-exist 'deviation' to Mount Cook/Aoraki. One of these properties, Pukaki Downs, has been bought by outside interests primarily with a view to tourist development. Another, Glentanner, has a long standing and well known dual identity as high country station and tourist focus. This has a positive role in relieving the adjacent Mount Cook National Park of some commercial pressures. Also of providing maintenance grazing within the park where required.
- 6.12 A third distinction of the western Pukaki is the very significant problem of wilding trees. These originate from bands of dense, well-established trees on Meridian and Transit NZ land flanking Lake Pukaki, and also from private land where they have not been contained. In the southern half of the Mount Cook Road the landscape has become to a large extent forested, compared to the grasslands throughout most of the remaining basin. Forests are not foreign to the Mackenzie, although these would have been largely of Nothofagus beech, not the exotic conifers of wilding forest.
- 6.13 It is possible to farm for wilding suppression, but this requires a viable farm economy to fund it and active management regimes. On Ferintosh an aggressive clearance programme is continuously maintained, but cleared land is reinfested from adjacent land within 3 – 5 years – a soul-destroying problem for many Mackenzie problems. Where property viability may be marginal, or where wilding clearance may not be a priority for any owner, cores of wilding forest quickly establish and spread to neighbouring land. Transit have recently been attacking the problem adjacent to the Mount Cook Highway, but trees also are widespread on Meridian Energy land flanking the lake.
- 6.14 My conclusion from the above is that the potential exists for a differing approach to land use futures in this area. Economically there is a passing tourist trade, scenically there are spectacular settings, and in my observation there is scope to site new facilities within the landscape without destroying its character or quality. My suggestion is that the Council should allow for development of low-level commercial tourist accommodation in the western Pukaki area.
- 6.15 This should be along the same nodal lines as elsewhere – that is, comprising small, properly-sited clusters of small buildings within trees, the clusters well-separated by actively grazed land. However the clusters could be for commercial tourism in this case. All new clusters should be above the highway, to maintain open views across the lake, and should be visually separated from the highway, with unobtrusive access roads, and signage in keeping with the alpine, national park character.

- 6.16 Such a precedent already exists at Gentanner, and my opinion is that in landscape terms at least, there is potential to accommodate further, probably smaller, complimentary developments, back from and above the highway. These should be for the purpose of supplementing the existing farm economy, not replacing it. It is essential the active land management should continue between nodes, to maintain the grassland surface and in particular, to maintain wilding suppression. They should also be only spasmodic along the highway, notionally 2 such developments on each of Pukaki Downs and Ferintosh.

HOLIDAY ACCOMMODATION

- 6.17 This refers to small scale accommodation, typically catering for New Zealand families and freedom-travelling foreigners. Typically, the duration of stay in such units may be longer than for tourist accommodation.
- 6.18 The eastern side of Lake Pukaki is a vast landscape, also with potential at the macro scale, that is, in the context of vistas up or across the lake, to accommodate significant development. However at the micro scale, that is, in the context of views at any one place, too much development would greatly alter the existing rural character. Above the Tekapo Canal outlet, this is a little-traversed area of gravel roads and well-treed low intensity grazing. It is however a considerably altered area, with scope to accommodate further appropriate development.
- 6.19 My opinion is that this area would be suitable for holiday accommodation, for longer stays, family and low-level facilities, as compared to the commercial, tourist-oriented, short stay character mooted for the western Pukaki. This could assume the character of bach settlements and should not be commercial. Buildings should not be between the road and the lake, and also should be confined to the lower slopes, up to a height of, provisionally, 200m above the lake.
- 6.20 The southernmost part of this area, where visible from the State Highway as it first descends to Lake Pukaki (southbound), should not be so developed, but should be maintained in its existing state of naturalness. Buildings within this viewshaft would significantly change the character of what is currently one of the sublime views of the lake. Likewise, the southern shoreline of Lake Pukaki, where the state highway follows the lakeshore to the outlet (southbound), should be maintained in its existing natural state in its entirety.
- 6.21 To date no details have been identified as to how development of this area could best occur. However my overall opinion is that the Council could allow for a development area, within specified limits of type, form and location, in the eastern Pukaki.

HUT SETTLEMENTS

- 6.22 There are three long-standing hut settlements at Lake Alexandrina which fit well into the Mackenzie environment, both socially and in environmental terms. This form of development is appropriate so long as the buildings and settlements remain small and simple. The Council should retain strong controls on the size of any further buildings, redevelopments or 'renovations' in this

area, to avoid Alexandrina becoming the setting for a community of 'gin palaces' of the Queenstown/Wanaka mode.

- 6.23 A previous discussion paper stated that '*a new hut community has arisen at Black Forest bordering Lake Benmore.*' (paragraph 2.3). This was in error, based on an impression of recent applications for house developments beside the lake plus an erroneous view of where the Haldon/Black Forest boundary lay. That paper should have referred to the area as 'the Haldon and Black Forest' margins of Lake Benmore, not solely Black Forest. Currently there are 3 or 4 houses along the lakeshore in this joint area. These could become a community in the future but do not amount to one so far. This erroneous impression is acknowledged.
- 6.24 However in landscape terms the Haldon-to-Black Forest margins of Lake Benmore would be a suitable area for the Council to consider further crib developments of the size and scale of Alexandrina. This should be back somewhat from the shoreline, to retain natural character, and should be linear rather than 'nodal' in form. By 'crib' is implied a small size, simple in design and surrounds, and probably non-permanent occupation. Public access to the shoreline should be maintained, and the landscape impacts of access roads and effects on the shoreline, e.g. from launching of boats, should be minimized.
- 6.25 Scope also exists for a small fishing settlement near the streams bordering the north side of the Grays Hills landform. This could be appropriately tucked into small valleys adjoining the stream, and be strung along the area at low density, in a linear manner, without significant landscape impact. The access road should however be maintained at a low level, to retain the existing farm track character. In my opinion, such a settlement could be a specialized form of 'node' for Grays Hills, modified for the particular settling.
- 6.26 Hut settlements near holiday and fishing spots are a traditional part of the Mackenzie and New Zealand landscape. These are an acceptable form of rural housing, and under clear conditions the Council could contemplate small areas of further settlements. Conditions could be that:
- i) *They are located unobtrusively within the landscape;*
 - ii) *they remain generally small in size (number of buildings);*
 - iii) *access roads also are in low, visually unobtrusive places;*
 - iv) *settlements and their subsequent usage do not impact significantly on natural features, processes or landscapes;*
 - v) *provision of services and roading is minimal, but environmentally friendly;*
 - vi) *houses are small, simple and low-impact;*
 - vii) *landscaping of sections is rural in character and not ornate;*
 - viii) *fencing, if any, is of open rural character – eg wire fences.*
- 6.27 Even if these may morph into permanent housing, the aim should be for the settlements to continue the traditional Mackenzie character, and to be located low in the landscape, so their visual impacts are not widespread.

RURAL LIFESTYLE SUBDIVISIONS

- 6.28 Apart from the 'townships' of Tekapo and Pukaki, and the homesteads on each run, there was traditionally no dispersal of independent housing in rural areas of the Mackenzie basin. Nor was there a gradual decrease of residential

density between 'town' and country, as occurs in lowland towns throughout New Zealand. In the Mackenzie, townships sat abruptly within their surrounding rural landscape.

- 6.29 A significant change since the mid 1990's has been the subdivision of rural land for lifestyle and recreational housing and uses around Twizel and between Twizel and Lake Ohau.
- 6.30 Rural lifestyle subdivisions are a new usage in the Basin. If too extensive or in the wrong places, they have potential to alter the open character that much of the rural Basin still offers. If subdivided and housed, the Basin would become just another 'occupied rural place' as in the lowlands of New Zealand. If an attribute of the Mackenzie landscape is its unspoiled openness, then the Council needs to think carefully about the amounts and locations of such rural lifestyle housing.
- 6.31 The process begins with subdivision, which is an irreversible process, referring of course to freehold land. Once a rural landholding is broken up, the land is highly unlikely to re-amalgamate and the former extensive high country ethos and landscape pattern is lost. There are a few places in the basin where such subdivision could occur with little impact, but mostly the Council needs to remove the general expectation that any rural land may be subdivided for lifestyle housing.
- 6.32 When land was held in leasehold, such developments were limited by the lease conditions irrespective of the District Plan. However as more land is freeholded, particularly in prime sites overlooking lakes, rivers or with views, it falls on the District Plan to maintain environmental policies.
- 6.33 There are places away from the state highway west of Twizel where further rural lifestyle intensification might occur without significant landscape impact or loss of significant rural character. This area is relatively flat, not widely visible, close to popular recreation facilities and urban services, and is already largely of 'rural' rather than 'high country' character.
- 6.34 Such an area should not extend north of the Twizel River, which would be in the view shaft of the state highway, and would significantly lessen the sense of connection between Twizel and its alpine surroundings. For the same reason, the lifestyle areas should not extend onto the land between the Twizel and Ohau Rivers, east of the state highway, where there are important visual connections from Twizel towards Lake Benmore and its adjacent flats.
- 6.35 Some thought should be given to the most effective size for rural residential lots. If they are too large, wastage of productive rural land will occur, and a maintenance issue will arise for absentee owners, particularly the spread of wilding trees. If they are too small the area will become a de facto urban area. Some buyers will want space for a retirement farm or active use but care should be taken that buyers wanting smaller lots with less maintenance, but with rural character, are not forced to buy sections larger than they need, with consequent waste of rural land.
- 6.36 Experience in lowland areas suggests that at lot sizes below 0.5 hectares the character of an area becomes 'spacious urban' rather than 'compact rural'. The Council should therefore aim for areas of rural lifestyle subdivision with lots

mostly in the 0.5 to 1 hectare size range near Twizel, and 2 or 4 hectare areas further out of town.

- 6.37 Any rural residential lots should have restrictions on re-subdivision to smaller size, to maintain them in their larger size. This would maintain an orderly land pattern as well as hopefully confining market demand to the real users, as opposed to investment speculators.
- 6.38 It is important that the Council consider the rural pattern which emerges from lifestyle development in any area. It should not be assumed that because this is 'rural', then the environment will take care of itself. In sustainable rural residential areas an open space pattern needs to exist in perpetuity, to counteract the tendency for characterless expanses of box-like lots and roads. Open space corridors should exist even in rural residential areas, to maintain views to mountains and sky. Partly these could be as golf courses, rivers or regular productive rural land grouped into organised corridors. But partly also they should be publicly-accessible walking or horse riding trails, nature reserves and the like, with generous rural tree plantings. These would connect Twizel to its rural hinterland and create a new rural pattern in the lifestyle area.
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7. FARMING & LAND USE

- 7.1 Pressures for changes to the farmed landscape of the Mackenzie mainly originate from circumstances beyond RMA control, particularly tenure review, water allocation, world prices for farm products, and urban demand for rural lifestyle land. If the landscape values of the Basin derive partly from the state and condition of the land, the Council must find a formula to maintain the uniqueness of the landscape while allowing farmers freedom to respond to the business challenges confronting them.
- 7.2 One driver of farm intensification thus is the splitting of former leasehold runs into separated 'conservation' and 'farmed' lands. This inevitably will lead to a visual differentiation between public conservation areas and freehold farmed areas in affected landscapes of the Mackenzie Basin. This will lessen the visual unity which up to now marked the landscape when managed under leasehold conditions.
- 7.3 It is possible that increases in irrigation for dairying may not result in widespread shelter plantings, but it would however involve 'greening' of the landscape, and an increase in the intensity, equipment, irrigators and structures within any vista. This in its own way will constitute a change from 'wild' to 'farmed' landscape, in visual terms.
- 7.4 Intensification of farming practice has the potential to diminish the unique simple continuity of the traditional grassland landscape, through increased subdivision by fencing into a 'patchwork' land surface through cultivation and irrigation, and shelter planting.
- 7.5 Also differentiation of land use into 'farms' and 'conservation estate' through tenure review will further break up the existing visual continuity.
- 7.6 These changes have the potential to diminish the landscape values of the basin from 'outstanding' to 'significant' in many farmed areas.
- 7.7 If substantial amounts of the long views, visual openness, and vast scale were to remain with intensified farming, a degree of the striking character of the Mackenzie Basin would survive intensification. The mountains, sky, lakes and scale would continue to create a striking impression even with a somewhat 'greened up' land surface.
- 7.8 It is acknowledged that the 'wild' landscape referred to is itself modified and somewhat unstable. What the eye reads as 'tussock' is often a mix of native tussock with introduced browntop, sometimes severely degraded by hieraceum and/or rabbits. However in colour, openness, lack of cultivation, infrequent structures and high naturalness, this landscape does read as 'wild', compared to the 'managed' character of lowland farmlands.
- 7.9 The RMA is not a good means of managing change that results from this process. The Council, while it should not stand in the way of such property management, should maintain dialogue with owners as to the manner in which such changes might occur. This would be to ensure as much as possible of the

public values of openness and naturalness might be maintained during intensification.

- 7.10 It is inevitable that the land surface of the Mackenzie Basin will change in parts, because of ecological/ economic issues that will not go away. Irrigation and topdressing can be the only way out where hieracium has got a hold. On some properties top dressing is used to make wilding trees 'sweet' enough for cattle to graze.
- 7.11 Land development may also be the only viable way to retain topsoil that otherwise will be lost to wind erosion in hieracium or rabbit-depleted places;
- 7.12 Such changes probably would not affect the whole Basin, but mainly lower areas and where irrigation becomes available.
- 7.13 It is essential to have continued land management by grazing throughout the basin, to control weeds, wildings, and erosion. Existing runholders are the repository of knowledge and responsibility for stewardship of land;
- 7.14 Grazing is a cheaper way of land management than tax-payer funded conservation maintenance;
- 7.15 A Mackenzie landscape character modified by intensive farming would not possess the current degree of landscape uniqueness, wildness, colouring, openness, unity, or 'legibility' (sense of formative processes) and absence of structures. It is these intangibles which elevate the Mackenzie Basin's landscape to outstanding value.
- 7.16 The Council should seek continued dialogue and understanding with its constituent landowners to ensure that as far as possible, land improvements do not needlessly destroy public values when alternatives may exist. Some form of accord may thus develop between Council and landowners over time. Such a process of Council – Farmer accord is favoured as the main tool for maintaining landscape values, rather than reliance solely on District Plan provisions.
- 7.17 From the Council's perspective, a series of Guidelines could be prepared and incorporated in the Plan, with various techniques for maintaining landscape values on intensified farmlands in the Basin. These could include the following:
- ii) balancing wind-screening effectiveness with visual openness in shelter plantings, particularly along State Highway 8;*
 - iii) avoiding long continuous windbreaks along highway boundaries and across views;*
 - iv) establishing shelterbelts and woodlots according to the visual principles prepared for the District Plan in the 1990's;*
 - v) ensuring buildings, structures and visual impacts are of suitable size and design and are located away from important road frontages, ridgelines and natural features, to maintain openness and naturalness;*
 - vi) managing farm earthworks, tracks, quarries, gravel pits and dumps to blend into the landforms, be located out of sight as far as possible, and be reinstated after use;*
 - vii) limiting building locations to the farm nodes discussed above.*

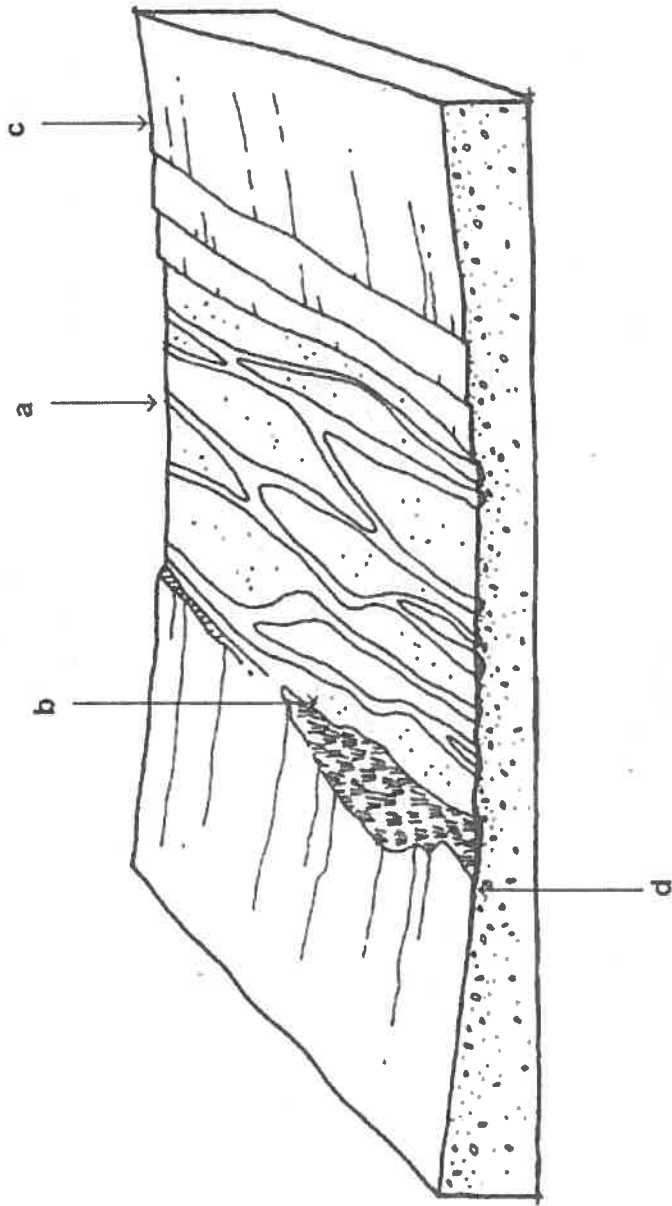
- 7.18 It is acknowledged the issue of District Plan controls on farm planning is a touchy issue. For that reason measures such as the above may be best achieved through an 'accord + guidelines' approach rather than as formal rules, except rules agreed by farmers.
- 7.19 However the Council also must do what it reasonably can to maintain landscape character in the Mackenzie Basin.
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APPENDIX 1:

LAND TYPES DESCRIPTIONS

(refers to Map 2)

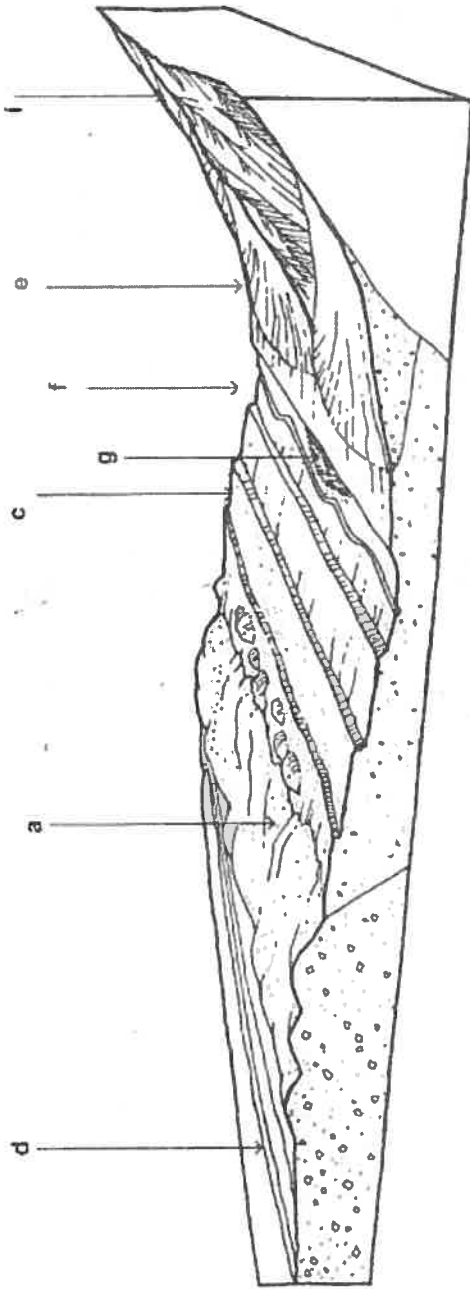
Source: Landcare Research Ltd,
&
Lucas Associates



H 1 MAJOR RIVER, VALLEY FILL LAND TYPE

Recent, major river valley fill, incorporating wide braided active and recently active riverbeds, recent floodplain terraces, and low angle valley fill fans. Elevation ranges from 300 to 1000 m with rainfalls from 1000 to 6000 mm/A. The land type includes the high country segments of the Waitaki and Ahuriri River floodplains.

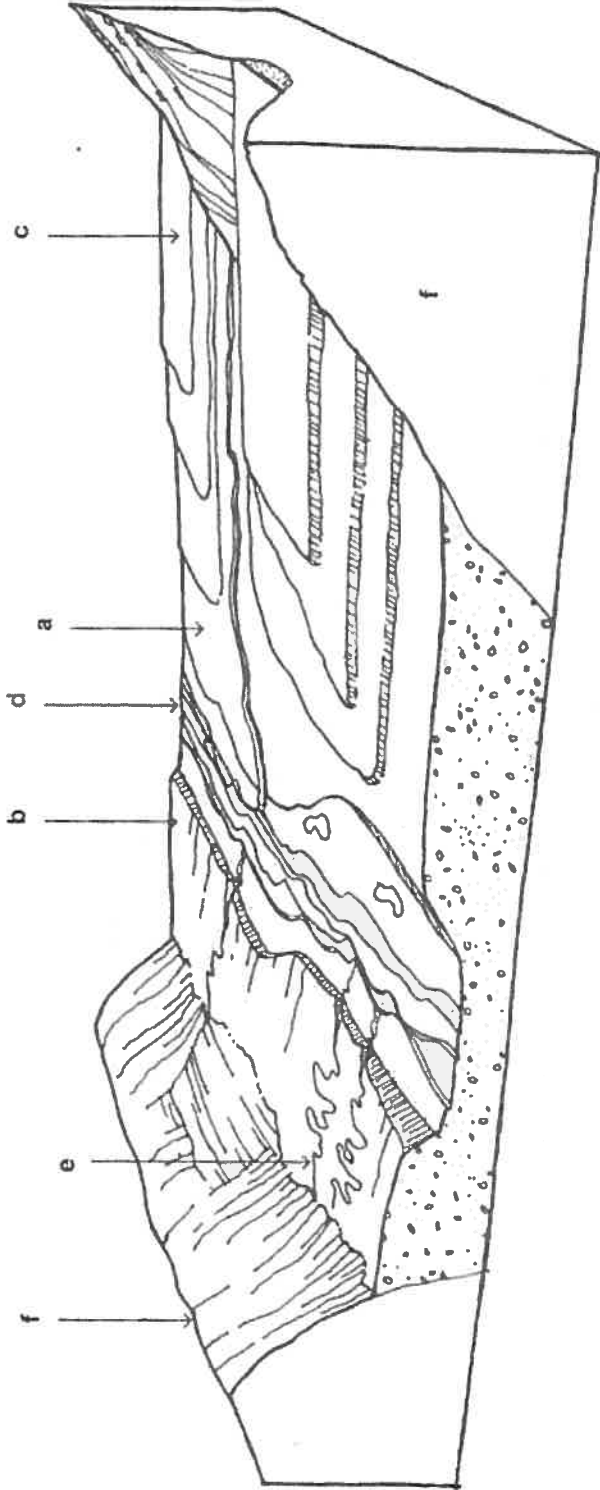
landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
(a) braided valley fill	Pleistocene / Holocene fluvial deposits	300 - 1000	Raouia cushion fields, moss tussock gravel fields	extensive opportunist grazing	low	extensive opportunist grazing	largely a 'natural' environment, exotic 'river control' trees
(b) valley floor swamp	Pleistocene / Holocene fluvial and swamp deposits	300 - 900	sedge, turf, reed and rushlands, red tussock and raupo	extensive grazing	low	extensive grazing	wetland vegetation modified by grazing
(c) floodplain terraces	Pleistocene / Holocene fluvial deposits	300 - 900	short tussock and matagouri scrub	extensive and intensive grazing	high	intensive grazing, feed cropping, exotic forestry	increase in exotic pasture, limited cultivation, decrease in scrub, fencing
(d) fans	Pleistocene / Holocene fluvial deposits	300 - 900	short tussock and matagouri scrub, moss tussock gravel fields	extensive grazing	high	intensive grazing, feed cropping, exotic forestry	increase in exotic pasture, limited cultivation, decrease in scrub, fencing



H3 Glacial and Fluvial Basin Floor Land Type

Glacial and fluvial basin floor landforms, extensive ablation and terminal moraine, and associated meltwater channels, outwash terraces, minor lakes, fans, meandering floodplains, backswamps etc. and glacial moulded hills and mountains under 1300 m. Elevation ranges from 400 to 1300 m, with the balance below 1000 m, and rainfalls between 850 and 4800 mm/A. The land type includes parts of the Waitaki basin and the mid Aburahi valleys.

landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
(a) extensive ablation & terminal moraine fields	late Pleistocene moraine deposits, with loess	500 - 1200	short, red and snow tussock, matagouri and manuka scrub	extensive grazing	medium	semi intensive grazing, exotic forestry	Increase in exotic pasture, shelter trees fencing, exotic forest
(b) glacial outwash terraces and minor moraine dumps	late Pleistocene outwash gravels and moraine deposits	450 - 900	short, red and snow tussock, matagouri and manuka scrub	extensive grazing, limited intensive grazing	high	intensive grazing, feed cropping, exotic forestry	Increase in exotic pasture, cultivation, cropping, shelter trees, fencing, exotic forest
(c) fluvial valley terraces	late Pleistocene outwash gravels	400 - 1000	short and snow tussock, matagouri scrub	extensive grazing, limited intensive grazing and feed cropping	high	intensive grazing, feed cropping, exotic forestry	Increase in exotic pasture, cultivation, cropping, shelter trees, fencing, exotic forest
(d) lake shore benches and beaches	late Pleistocene outwash deposits	400 - 750	short tussock and matagouri scrub, moss tussock, gravel fields	extensive grazing	high	intensive grazing, feed cropping, exotic forestry	Increase in exotic pasture, cultivation, cropping, shelter trees, fencing, exotic forest
(e) fans	late Pleistocene and Holocene fan deposits	400 - 1000	short tussock and matagouri scrub, some red tussock	intensive and extensive grazing, feed cropping, shelter trees	high	intensive grazing, feed cropping, exotic forestry	Increase in exotic pasture, cropping, shelter trees, cultivation, fencing
(f) meander floodplains	Recent alluvium and swamp deposits	500 - 800	wetlands, sedge, reed, and rushlands, red tussock raupo	extensive grazing	high	intensive grazing, feed cropping	Increase in exotic pasture, drainage, cultivation, fencing, decrease in scrub
(g) valley fill swamps	Recent alluvial and swamp deposits	400 - 850	wetlands, sedge, reed, and rushlands, red tussock raupo	extensive grazing	very high	intensive grazing, feed cropping	drainage, cultivation, increase in exotic pasture, fencing
(h) terrace and moraine backswamps	late Pleistocene outwash and Recent swamp	400 - 850	wetlands, sedge, reed, and rushlands, red tussock raupo	extensive grazing	low	semi intensive grazing	decrease in wetland vegetation by grazing, drainage
(i) erosional 'hard' rock hill slopes	Recent alluvial and Recent swamp	610 - 1400	short tussock, matagouri scrub and fern, beech forest	extensive grazing	medium	semi intensive grazing, exotic forestry	Increase in exotic pasture, fencing, tracking, exotic forest, decreased tussock and scrub



H 4 BASIN FLOOR OUTWASH PLAINS LAND TYPE

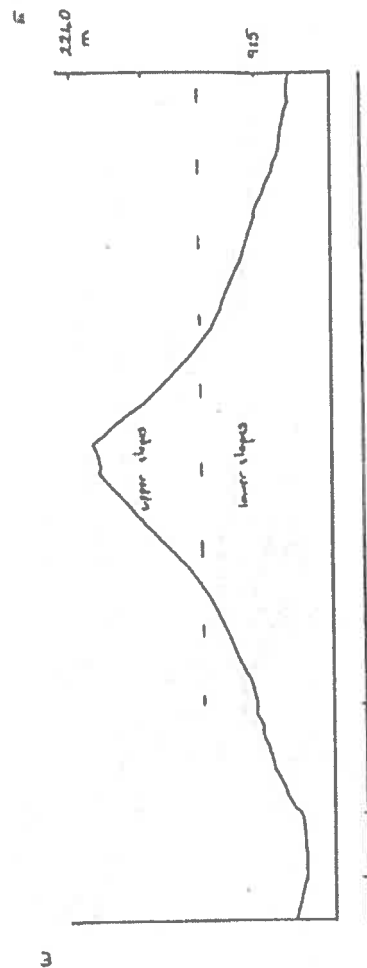
Basin floor fluvio-glacial outwash plains, terraces, piedmont fans, braided and meandering floodplains, and backswamps etc, and associated low land rock ranges, and minor soft rock hills. Elevation ranges from 350 to 1400 m, with the balance below 600 m, and rainfalls between 430 and 850 mm/A. The land type includes parts of the Wainaki basin.

landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
(a) fluvio-glacial outwash plains	Pleistocene and late Pleistocene outwash gravels	360 - 700	short tussock and mataigouri scrub	extensive grazing	low	extensive grazing, conservation forestry	management dependent, decrease tussock cover, increase in Hieracium and exotic trees
(b) outwash terraces	late Pleistocene outwash gravels, some loess	350 - 800	short tussock and mataigouri scrub	extensive grazing	low to medium	semi intensive grazing, exotic forestry	increase in exotic pasture, and trees, fencing
(c) piedmont fans	Pleistocene and late Pleistocene fan alluvium, some loess	360 - 800	short tussock and mataigouri scrub	extensive grazing	low to medium	semi intensive grazing, exotic forestry	increase in exotic pasture, and trees, fencing
(d) braided floodplains	Holocene fluvial deposits	360 - 970	Roughia cushion fields, moss tussock gravel fields	extensive opportunist grazing	low	extensive opportunist grazing	largely a 'natural' environment, exotic river control trees and 'weed' establishment
(e) meander floodplains and backswamps	Recent alluvium and swamp deposits	350 - 970	wetlands, sedge, reed, and rushlands, red tussock, raupo	extensive grazing	high	intensive grazing, feed cropping	increase in exotic pasture, drainage, cultivation, fencing, decrease in wetland vegetation
(f) low hard rock ranges	Tortoise Group sandstones and siltstones	810 - 1400	short tussock, mataigouri scrub and fern	extensive grazing	medium to low	semi intensive grazing, exotic forestry	increase in exotic pasture, fencing, tracking, exotic forest, decreased tussock and scrub
(g) minor soft rock hill slopes	tertiary non marine gravels	500 - 500	short tussock, mataigouri scrub and fern, broadleaved scrub	extensive grazing	medium	semi intensive grazing, exotic forestry	increase in exotic pasture, fencing, tracking, exotic forest, decreased tussock and scrub

II 7 ISOLATED MOUNTAIN LAND TYPE

Steep to very steep, dissected, isolated mountain blocks, up to 1830 m, nested within the glacial and fluvial valley floor or basin land types; extensive scree and rock outcrop are common at higher elevations, lower steep to very steep often rectilinear slopes have been scoured by past glacial activity, rolling to strongly rolling, rounded summits currently undergo intensive periglacial processes. Elevation ranges from 450 to 1830 m and rainfalls between 1200 and 1800 mm/A. Example locations include Sugarloaf in the Waimakariri basin, Cottons Sheep Range, in the Rakai, and the Harper Range in the Rangitata.

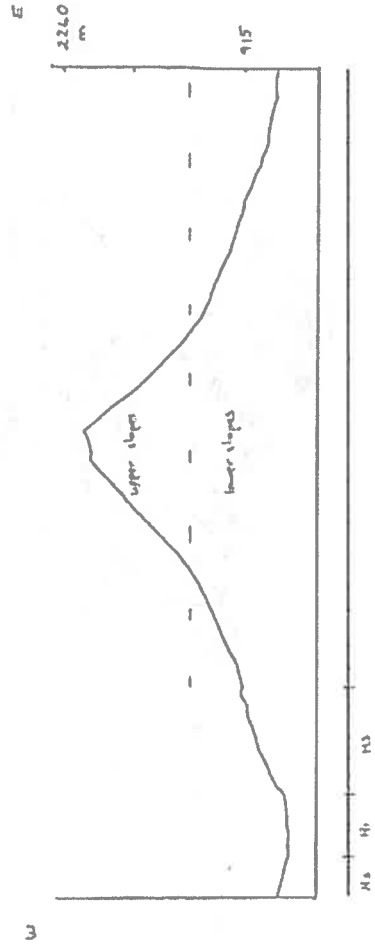
landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
upper mountain slopes, and summits (> 1200 m)	Torlesse Group sandstones and siltstones	1200 - 1830	snow and alpine tussock grassland, subalpine scrub, fellfield and scree vegetation	extensive grazing, conservation land	very low to nil	conservation land recreation, extensive 'wild' animal grazing	increase in tall stature vegetation with withdrawal from grazing, tracking, recreation impacts
lower mountain slopes (< 1200 m)	Torlesse Group sandstones and siltstones, colluvium	450 - 1200	short tussock grassland with mangouari, manuka and broadleaved scrub and fern, beech and mixed hardwood forest	extensive grazing	low	extensive grazing exotic forestry < 1000 m, conservation land, recreation	increase in scrub with lowering of grazing pressure, fencing, tracking, exotic forest

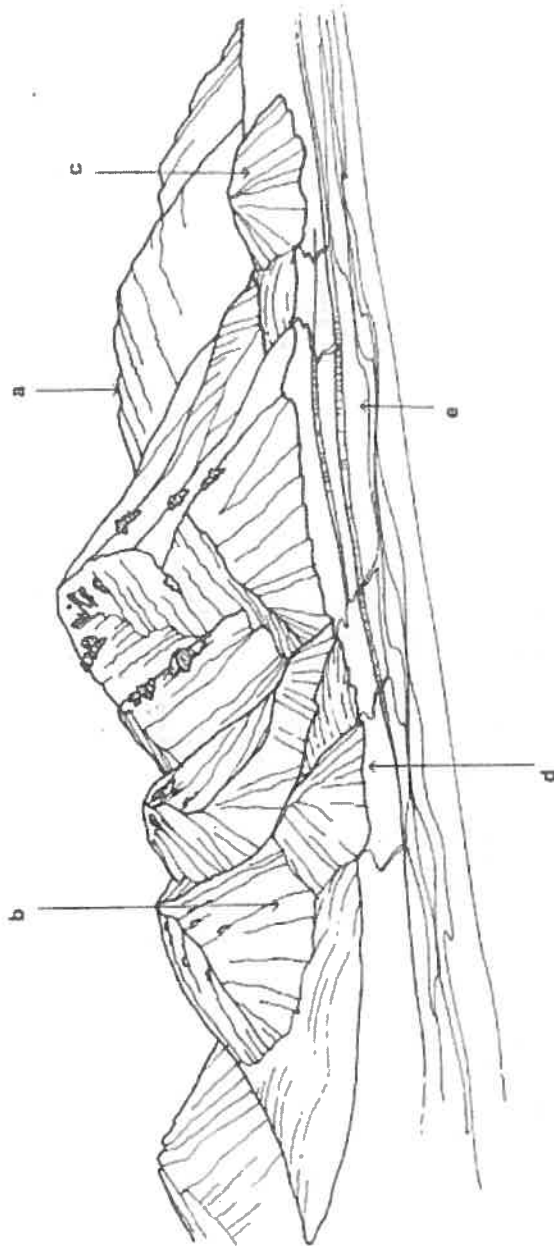


H 15 SOUTHERN SUBHUMID TO HUMID MOUNTAIN RANGE LAND TYPE

Steep to very steep, dissected, subhumid to humid mountain ranges south of the Rakaia up to 2500 m; formerly valley and strongly cirque glaciated, with narrow sharp ridges and minor permanent snow and ice accumulations, extensive scree and bedrock outcrop especially at higher elevations. Significant moraine and kame terraces and deep colluvium mantle moderately steep to steep rectilinear lower mountain slopes and upland plateaus. Elevations range from 500 to 2500 m, and rainfall between 1300 to 4500 mm/A. Snow tussock, subalpine scrub and alpine and rockfield vegetation features above 1100 m, with an induced short tussock grassland, mataigouti and manuka scrubland, with remnant beech forest on the lower slopes only in the south west. Example locations include the Dig Hill, Two Thumb, Hall, Ben Ohaui and Diakern Ranges.

landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
upper mountain slopes, summits and cirques (> 1200 m)	Torlesse Group sandstones and siltstones, and low grade schist	1200 - 2500	snow and alpine tussock grassland and beechfield subalpine and alpine scrub, fellfield and scree vegetation	conservation land, recreation limited 'wild' animal grazing	very low to nil	conservation land, recreation, 'wild' animal grazing	recreational impacts, tracking, buildings, tow lines etc.
lower mountain slopes (< 1200 m)	Torlesse Group sandstones and siltstones, and low grade schist, colluvium, and moraine	518 - 1200	short and snow tussock grassland with mataigouti, manuka - kinohi, braided grass and subalpine scrub and herbs, beech and Halls totara forest	extensive grazing, conservation land, recreation	low	extensive grazing, exotic forestry < 1000 m, recreation	increases in scrub cover with reduced grazing pressure, tracking, exotic forest, recreation impacts
minor valley floors and colluvial side slopes	alluvium, colluvium and moraine from Torlesse Group sandstones and low grade schist	500 - 900	short tussock grassland with mataigouti, manuka - kamika, braided grass scrub, red tussock and wetlands, and beech forest	extensive grazing, conservation land, recreation	low to medium	semi intensive grazing, exotic forestry	increase in exotic species, fencing, shelter trees, exotic forest

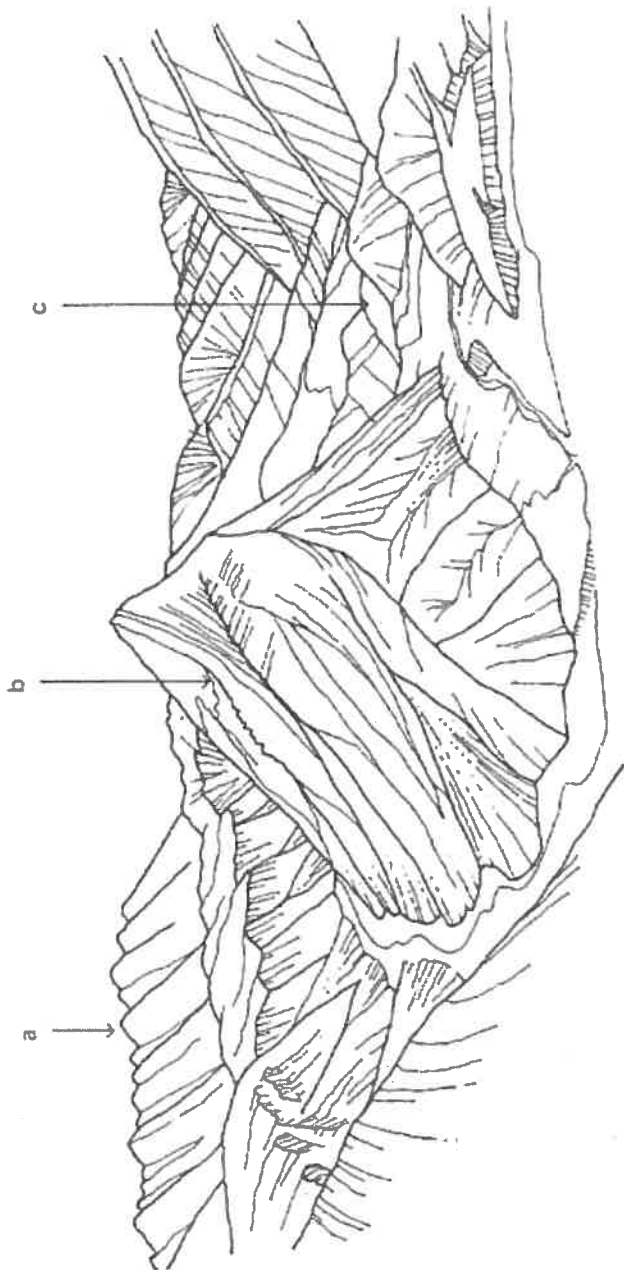




H 17 SEMI ARID TO HUMID MOUNTAIN RANGE LAND TYPE

Steep to very steep, dissected, semi arid (lower slopes), to subhumid (summits), mountain ranges and associated foothills, from 350 to 2000 m; largely non glaciated although with a heavy periglacial imprint, extensive scree and rock outcrop especially at higher elevations and strongly rolling to rounded summits (>1500 m), moderately steep to steep broken, lower mountain and hill slopes with some broad rolling to strongly rolling spurs, and minor river beds, and associated terraces. Elevation ranges from 350 to 2000 m and rainfall between 400 to 1200 mm/A. Low elevation vegetation is highly modified, ceptated, short tussock grassland with extensive *Helictotrichum*, sweet briar, and matigouri scrub. Snow tussock, alpine, and rockfield vegetation occurs above 1000 m. The semi arid to humid mountain range land type includes the Beharotte, St. Cuthbert Ranges.

landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
(a) upper mountain slopes (>1000 m)	Torlesse Group sandstones and siltstones, and associated low grade schist	1000 - 2000	snow and alpine tussock grasslands and herbfield, subalpine and alpine scrub, foefield and scree vegetation	very extensive grazing, conservation land, recreation, wild animal grazing	very low to nil	extensive grazing, conservation land, recreation, wild animal grazing	tracking, increased scree with reduced grazing, recreation impacts
(b) lower mountain slopes (<1200 m)	Torlesse Group sandstones and siltstones, and associated low grade schist	600 - 1300	short and snow tussock grassland with matigouri, and subalpine scrub and heath, tallara forest - woodland	extensive grazing, conservation land, (heavy rabbit grazing)	low	extensive grazing, exotic forest on moist aspects, conservation land, recreation	tracking, fencing, exotic trees, recreation impacts
(c) marginal foothill hill slopes	Torlesse Group sandstones and siltstones, and associated low grade schist	350 - 1000	short tussock grassland with matigouri scrub	extensive grazing, (heavy rabbit grazing)	low to medium	extensive and semi intensive grazing, exotic forest on moist aspects	tracking, fencing, exotic pasture species on moist aspects, exotic trees
(d) minor terraces	late Pleistocene and Holocene alluvium	350 - 600	short tussock grassland with matigouri scrub	semi intensive grazing, feed cropping, (heavy rabbit grazing)	medium	semi intensive grazing, feed cropping, exotic forestry	shearer, subdivision, cultivation, exotic trees
(e) braided floodplains	Recent alluvium	300 - 600	Rolfsa cushion flax, meata and tussock gravel beds	extensive opportunistic grazing	low	extensive opportunistic grazing	largely a natural environment, exotic weed establishment



11 20 SOUTHERN MAIN DIVIDE AND ASSOCIATED RANGES LAND TYPE

Sleep to precipitous, high, heavily glaciated mountains of the main divide and central ranges to 3784 m, south of Arthurs Pass. Glacially eroded bedrock forms, arêtes, cirque basins, U-shaped glacial troughs with extensive bare rock, scree, and permanent ice and snow dominate above 1400 m. Extensive thin scree and talus mantles rectilinear slopes below 1500 m. Steep to very steep, dissected lower mountain slopes with extensive Holocene moraines, fluvio-glacial benches and colluvial footslopes fill valley heads and veneer valley walls. Elevation ranges from 550 to 2682 m and precipitation ranges from 5000 to 8000 mm/A, through maritime to alpine - nival bioclimatic zones. Alpine vegetation, snow tussock and subalpine scrub, modified fescue / snow tussock grassland, manuka and mātagouri scrub, remnant, and extensive beech forest cloth slopes below 1500 m. The land type incorporates the headwaters of Ahuriri, Hopkins and Dobson Rivers.

landform component	geological formation	elevation m	remnant native vegetation	present land use	potential land use	potential impacts
(a) upper mountain slopes, summits and cirques above vegetation limit	Torlesse Group sandstones and siltstones, and schist	upper limit of vascular plants to 2682		recreation, tourism, conservation land	conservation land, recreation, tourism	recreation impacts
(b) middle mountain slopes, summits and cirques (> 1200 m)	Torlesse Group sandstones and siltstones, and schist	1200 - to upper limit of vascular plants	snow and alpine tussock grassland and herbfield, subalpine and alpine scrub, fellfield and scree vegetation	recreation, tourism, conservation land, wild animal grazing	conservation land, recreation, tourism, wild animal grazing	recreational impacts, tracking, buildings, tow lines etc.
(c) lower mountain slopes (< 1200 m)	Torlesse Group sandstones and siltstones, schist, colluvium, and moraine	550 - 1200	snow and short tussock grassland with mātagouri, manuka - kanuka, broadleaved and subalpine scrub and herbs, beech and Halls totara forest	conservation land, recreation, extensive grazing, exotic forestry	conservation land, recreation, extensive grazing, exotic forestry < 1000 m	tracking, exotic trees and forestry, recreation impacts

