

Crown Pastoral Land Tenure Review

Lease name : Mt St BATHANS

Lease number : PO 116

Conservation Resources Report - Part 1

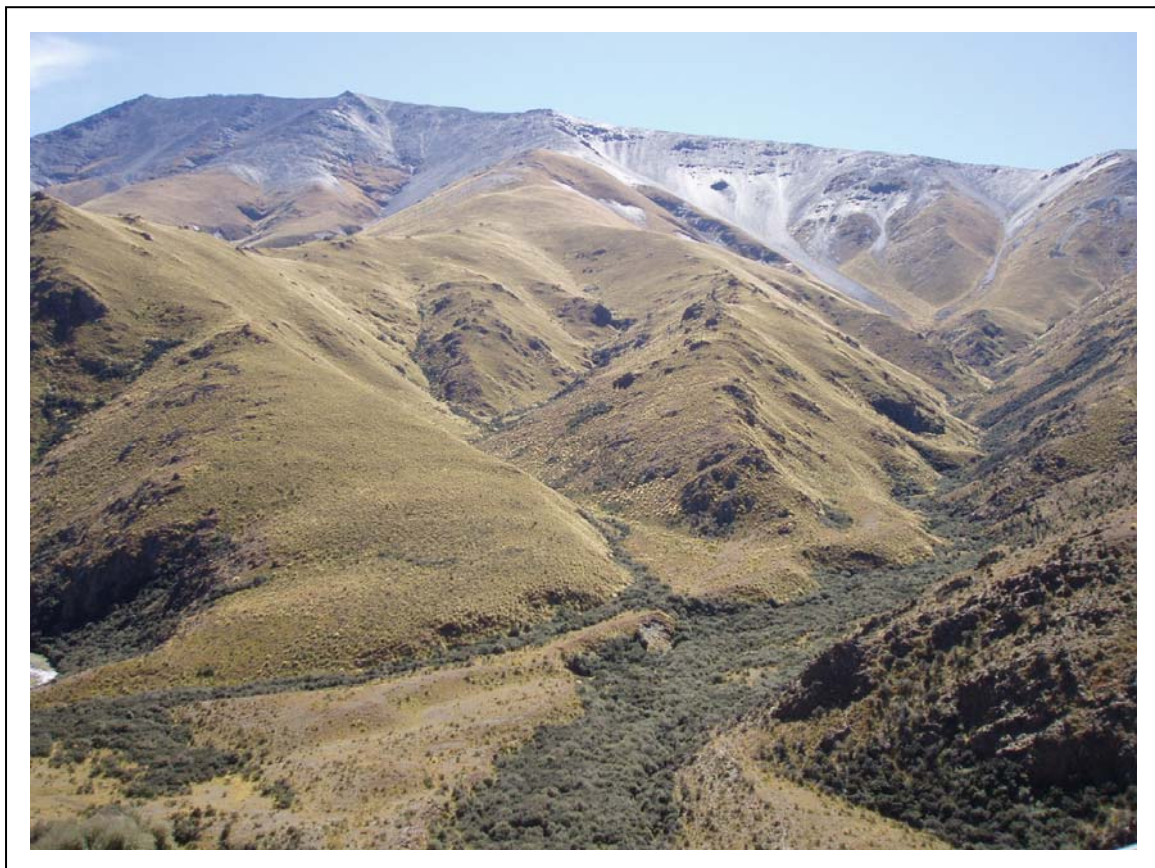
As part of the process of Tenure Review, advice on significant inherent values within the pastoral lease is provided by Department of Conservation officials in the form of a Conservation Resources Report. This report is the result of outdoor survey and inspection. It is a key piece of information for the development of a preliminary consultation document.

Note: Plans which form part of the Conservation Resources Report are published separately.

These documents are all released under the Official information Act 1982.

September 06

DEPARTMENT OF CONSERVATION
CONSERVATION RESOURCES REPORT
ON TENURE REVIEW OF



**MOUNT ST BATHANS PASTORAL LEASE
(PAL 14-04-116)**

UNDER PART 2 CROWN PASTORAL LAND ACT

July 2006

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PART 1 INTRODUCTION

Background

The lessees of the Mount St Bathans Pastoral Lease (the lease) have applied to the Commissioner of Crown Lands to enter the land tenure review process.

The moderately large (9216 ha) lease comprises two blocks. The majority of the lease lies in the area where the Dunstan and St Bathans Ranges, separated by Dunstan Creek, merge into the upper Manuherikia River Valley. The inherent conservation values of this block are assessed within this report. A second small block (~100ha) lies south of the St Bathans Loop Road. This block is not considered to contain any significant inherent conservation values and is not discussed further.

The lease is U-shaped with the west branch being accessed from Pauley Road and the east branch from the Hawkduns Runs Road. The southwest and northeast corners of the lease lie 18km apart in a straight line or 30km by road. The lease spans an altitudinal range of approximately 1400 m between the St Bathans Loop Road (~640 m) and the peak of Mount St Bathans (2080 m). The lease adjoins the Cluden lease and the Michael Peak lease to the north. To the south, the Dunstan Burn lease lies in the area between Dunstan Creek and Rocks Creek. The homestead is sited on freehold land which adjoins the lease off Pauley Road. The homestead is approximately 2 km from the St Bathans township and approximately 40 km from Ranfurly, the nearest commercial centre.

The lease was first inspected for conservation values by a team of Department of Conservation specialists from December 14-17, 1998. Weather conditions during the survey period were fine and warm. Following the sale of the lease and later reinstatement of tenure review, the botanical, herpetological and recreation values of the lease were reinspected from February 8-10, 2006. Weather conditions were variable - generally cool and damp with some warm periods. This report describes the inherent conservation values present on the lease based on findings from both inspections.

Ecological Context

The lease lies on the boundary between the Central Otago and Waitaki Ecological Regions. Parts of the lease lie within each of the Dunstan, St Bathans and Maniototo Ecological Districts (ED).

The Dunstan ED and the neighbouring Linda and Pisa EDs were surveyed as part of the Protected Natural Areas Programme (PNAP) during the summer of 1984/85 (Grove, 1994). Approximately 3000 ha in the western part of the lease were surveyed as part of the Dunstan ED. Two Recommended Areas for Protection (RAPs) were identified which lie entirely within the lease. These are RAP Dunstan B2 "Sawtooth Creek" (560 ha) and RAP Dunstan B3 "Dunstan Peak" (275 ha).

A PNAP report for the Maniototo Ecological District was prepared in 1994 based on an inventory of existing ecological information supplemented with some field investigation. Approximately 1200 ha on the eastern terraces and low hills were surveyed as part of the Maniototo Ecological District. A 2040 ha Area of Interest AOI 1 "Upper Manuherikia Valley" was identified. The AOI incorporates approximately 350 ha on the flats and terraces on the true right of the Manuherikia River.

The balance of the lease lies within the St Bathans Ecological District (Waitaki Ecological Region). This ecological region has not been surveyed under the PNA programme.

Four existing conservation areas adjoin the lease. Two gravel reserves of 1.4 ha (H40103) and 2.28 ha (H40104) lie between the lease and the Hawkdun Runs Road. Two Land Act (fixed) marginal strips are in places on Dunstan Creek (H40106 and H41051). A Conservation Act (movable) marginal strip lies between the lease and the Manuherikia River.

PART 2 INHERENT VALUES: DESCRIPTION OF THE CONSERVATION RESOURCE AND ASSESSMENT OF SIGNIFICANCE

2.1 LANDSCAPE

Landscape Context

Diverse landscape characteristics are represented on the lease as a consequence of its geographical location. The lease lies on the boundary between the rounded Dunstan Range and the contrastingly steep St Bathans Range. The two ranges are separated by Dunstan Creek which flows through several areas of steep gorge on the lease. Rocks Creek drains the east face of the St Bathans Massif and also incorporates steep gorge areas. The hill country on the lease rises directly from the surrounding flat river terraces to form the forefront of the St Bathans Range. The flat rolling terrain at the open, upper end of the Manuherikia River valley provide distinctive contrast to the hill country on the lease.

Survey Method

The landscape inspection and assessment was made from farm access tracks and from roads in the St Bathans district. The lease is divided into landscape units, the boundaries of each defined principally by differences in physical characteristics and land use. The landscape character of each landscape unit is described in terms of landform, land cover and land use. An assessment of landscape values is made using the following criteria:

- Naturalness –an expression of the degree of indigenous content of the vegetative cover and the extent of human intervention.
- Legibility –an expression of the clarity of the formative processes and how striking these physical processes are.
- Aesthetic values –includes the concepts of memorability and naturalness. Aesthetic factors that can make a particular landscape vivid include. simplicity in landform, muted colours and fine textured ground cover
- Historical values – areas containing high heritage importance.

The visual or “amenity” value of each unit is described. The amenity value incorporates the concepts of visual distinctiveness or how memorable certain landscapes are, sense of place or the essential character of an area, and visual coherence or how the visual resources of a landscape link together to form a coherent pattern. Finally, an assessment of each landscape unit’s vulnerability to change is made.

Landscape Description

Five landscape units are identified on the Mount St Bathans lease. The inherent landscape values present on the lease are detailed on Map 4.2.2.

Landscape Unit 1

Description

Landscape Unit 1 incorporates the east and southeast side slopes leading off Dunstan Peak (1569 m). The unit also includes the wedge shaped block of hill country that separates Browns Creek from Dunstan Creek.

The dome shaped Dunstan Peak dominates this unit and provides a strong contrast to the steeper, serrated crest of the adjoining St Bathans Range. This contrast is due to differences in the underlying geology and the presence of peri-glacial features. Moderately indented drainage patterns are evident over much of the unit. Small streams drain into Dunstan Creek. These typically originate in perched bogs located just below the main ridgeline. In turn, Dunstan Creek drains into the Manuherikia River to the south of the lease. Bands of rocky outcrops stretch across the mid-slopes and stud the ridgeline. These are a significant natural feature of the unit. The most impressive column tors lie close to the summit of Dunstan Peak.

The summit vegetation of Dunstan Peak is characterised by tufts of blue tussock interspersed with cushion plants amongst the rock pavement. Below 1000m the inter-tussock species are replaced predominantly by introduced grasses and induced native species such as Maori onion. Slim snow tussock grasslands descend to an unusually low altitude and an overall visual impression of coherent tussock grassland extends down to 700 m. Close to the valley floor shady slopes are clad in matagouri scrub and thickets of manuka.

Human induced modifications evident in this unit include the impacts of stock, which tend to concentrate on the open sunny faces, and the invasion of hawkweed. This generally follows the earth-disturbed zone close to the access track.

Landscape Values

In a landscape context the homogeneity of the tussock cover within this unit gives a strong overall impression of uniformity and coherence. The muted colours of the tawny tussocks contrast strikingly with the legible formative processes evident on the adjoining Mount St Bathans rangelands.

The unit has a significant visual resource value owing to the fact that Dunstan Peak is a notable and distinctive natural feature of the rangelands overlooking the Manuherikia Valley. Dunstan Peak helps to form the visual edge to the Dunstan Mountains and is visible from the surrounding network of rural roads, especially along Loop Road near the historic township of St Bathans.

Potential Vulnerability to Change

This unit has the potential to be adversely affected by the following changes in land use and activities:

- Intensification of existing grazing blocks.
- Built elements such as tracking or installations on the skyline which would have a detrimental effect on the integrity of Dunstan Peak.

Landscape Unit 2

Description

Landscape Unit 2 encompasses Pass Creek, Sawtooth Creek and the associated catchment areas. Both catchments lead off the narrow ridgeline north of Dunstan Peak and drain into Dunstan Creek. Dunstan Creek itself passes through a winding gorge at this point. This unit has an extensive altitudinal range from 1510 m along the ridgeline down to 710 m near Dunstan Creek. The unit has an enclosed feel which is strengthened by the abrupt rocky faces of the St Bathans rangelands.

The Pass Creek and Sawtooth Creek catchments have similar landscape features and elements. Tussock grassland covers the spurs and sideslopes. The condition of the tussock is greatly dependant on aspect and altitude. Matagouri shrublands occupy the lower dark faces and also line Dunstan Creek.

Landscape Values

In the broader landscape context this unit is important as it helps to maintain a sense of the original character of the area. In landscape terms this unit could be best described as the high country's 'middle ground'.

Landscape Unit 3

Description

Landscape Unit 3 encompasses the mountainous core of the lease. The unit extends to the naturally eroding limits on both the west and east sides of the St Bathans Range and includes the summit of Mount St Bathans. Mount St Bathans is a prominent landmark within the district with its distinctive serrated crest, steep scree faces and cirques.

The drainage pattern on the western side of the rangelands overlooking Dunstan Creek includes a series of small streams which have their origins in angular catchments and are contained within deeply incised gullies. Between the gullies, rocky bluffs and scree faces drop directly down into the valley floor. On the eastern side the main watercourse is Rocks Creek. Rocks Creek has its origins in the large cirque just below the crest of the St Bathans Range and drains the long backslope of the main mountain spine. Rocks Creek drains into the western branch of the Manuherikia River.

The alpine zone of this unit is characterised by the near complete exposure of the basement rock which is a blue-grey greywacke. A number of glacial landform features are present including the headwalls of cirques which frequently contain tarns. Away from the cirques, the landscape is dominated by long scree faces and stable rockfields.

This high altitude environment is nearly devoid of vegetation except for alpine cushion plants which have established within the more stable areas and a sparse

covering of blue tussock. Near the lower boundary of the unit snow tussock occupies the stable slopes between steep dissected gullies.

Landscape Values

This landscape unit incorporates a number of elements which together form the nucleus of a comprehensive high country landscape. These include distinctive landscape features and elements, a series of altitudinal sequences of plant communities, and an overall sense of remoteness.

In visual terms, the most striking feature of the unit is the contrast in the colorations of the underlying geology and the tawny brown tussocklands. This combination forms a vivid pattern which is visible from many surrounding vantage points. The physical character of this steep and angular landform contrasts markedly with the rounded, smooth appearance of the landforms in Landscape Units 1 and 2.

Landscape Unit 4

Description

This unit comprises much of the long eastern backslope that leads off the St Bathans Range. The main watercourse is Rocks Creek. The upper boundary of the unit lies around 1400 m where a marked change in the patterning of the ground occurs from long scree chutes to more random patches of exposed scree. The base of the foothills which overlook the Manuherika River forms the lower boundary of the unit.

The dominant physical feature of the unit is the parallel ridgelines which are slightly indented by gullies. These contain small tributaries which flow into Rocks Creek.

The main vegetative cover is relatively depleted snow tussock intermingled with golden spaniard. At a lower altitude over the stable rockfields there is a scattering of grey shrublands which are dominated by matagouri.

Landscape Values

In landscape terms, this unit is similar to Landscape Unit 3. The unit is best described as middle ground. The unit conveys an overall impression of being natural in character, but does not contain any outstanding natural features.

Landscape Unit 5

Description

This unit comprises the area of the lease that extends across the upper Manuherikia Valley. The western boundary of the unit follows the Scandinavian Water-Race. The corresponding boundary to the east is defined by the margins of the Manuherikia River. To the north, the Michael Peak lease borders both the unit and the lease. To the south the unit borders freehold land. The Hawkdun Runs Road bisects the unit. The landforms within this unit include the series of rolling hillocks (highest point 788 m) that trend in a north-south direction. The physical relief between the hillocks

and the lower side slopes of the St Bathans Range is generally low and is dominated by a wide dish-like valley. The drainage pattern is superimposed on the land's surface. Many of the small streams follow the edges of low escarpments that extend from the side slopes. To the east of the hillocks the topography is typically subdued and even-graded, formed by alluvial material washed out from the upper Manuherikia River.

The vegetative cover of the unit reflects a cultural influence with short grasslands being dominant. Within these uniform grasslands species present include fescue tussock, patches of hard tussock and a variety of pasture grasses. Copper tussocklands are a conspicuous feature. Frequently *Coprosma*-matagouri shrublands clad the darker faces of the hillocks as well as the more gravely areas along the existing watercourses and abandoned channels. Close to the Hawkdun Runs Road is an old and apparently unmanaged pine plantation. A number of self-sown seedlings are dispersed around the edges.

Landscape Values

Within a landscape context this unit forms the "front yard" of the St Bathans Range. The unit possesses high visual resource value. This is attributable to the gentle terrain along the valley floor which allows for expansive and uninterrupted vistas of the eastern flanks of the St Bathans Range from local roads, and also to the uniformity of the wider landscape in which this unit sits. Furthermore, the unit forms the transition between dry farmland on the valley floor and the surrounding high country. This subtle and gradual change in land use and landscape character is a distinctive feature of the upper Manuherikia Valley.

Potential Vulnerability to Change

This unit has the potential to be adversely affected by the following changes in land use and activities:

- Sub-division that would fragment the existing coherent grasslands overlaid on subdued topography.
- Introduction of a single high impact land use such as plantation forestry
- Location of shelter planting positioned along public roads.
- Wilding pine spread.

Significance of Landscape Values

The lease makes a significant contribution to the recognizable landscape character of the Central Otago high country. The lease, with the exception of Landscape Unit 1 below 700m, has inherent landscape value both in itself and as part of the wider landscape.

Dunstan Peak in Landscape Unit 1 forms the eastern extent of the Dunstan Mountains and is a significant local landmark. Further to the west the lease encompasses a large block of the more dissected St Bathans Range and surrounding lowlands. A large part of the lease forms the front rangelands which rise directly from the edge of an extensive valley. Often snowcapped, the rangelands provide visual contrast to the surrounding low relief terrain. The predominantly natural Landscape Units 2 and 4

contain significant 'enclosed' areas, and are an integral part of an overall background landscape to St Bathans and the upper Maniototo. Landscape Unit 3 contains outstanding elements of a comprehensive high country landscape and is also a key part of the upper Dunstan Creek remote landscape. Landscape Unit 5 retains a natural appearance despite heavy modification to predominantly exotic species. This unit, with the exception of the road and fencing, is an integral part of the backcountry setting of the upper Manuherikia Valley landscape.

The intactness of the native vegetative cover, prominent natural features and the overall sense of remoteness collectively form an outstanding high country landscape. The congruence of this lease with similar types of high country is one of its most significant attributes. Altitudinal and topographical sequences which span two mountain ranges and a river valley are also a significant attribute.

2.2 LAND FORMS, GEOLOGY AND SOILS

Landforms

The lease is dominated by the St Bathans Range and in particular Mount St Bathans at the rear of the lease. The St Bathans Range rises from the Manuherikia Terraces at a moderately steep grade with the deeply entrenched Rocks Creek extending almost to the peak. An area of steep scree slopes surrounds the upper margin of the range. West of this the lease slopes down to the very steep and bluffy area of the Dunstan Creek Gorge. To the west of Dunstan Creek the terrain changes from the steep gorge to moderately steep slopes which extend to the top of the Dunstan Range. Easy undulating terrace country extends up the Manuherikia River Valley.

Geology

The Dunstan Range part of the lease is a typical Central Otago block mountain; schist uplifted along a fault with gentle slopes on the northwest side and rounded crests. The underlying geology changes to semi-schist near Dunstan Creek and to Torlesse Greywacke on the St Bathans Range. The St Bathans Range has much sharper ridge crests and extensive screes which are more typical of the Canterbury region.

In the valley floor several rock types are present. These include areas of quartz conglomerate, sandstone deposits, patches of recent gravels derived from the last period of glaciation, remnants of successive tills on associated outward fans from earlier glaciations and weathered, greywacke predominant, gravels and sand.

Soils

Land Environments of New Zealand data identifies soils in the higher altitude areas of the lease as predominantly well drained moderately fertile soils derived from greywacke and schist in the Q1.1 and Q2.1 environments (see Appendix One). Lowland areas typically contain K, N and E environment soils. These are typically moderate to high fertility soils with variable drainage and are derived from tertiary mudstones and sandstones with gravels and/or schist and/or greywacke colluvium, alluvium, loess and till.

Significance of Geology, Landforms and Soils

Significant geological features of the Dunstan Peak area include:

- The textural zone 2B schist with extensive old landslides (hummocky ground). These features are natural and ancient, resulting from ongoing slope processes that have operated for many thousands of years.

Significant geological features of the St Bathans Range include:

- The rocks on the summit of the range which are of textural zone 2A semi-schist, with a transition into greywacke on the eastern slopes leading down to the Manuherikia River.
- Extensive deposits of scree and glacial till in all the east facing valleys of the St Bathans Range and a number of well defined cirques on the eastern face. Below the summit of Mount St Bathans on the eastern face (head of Rocks Creek) there are rock glaciers and other solifluction deposits.
- The valley of Dunstan Creek is controlled by the active Blue Lake fault system, which runs to the east of the creek. Minor faults also occur to the west of the creek. The main Blue Lake fault runs along a line of saddles east of the Dunstan Creek gorge, and descends to the base of the St Bathans Range hillslope in the upper basin of Dunstan Creek.
- Uplift on the eastern side causes the contrast in elevation and slope gradient on either side of the creek.
- Rock debris from the uplifted St Bathans Range is shed downslope to form a complex system of fans in the upper basin of Dunstan Creek. The Dunstan Creek gorge has little in the way of alluvial or slope deposits.

No soils of significance as identified by Arand *et al.* (1991) are recorded on the lease.

2.3 LAND ENVIRONMENTS

Description

The environmental distinctiveness of this area has been assessed through the Land Environments of New Zealand (LENZ). This is a classification of New Zealand landscapes using a comprehensive set of climate, landform and soil variables chosen for their roles in driving geographic variation in biological patterns (Leathwick *et al.* 2003). It is presented at four levels of detail containing 20, 100, 200 or 500 environments nationally. The data in this report is presented at Level IV which more adequately reflects the distribution of biodiversity, past clearance and current vulnerability across the landscape than higher levels of LENZ (e.g. level II). Threat classification at level IV results in substantially more effective and efficient identification of threatened remaining indigenous cover.

Attributing significance to LENZ units, while a useful exercise, must be treated with caution. Work is currently underway to improve the accuracy of underlying spatial data. Soils data, for example, is being upgraded, as the median patch size for polygons

sourced from the Land Resource Inventory is currently between 10,000 and 100,000 hectares, while at Level IV resolution, LENZ units cover areas as small as 10 hectares. Improvement of the underlying classification process which generates LENZ units is ongoing.

Level IV LENZ information when combined with information describing the area of unprotected indigenous cover in threatened land environments, as identified in the national land cover database (LCDB), allows the values under most threat to be identified. Five categories identify those threatened environments containing indigenous biodiversity at most risk of loss. These categories which are derived from a combination of measures for the percentage of biodiversity legally protected and percentage of remaining indigenous vegetation cover, are described as follows:

Table 1: Land Environments of New Zealand Threat Classification Categories.

| Threat Classification | Description |
|---------------------------|---|
| Acutely threatened | <10% indigenous vegetation cover remaining |
| Chronically threatened | 10-20% indigenous vegetation remaining |
| At risk | 20-30% indigenous vegetation cover remaining |
| Critically underprotected | > 30% indigenous vegetation cover remaining and <10% protected |
| Underprotected | >30% indigenous vegetation cover remaining and 10-20% protected |
| No threat | >30% indigenous vegetation cover remaining and >20% protected |

The LENZ Q environment, the dominant environment of the mountains and hill country of the south-eastern South Island (Leathwick et al. 2003), is predominant on the lease. At Level IV classification most of lease comprises the 'underprotected' Q1.1c (25% of land area) or the 'critically underprotected' environment Q2.2a (22%). Small areas of the 'critically underprotected' environments Q1.1b (10%) and Q2.1b (12%), the 'not threatened' Q1.1a (8%) and Q2.1a (3%), the 'at risk' E4.1b (8%) and K3.1a (7%), the 'acutely threatened' N5.1a (3%) and N3.21 (1%) and the 'chronically threatened' N3.1d (1%) environments are present. Negligible amounts of several additional LENZ environments which are also present are identified in Table 2. Table 2 presents a full LENZ analysis for the lease. This is graphically depicted on Map 4.2.6. The LENZ environments are described at Appendix One.

Table 2: LENZ environments present on Mount St Bathans PL and indigenous vegetation characteristics of those environments.

| Threat Category ¹ | LENZ Level IV environment | Area of LENZ unit on Mount St Bathans Lease (ha) | Percent of lease area | Percent protected nationally for conservation purposes | Percent of indigenous vegetation cover remaining | Change in Indigenous Vegetation Cover 1997 - 2002 |
|------------------------------|---------------------------|--|-----------------------|--|--|---|
| Acutely Threatened | N5.1a | 237.75 | 3 | 3 | 1 | No Change |
| | N3.2a | 67.56 | 1 | 7 | 1 | No Change |
| Chronically Threatened | K3.1b | .94 | <1 | 20 | 3 | No Change |
| | N3.1d | 112.88 | 1 | 14 | 1 | Decrease |
| | N4.1b | .31 | <1 | 17 | 1 | No Change |
| | N6.2a | 11.06 | <1 | 18 | 6 | No Change |
| At Risk | E4.1b | 708.69 | 8 | 27 | 4 | No Change |
| | K3.1a | 672.81 | 7 | 27 | 3 | No Change |
| | K3.2a | 35.25 | <1 | 25 | 6 | No Change |
| Critically Underprotected | K5.1b | 1.5 | <1 | 61 | 9 | No Change |
| | N4.1c | 26 | <1 | 49 | 1 | No Change |
| | Q1.1b | 892.5 | 10 | 77 | 8 | Decrease |
| | Q2.1b | 1136.13 | 12 | 66 | 4 | No Change |
| | Q2.2a | 2001.19 | 22 | 40 | 4 | Decrease |
| | Q2.2b | .56 | <1 | 45 | 6 | No Change |
| | Q3.3b | 5.19 | <1 | 81 | 1 | Decrease |
| Underprotected | Q1.1c | 2247.63 | 25 | 91 | 15 | No Change |
| | Q3.3c | 2.88 | <1 | 90 | 17 | Decrease |
| No Threat Ranking | Q1.1a | 752.38 | 8 | 98 | 25 | No Change |
| | Q1.2a | 243.5 | 3 | 99 | 37 | No Change |
| | Q3.3a | 1 | <1 | 97 | 26 | No Change |
| Total | | 9157.71 | 100 | | | |

¹Acutely threatened: <10% indigenous cover remaining; Chronically threatened: 10-20% indigenous cover remaining; At risk: 20-30% indigenous cover remaining; Critically under-protected: >30% indigenous cover remaining and <10% protected; Under-protected: >30% indigenous cover remaining and 10-20% protected; No threat: >30% indigenous cover remaining and >20% protected.

Significance of Land Environments

Walker et al. (2005) describe a safety net of legal protection covering at least 20% of the original area as desirable to retain a full range of biodiversity (2005:9). Of the Level IV environments represented on the lease, protection of the environments N5.1a (3%), N3.2a (7%), N3.1d (14%), N4.1b (17%) and N6.2a (18%) falls below the 20% target level.

2.4 CLIMATE

The lease experiences a typical Central Otago climate with warm dry summers and cold winters. Considerable variation in annual rainfall and seasonal temperature occurs. Due to the moderate to high altitude of the lease, even the lowest areas generally receive over 500 mm of precipitation. This rises to around 700 mm up the Manuherikia Valley and to over 2500 mm on the tops of the St Bathans Range. Rainfall is generally heavier during summer months, however, due to high evapotranspiration rates a soil moisture deficit usually exists. Frosts can be recorded at any time during the year. Winters are cold with moderate to heavy frosts. Snow

falls to low levels where it generally lies on the ground for several days during winter. The highest parts of the lease are snow covered throughout winter and spring.

2.5 VEGETATION

Introduction

The St Bathans Range attracted the attention of early botanical explorers. Donald Petrie (1846–1925), for example, discovered new species on the range which gave rise to several type localities. There has not, however, been a comprehensive assessment of its botanical significance such as that afforded to the adjoining Dunstan Range. The Dunstan Range was encompassed in the Protected Natural Areas Survey Programme through which the Lindis, Pisa and Dunstan Ecological Districts were surveyed during the summer of 1984/85.

The present vegetation on the pastoral lease is thought to be very different from that in the past. The likely nature and extent of the pre-human vegetation has been assessed as part of a wider study of the woody vegetation of Central Otago (Walker et al. 2003). They suggest that at lower altitudes (450 – 730 m) a kanuka-kowhai-Hall's totara forest would have occurred. At higher elevations (up to 1040 m) a beech-Hall's totara-snow totara forest probably prevailed below a snow totara-mountain toatoa shrubland rising up to 1340 m. At the higher reaches of the Dunstan and St Bathans Ranges, an alpine tussock-shrubland is predicted, with the models indicating dominance by mat-forming and other low-statured woody plants.

Some snow totara remnants remain on the lease in the head of Rocks Creek and important relictual forest and shrubland is known from other parts of both the Dunstan and St Bathans Ranges. Nearby Shepherds Creek on Cambrian Hills contains remnants of Hall's totara with bog pine, celery pine and snow totara close by. Snow totara and celery pine also occur in the next valley north of Rocks Creek on the St Bathans Range.

Survey Method

The original 1998 survey and the current 2006 survey were conducted by vehicle and on foot. The entire length of Rocks Creek within the lease was walked as were the upper Manuherikia River terraces, head of Browns Creek, and head of Sawtooth Creek. Descriptions were made of the composition of major plant communities and notes taken on the impact of pastoral farming on those communities. Searches for threatened plants were made in potentially suitable habitat. Photographs were taken of particular species, communities and landscapes to aid in interpretation. Specimens of uncertain taxa were collected for later determination.

Vegetation Description

Three land units are identified for the purpose of describing the vegetation.

- The Upper Manuherikia River Terraces east of Hawkdun Runs Road.
- The St Bathans Range.
- Northern end of Dunstan Range.

Upper Manuherikia River Terraces

Copper tussock (*Chionochloa rubra* subsp. *cuprea*) is dominant in patches but is otherwise highly variable over much of the area both in stature and density. Copper tussock cover is most intact at the south end (south of dividing fence) and near the Hawkdun Runs Road. Pasture grasses and weeds, especially mouse-ear hawkweed (*Hieracium pilosella*), are common between tussock patches and between tussocks.

Wetter tussock areas commonly have *Bulbinella angustifolia*, *Carex coriacea*, *Rumex flexuosus* and bog rush (*Schoenus pauciflorus*). Small pools have a *Carex secta* margin with *Hydrocotyle sulcata* covering the damp mud beneath. Some damp depressions surrounded by copper tussock have sharp spike sedge (*Eleocharis acuta*), *Hypsela rivalis* and *Myriophyllum triphyllum* and the weeds oval sedge (*Carex ovalis*) and jointed rush (*Juncus effusus*). Other depressions have sphagnum moss, *Carex guadichaudiana*, *Ranunculus amphitrichus*, and comb sedge (*Oreobolus pectinatus*). Some heavily cattle pugged depressions are dominated by exotic wetland grasses.

Better drained tussockland communities have a range of native inter-tussock species including golden speargrass (*Aciphylla aurea*), hard tussock (*Festuca novae-zelandiae*), coral broom (*Carmichaelia crassicaule*), *Leucopogon fraseri*, *Acrothamnus colensoi*, *Raoulia subsericea*, *Pimelea oreophila*, *Celmisia gracilentia*, *Wahlenbergia albomarginata*, *Helichrysum filicaule*, *Pentachondra pumila*, and *Brachyscome sinclairii*. Coral broom is locally abundant although this generally consists of apparently old, heavily stock-browsed shrubs. Mouse-ear hawkweed is the dominant weed.

Mixed shrublands are present at the base on both the east and west sides of the low hills formed by the overlay of Maori Bottom gravels on Manuherkia Group sediments. These consist of matagouri (*Discaria toumatou*), *Olearia odorata*, *O. bullata*, *Coprosma intertexta*, *Muehlenbeckia complexa* and *Melicytus alpinus*. On the dry eastern terrace riser are shrubs of *Pimelea traversii*, *P. oreophila* and coral broom. Matagouri shrublands are present in gullies draining the terrace.

The Manuherikia River bed terraces have a mostly prostrate cover of native and exotic herbs and grasses. Common native species include *Raoulia australis*, *R. hookeri*, *Muehlenbeckia axillaris*, *Leucopogon fraseri*, *Aceana inermis*, *Epilobium* spp, *Geranium sessiliflorum*, *Pratia angulata* and silver tussock (*Poa cita*). More local species include *Carex muelleri*. Exotic weed species include mouse-ear hawkweed, sheep's sorrel (*Rumex acetosella*), *Verbascum thapsus* and *Sedum acre*.

St Bathans Range

Rocks Creek catchment

The headwaters of Rocks Creek, high on the St Bathans Range, consists of very sparsely vegetated scree. More stable landforms on ridge crests have well developed cushion fields. At around 1500 m the range crest vegetation is dominated by slim snow tussock (*Chionochloa macra*) and blue tussock (*Poa colensoi*) grasslands with extensive mats of *Dracophyllum muscoides*, *D. pronum*, *Scleranthus uniflorus* and *Celmisia sessiliflora*. Other common native species include *Anisotome aromatica*, *Leucopogon fraseri*, *Leptinella pectinata*, golden speargrass and *Kelleria* spp. Exotic species are limited to tussock hawkweed (*Hieracium lepidulum*), mouse-ear

hawkweed and sheep's sorrel, which occur at very low density. About 10 % bare ground is present.

Narrow seepage tongues with low growing herbaceous cover dissect the headwater basin. Species diversity is high and includes *Gaultheria parvula*, *Orebolus pectinatus*, *Plantago triandra*, *Leptinella squalida*, *Psychrophila obtusa*, *Nertera balfouriana*, *Ranunculus* spp. and bog rush. Wetter flushes have *Ourisia caespitosa*, and *Carex berggrenii*.

Unstable scree slopes have little vegetation except for pockets of *Ranunculus haastii*, *Epilobium* spp and *Myosotis* spp. Rock outcrops have *Celmisia angustifolia*, *Brachyglottis haastii*, *Dracophyllum pronum* and mountain shieldfern (*Polystichum cystostegia*).

At about 1300 m on headwater slopes is a good cover of narrow-leaved tussock (*Chionochloa rigida*), slim snow tussock, *Dracophyllum pronum* and *Celmisia lyallii*. Small shrub dominated boulder fields below have snow totara (*Podocarpus nivalis*), *Myrsine nummularia*, *Acrothamnus colensoi* and *Coprosma dumosa*. Just above the dilapidated ski club hut at about 1000 m are *Pimelea traversii*, *Dracophyllum uniflorum*, matagouri, *Celmisia densiflora*, *C. viscosa* and abundant golden speargrass. Around the hut a small grove of *Pinus* sp. have been cut down.

Below the hut, Rocks Creek meanders through narrow terraces confined by the steep valley profile. The steep valley slopes are predominantly tussock covered but dense mixed shrublands occur alongside Rocks Creek. These are dominated by matagouri but also include *Carmichaelia petriei*, coral broom, *Olearia bullata*, *Melicytus alpinus*, and golden speargrass with *Clematis marata* sprawling throughout.

Below the retirement fence, similar shrublands are present but *Olearia bullata* is more abundant and both mountain wineberry (*Aristotelia fruticosa*) and briar occur. In the lower part of the creek *Corokia cotoneaster*, *Hebe salicifolia* and *Rubus schmidelioides* also become important components. These shrublands extend up side gullies and on steep faces above the creek.

Tussock cover thins out on the north-facing true right of the valley with increasing mouse-ear hawkweed down valley. A relatively dense tall tussock cover is maintained along the length of the valley on the true left. A final rocky gorge before the creek emerges out onto the Manuhierikia flats has the fern *Asplenium richardii* and *Anisotome caudicola*.

A small valley immediately to the south of Rocks Creek has similar values to those described for Rocks Creek. It too has extensive native shrubland on rubbly north-facing slopes dominated by *Olearia odorata*, *Coprosma propinqua*, *Aristotelia fruticosa* and matagouri. The most downstream riparian areas have occasional willow (*Salix fragilis*) and elderberry (*Sambucus nigra*). Outside of the main shrubland areas the valley has a good tall tussock cover (density varying with aspect) albeit with substantial tussock hawkweed on toe-slopes.

Western faces

River flats adjoining Dunstan Creek above the gorge have scattered silver, hard and blue tussocks. Other native species present include *Muehlenbeckia axillaris*, *Pimelea*

oreophila and matagouri. Mouse-ear hawkweed and sheep's sorrel are abundant weeds.

Above these flats a steep scarp leads to easy foot slopes beneath the wide sweeping face below Mount St Bathans. The lower slopes are fringed with a short tussock - *Hieracium* dominated community with occasional *Olearia bullata*, matagouri and briar. This soon grades into taller narrow-leaved tussocklands with moderate inter-tussock diversity. Shrub species associated with this are the brooms *Carmichaelia crassicaule*, *C. petriei*, and *C. vexillata*. Inter-tussock herbs and sub-shrubs include *Thelymitra longifolia*, *Raoulia subsericea*, *Prasophyllum colensoi*, *Celmisia gracilentia*, *Wahlenbergia albomarginata*, golden speargrass, *Gaultheria parvula*, *G. depressa* and *Hieracium* spp. The occurrence of *Hieracium* is patchy, with some of the tallest and most dense tussocklands having relatively little.

Gravel outwash fans interspersed along the slopes have silver tussock, *Acaena inermis* and *Epilobium* spp. Shrubs at the periphery of these fans and along creeks are mostly matagouri but also include occasional *Coprosma intertexta*. Above the tussocklands, very steep scree slopes rise to the crest of the St Bathans Range. These are sparsely vegetated as previously discussed under Rocks Creek above.

Extensive and diverse mixed shrublands are present throughout Dunstan Creek gorge and major tributary gullies such as Sawtooth Creek, Pass Creek and unnamed creeks on the true left. Dominant species are matagouri, *Coprosma propinqua*, *Corokia cotoneaster*, *Olearia bullata*, *O. odorata*, *Gaultheria crassa* and mountain flax (*Phormium cookianum*). Much less common are occurrences of rarer shrubs such as *Hebe cupressoides*, *Olearia cymbifolia*, *Hebe rakaiensis* and *Coprosma intertexta*.

Rock outcrops on the steep craggy slopes above the gorge have shrubs of *Pimelea traversii*, *Acrothamnus colensoi*, *Helichrysum intermedium*, *Coprosma propinqua*, *Melicytus alpinus*, *Olearia odorata* and *Carmichaelia petriei*. Herbs include *Pseudognaphalium* aff. *luteoalbum*, *Wahlenbergia albomarginata*, *Brachyglottis bellidioides*, *Senecio dunedinensis*, *Anaphalioides bellidioides* and *Anisotome aromatica*.

Tall tussocklands on the more open slopes above are in good condition. Coral broom is scattered throughout and the sub-shrubs *Pentachondra pumila* and *Leucopogon fraseri* are common as ground cover.

Northern end of Dunstan Range

Sawtooth Creek

This catchment is dominated by narrow-leaved tussocklands with abundant golden spaniard. A large slump down the centre of the catchment has slim snow tussock which is also present in a band above 1400 m. Slim snow tussock extends to its lowest altitude in the ecological district at this site.

Significant aspect differences exist in the catchment. Shady southeast facing slopes have denser tussockland with a high component of false speargrass (*Celmisia lyallii*). Other important species include golden speargrass, *Ozothamnus vauvilliersii*, *Dracophyllum pronum*, *Lycopodium fastigiatum*, *Raoulia grandiflora*, *Pentachondra pumila*, *Celmisia densiflora*, *Craspedia lanata*, and *Pimelea oreophila*.

Tussock hawkweed, mouse-ear hawkweed and *Hieracium praelatum* are present at very low frequencies.

Sunny aspects are generally more depleted with more *Hieracium* but the inter-tussock flora is still strongly dominated by native species. Most common are *Leucopogon fraseri*, *Acrothamnus colensoi*, *Carmichaelia vexillata* and coral broom. The lower reaches of the catchment down to and including the west bank of Dunstan Creek, have shrublands as described above for the Dunstan Creek gorge.

Dunstan Peak and surrounds

This is an outlier of the northern Dunstan summit plateau. The summit of Dunstan Peak (1569 m) and rounded ridge crests to the north and south are cushionfield, dominated by *Dracophyllum muscoides*. Other important species are blue tussock (dominates in the north), *Celmisia sessiliflora*, *Raoulia grandiflora*, *Phyllachne colensoi*, *Anisotome imbricata*, *A. aromatica*, *Leptinella pectinata*, *Aciphylla hectorii*, *Abrotanella inconspicua* and *Scleranthus uniflorus*. There is considerable rock on the ground surface and scattered clumps of slim snow tussock. A small population of the very rare forget-me-not *Myosotis cheesemanii* is present in cushionfield near the vehicle track on the western side of the peak.

Rock tors around the summit of Dunstan Peak have cushions of *Chionohebe thomsonii* and *Pachycladon novae-zelandiae*.

Below the cushionfield, slim snow tussockland is present especially on slopes with shady southeast aspect. These give way abruptly to narrow-leaved tussocklands on steeper slopes. Below the fenced southern RAP boundary there is still good narrow-leaved tussock cover with golden speargrass, blue tussock, *Bulbinella angustifolia*, false speargrass and *Gaultheria novae-zelandiae*. Sweet vernal and mouse-ear hawkweed are common, tussock hawkweed is present at very low density. Small flushes have the sedges *Carex gaudichaudiana* and comb sedge, with abundant moss. At about 1000 m a reasonable tussock cover still exists, however the inter-tussock flora is strongly dominated by sweet vernal.

The headwaters of Browns Creek have a strong narrow-leaved tussock and slim snow tussock cover of moderate stature and density. A litter layer is well developed between tussocks along with common herbs such as false speargrass, *Raoulia subsericea*, *Leucopogon fraseri*, *Festuca mathewsii*, *Gaultheria depressa* and golden speargrass. Locally there are many patches of coral broom (particularly on steep sides of dissecting gullies) and *Carmichaelia vexillata*. Hawkweeds are at low density.

Small herb seepages dominated by comb sedge also have bog rush, *Nertera baufouriana*, *Coprosma atropurpurea*, *Psychrophila obtusa* and the more local *Ranunculus maculatus* and *Carex berggrenii*. Many of the seepages show evidence of heavy grazing.

Areas north and south of Browns Creek below about 1000 m (depending on existing fencelines and stocking regimes) in the catchments of Pass Creek and small creeks flowing directly into Dunstan Creek, are similarly strongly dominated by pasture grasses and weeds. Previously tussock-clad slopes above the true left of Browns Creek (up to 1200 m) have recently been burnt. This area now supports a dense cover of tussock hawkweed.

Significance of Vegetation Values

The lease contains the RAP Dunstan B2 and Dunstan B3 and the AOI-Upper Manuherikia River.

The lease contains representation of the plants and plant communities in the montane, sub-alpine, low alpine and high alpine bioclimatic zones. Of the native vascular plant species present, at least 12 species are listed as threatened and a further one as Data Deficient in the most recent threat classification system (Hitchmough 2002 as amended by de Lange 2004). A list of these species with their threat of extinction status and distribution within the pastoral lease is provided below in Table 3 and Map 4.2.4.

Of highest significance is the occurrence of populations of *Myosotis cheesemanii* (Nationally Critical) and *Hebe cupressoides* (Nationally Vulnerable). Taxa in these categories are facing a very high risk of extinction in the wild (Molloy et al. 2002). The small forget-me-not *Myosotis cheesemanii* is apparently confined to several small populations on just the Dunstan and Pisa Ranges. The species qualifies as Nationally Critical because the best available knowledge suggests that there are less than 250 plants known, occupying a combined area of < 1 ha. The population of the shrub *Hebe cupressoides* is important as one of a number of recently discovered small populations in Central Otago and the Mackenzie Country that are indicative of its former range. This shrub is the subject of a national recovery plan (Norton 2000) which promotes the formal protection of its habitat.

Species listed in the categories Serious Decline and Gradual Decline fall within the division 'Chronically Threatened'. Species in this division face extinction, but are buffered slightly by either a large total population size or a slow decline rate. Species listed as Sparse and Range Restricted fall under the division 'At Risk'. Although they are not currently in decline, their population characteristics mean a new threat could rapidly deplete their populations. Sparse taxa have very small, widely scattered populations. Species listed as 'Data Deficient' have insufficient information on which to make an assessment as to their appropriate category.

Several other species, although not ranked as nationally threatened, are notable in a regional and local context. These include *Olearia cymbifolia*, *Hebe rakaiensis*, *Anisotome caudicola* and *Rumex flexuosus*.

High alpine and low alpine communities (cushionfield on patterned ground, alpine tors, snow banks and herb seepages) are significant as distinctive communities, and for their contribution to contiguous larger areas of these communities. In comparison with the rest of the lease these communities have been least affected by recent pastoral farming activities. There are several good examples of slim snow tussockland, a community that once more common on the crests of the Central Otago block mountains but which has undergone substantial retreat following pastoralism. Slim snow tussock is present to low altitude on a large slump feature in the catchment of Sawtooth Creek and reaches its highest density in the district on the southeast slopes of Dunstan Peak.

Table 3: Threatened and data deficient plant species found on Mount St Bathans Pastoral Lease

| Threat Division | Threat Category | Species | Location on lease |
|------------------------|-----------------------|----------------------------------|--|
| Acutely threatened | Nationally Critical | <i>Myosotis cheesemanii</i> | Dunstan Peak |
| | Nationally Vulnerable | <i>Hebe cupressoides</i> | Dunstan Creek Gorge shrublands |
| Chronically threatened | Serious Decline | <i>Carmichaelia vexillata</i> | Scattered through tussockland and stony places |
| | Gradual Decline | <i>Carmichaelia crassicaule</i> | Widespread in montane to alpine zones |
| | | <i>Montigena novae-zelandiae</i> | Alpine zone in head of Rocks Creek |
| At Risk | Sparse | <i>Coprosma intertexta</i> | Riparian areas in Rocks Creek, Manuherikia River and Dunstan Creek Gorge |
| | | <i>Carex berggrenii</i> | Alpine herb seeps |
| | | <i>Senecio dunedinensis</i> | Rocky sites in Dunstan Creek Gorge |
| | | <i>Carex muelleri</i> | Manuherikia River terraces |
| | | <i>Ranunculus maculatus</i> | Alpine herb seeps |
| | | <i>Olearia lineata</i> | One site near lower Browns Creek |
| | Range Restricted | <i>Raoulia petriensis</i> | Alpine fellfield on St Bathans Range |
| Data Deficient | | <i>Vittadinia australis</i> | Open tussockland in Rocks Creek |

The copper tussocklands of the upper Manuherikia River terraces are considerably modified and fragmented but in the context of landform and altitude constitute part of the best example remaining in the ecological district. They have additional significance derived from their contiguity with an altitudinal sequence of less modified indigenous vegetation types extending from the braided Manuherikia riverbed to the tops of the St Bathans Range. Such sequences have all but vanished in the region through the loss of the lower elevation component by farming activities. What remains is vulnerable to further disturbance and development.

The shrublands of Dunstan Gorge are significant on the basis of their size, complexity and intactness. Extending over 9 km in the main gorge and for considerable distances up small tributaries, the shrublands occupy the narrow strip of recent alluvium as well as rocky outcrops above. They provide habitat for nationally threatened and

uncommon plants and, over most of their length, are little affected by shrub weeds. They are also part of an uninterrupted sequence of indigenous vegetation from the valley floor to the crest of the St Bathans Range. The shrublands of Rocks Creek too, although smaller and more fragmented, are also part of an important altitudinal sequence from valley floor to mountain crest. They include sub-alpine relics of snow totara shrublands in the head of the valley. The importance of woody vegetation, and the desirability of protecting shrublands across a full range of Central Otago environments, has been given prominence by Walker et al. (2003). The recovery of shrublands in the absence of grazing and fire has been demonstrated at several sites in Central Otago and is a desirable biodiversity outcome.

The geographic position of the lease at the transition zone between schist and greywacke geology has meant that plants typical of Canterbury scree communities are near their southern limit. The presence of species with very restricted geographical distribution has given rise to Mount St Bathans being the type locality for *Raoulia petriensis* and *Raoulia hectorii* var. *mollis*.

2.5.1 Problem Plants

Three species of hawkweed are present at low-moderate densities throughout the lease with higher altitude areas least affected. Their impact is difficult to quantify but they have undoubtedly reduced the abundance of native inter-tussock species in particular habitats. The spread of tussock hawkweed appears to be in its early stages and in the future can be expected to occupy a much greater range of habitats on this lease than at present. Its rapid infestation into areas recently cleared of their tall tussock cover by fire, is a clear indication of potential on the lease. It is recognised as a significant ecological weed of threatened plant habitat in Central and western Otago.

A population of wildings is spreading from a small plantation on the lease adjoining Hawkdun Runs Road near Rocks creek. The plantation of *Pinus nigra* was established under a national forestation programme by the New Zealand Forest Service in the 1960's. The plantation is a potential source of wilding trees in the catchment and beyond. Small groves of *Pinus* sp. recently cleared from several sites on the lease, for example around the old ski hut in Rocks Creek, will need to need to be monitored for seedlings.

2.6 FAUNA

2.6.1 Invertebrates

Survey Methods

Invertebrate faunal values were determined by traversing areas, collecting insects and turning rocks where possible. A list of invertebrate species is at Appendix 2. Four distinct invertebrate survey areas were identified:

- The Manuherikia River to the foot of the St Bathans Range, piedmont terraces and outwash gravels mainly at 640 m-780 m.
- The east side of the St Bathans Range consisting mainly of the Rocks Creek catchment from 780 m-1500 m.

- The west side of the St Bathans Range from the range crest to Dunstan Creek (700-1500 m).
- The slopes west of Dunstan Creek including three major streams (700m - 1500 m).

Rocks Creek/Upper Manuherikia River flats

The Rocks Creek catchment is an important area for the native invertebrates of the St Bathans ED. The area contains diverse populations of aquatic invertebrates, including short-winged forms of *Austroperla cyrene*, and beetles, moths and bugs both on drier, rocky, sparsely-vegetated slopes and in the damp riparian zone to 1550m. The shrublands in the lower gorge also comprise important invertebrate habitat.

Well structured trophic layering in this area indicates a healthy intact insect ecosystem. The predatory carabids *Megadromus fultoni* and *Diglymma obtusum* are present in the head of Rocks Creek as is the predatory sucking bug *Dictoytus caenosus*. The moth fauna of this part of the lease is diverse with 12 species of moth and butterfly recorded. The presence of species such as *Tawhitia glaucophanes* at 1500 m and *Orocrambus crenaeus* at 1100 m indicates an intact grassland system.

A new species of stonefly in the genus *Vesicaperla* is present in the headwaters of Rocks Creek at 1600m. Both larvae and adults of this flightless species are present away from water in the damp zones around seepages.

The weta *Hemideina maori* is present in the head basins of Rocks Creek. The species has a restricted range in Otago. This and previous records on the lease fill major gaps in distribution.

The upper Manuherikia River flats portion of this lease is the most modified land included in this report. Despite vegetative modification, this area retains inherent value because of the diversity of insects. Six species of moth/butterfly are present as well as scarab beetles and damsel flies.

The upper Manuherikia River flats area is also significant in the contribution it makes to the complete altitudinal sequence of relatively intact invertebrate habitat. This sequence extends from the river at 680 m to the alpine tops at 1986 m.

Western Flanks of St Bathans Range

The Dunstan Creek part of the lease comprises a healthy, intact grassland ecosystem, indicated by the diverse range of species present. Examples of this lie in the upper Dunstan Creek area with the presence of species including the moth *Orocrambus crenaeus* and a predatory tachinid fly *Protchystricat* sp., and the abundance of the grasshopper *Sigaus australis* in the middle reaches of Dunstan Creek. The area of RAP on the true left of Dunstan Creek also contains a range of insects including the grasshopper *Sigaus australis*, the moth *Orocrambus* sp., the tussock butterfly *Agyrophenga anitpodum* and some wasps.

True Right Dunstan Creek

This area includes the Sawtooth Creek and Dunstan Peak RAPs . The wetas *Hemideina maori* and *Zealandosandrus grautis* are present on Dunstan Peak. From Dunstan Peak to Sawtooth Creek the presence of a range of predatory carabids and moths such as *Orocrambus* sp., *Argyrophenaga antipodum* as well as the grasshopper *Sigauss australis* again indicate intact grassland with good species diversity.

Significance of Invertebrate Fauna

The invertebrate community recorded during the 1998 inspection indicates an intact functioning ecosystem. Species present include a full range of vegetative browsers (mainly moths and butterflies), scavengers (flies) and predators (beetles and flies).

The presence on the lease of the alpine tree weta *Hemideina maori* and the weta *Zealandosandrus grautis* at Dunstan Peak are important distributional records. These records substantially enlarge the known distribution of the species.

2.6.2 Herpetofauna

“Site locations of rare and endangered herpetofauna are recorded in the original report. Herpetofauna of this nature is at risk of illegal activities including damage and removal through unlawful interference and disturbance. Accordingly, information regarding the locations of any such herpetofauna has been deleted from this version of the report. The Department of Conservation has put in place mechanisms to ensure that such information can be released for genuine scientific and research purposes. Please contact the Department of Conservation directly to determine whether the information can be released.”

Introduction

The lease provides habitat suited to several species. Good potential habitat and sightings of lizards in the vicinity of the lease suggest the herpetofaunal diversity on the lease is likely to be high. Historically, up to ten species may have been present (Whitaker *et al.* 2002) and currently between four and eight species are likely to be present.

The lease was first inspected for lizards in 1989 as part of a wider search for grand and Otago skinks (Whitaker and Loh 1990). This team located scree skinks (*Oligosoma waimatense*) high in the Rocks Creek catchment, one of only two populations known in Otago, and green skinks (*O. chloronoton*) in the middle reaches. Green skinks, scree skinks and common skinks (*O. nigriplantare polychroma*) were also found on the adjoining Dunstan Burn PL during the same survey. McCann’s skinks (*O. maccanni*) and common geckos (*Hoplodactylus maculatus*) were found both on the lease and in the surrounding area.

The herpetofaunal values of the lease were again surveyed during the tenure review inspection in December 1998. During this survey the weather was fine and warm, but search time was limited. No further lizard records of note were found.

Survey Method

The current survey (2006) was undertaken over three days by two people. Weather and search conditions were variable. The assessment of areas was limited by search conditions, time available and the area to be covered. Observations made are recorded in Appendix 3 and further detail is available on the herpetofauna database (survey number 328).

Conditions on 8th February 2006 were damp and cold with periodic rain throughout the day. An afternoon search was conducted by lifting rocks on the middle reaches of the north facing slope in Rocks Creek.

The weather cleared on the morning of February 9 and searching was conducted in the Rocks Creek gorge. The search focussed on rocky outcrops, boulderbanks and surrounding shrubland. The search was undertaken by scanning the area with binoculars, looking in crevices and lifting rocks. The rocks and vegetation remained wet for much of the morning and sunshine was periodic. In the early afternoon search sites higher in Rocks Creek were accessed from the access track on the Dunstan Burn /Mount St Bathans lease boundary. During late afternoon occasional searching was conducted adjoining the track on the Pass Creek/Browns Creek spur below Dunstan Peak. A spotlight search targeting geckos was undertaken between 10 pm and 1 am when two groups of two people lifted rocks. The search area was mostly within 100 m of the track on the eastern side of Dunstan Peak, down to Cluden Pass and along the Browns Creek/Pass Creek spur to high point 1213 m. The weather was fine with a strong cold wind.

Weather conditions on the morning of the February 10 were fine and warm. Two observers searched a circuit across the tributaries of Browns Creek to Dunstan Peak and back to Cluden Pass. Habitat near the Sawtooth Creek track and from the Dunstan Creek track downstream of the Sawtooth track junction was observed from the vehicle.

Description of Lizard Fauna

McCann's skinks (*O. maccanni*) are common throughout the lease, inhabiting rocky areas and tussock grasslands.

A gecko within the *H. maculatus* complex present on the lease is believed to be the Southern Alps gecko (*H. sp.* "southern alps"; Jewell 2006, Jewell pers. comm.). These geckos are common on the lease as suitable habitat is present throughout. Specimens are evident up to 1300 m under Dunstan Peak.

Lizard Habitat and Associated Species of Interest

A wide range of lizard habitat is present on the lease. This is of particular interest given the number of species recorded on the lease and/or nearby in earlier surveys, but not observed in this survey.

Common skink (*O. nigriplantare polychroma*) habitat is common at low-mid altitudes. These skinks are known nearby and while not observed during this survey, are highly likely to be present on the lease.

Green skink (*O. chloronoton*) habitat, commonly rocky slopes and boulder banks within grassland and shrubland, is present in the higher and lower reaches of Rocks Creek, in Dunstan Creek and its tributaries, particularly on the St Bathans Range side, and also in the upper reaches of the Browns Creek catchment across to Cluden Pass (Map 4.2.5). Green skinks have previously been recorded on the lease in the Rocks Creek catchment (herpetofauna database). Green skinks are also known from 1km west of the lease in Shepherds Creek (Tocher 2005), close to the lease boundary in Dunstan Creek, and in tributaries of Dunstan Creek on Dunstan Burn lease (Whitaker and Loh 1990; herpetofauna database). The large number of records in the vicinity and the high quality habitat available in numerous locations make the presence of green skinks on the lease very likely.

Suitable scree skink (*O. waimatense*) habitat, commonly rocky slopes and boulder banks within grassland and shrubland, is present in the higher reaches of Rocks Creek, and above Dunstan Creek on the St Bathans Range side. Scree skinks have previously been recorded on the lease in the Rocks Creek catchment (herpetofauna database) and other records are known from above Dunstan Creek on the adjoining Dunstan Burn PL (herpetofauna database). Again, prior records of this skink both on the lease and in the vicinity, and the availability of high quality of habitat suggests the presence of scree skinks on the lease is very likely.

Cryptic skinks (*O. inconspicuum*) usually inhabit damp microhabitats in grassland, herbfield or open shrubland (Whitaker *et al.* 2002). These have been recorded in a tributary of Dunstan Creek on the adjoining Dunstan Burn lease, are known from elsewhere in the upper Manuherikia (herpetofauna database), and were found in the Dunstan Mountains during the adjoining Cluden lease tenure review survey (Jewell 2004). Suitable habitat is present in both Rocks Creek and the Dunstan Creek catchment on the lease. Cryptic skinks are also likely to be present on the lease given the suitable habitat and the close proximity of known populations, although none have previously been recorded.

A high altitude forest gecko likely to be described as the Roys Peak gecko (*H. aff. nebulosus* "Mount Roy") has been recorded within 1.5 km of the lease, recorded between Cluden Pass and Dunstan Pass in 2003. The species, discovered at Mount Roy in 1998, is not formally described but is considered to be a new species (Tocher & Marshall 2001). The behaviour and habitat of high altitude geckos is not well understood and they are notoriously difficult to locate even at sites where they are known to be present (Tocher & Marshall 2001). The sightings of weta, at night, in habitat that appears suited to alpine gecko indicates that suitable retreat sites are present (Jewell pers. comm.). The close vicinity of known sites and available habitat are indicative of the likely presence of these geckos on the lease. If present, previous

surveys are unlikely to have located these geckos as these did not focus on areas or use techniques most likely to find these geckos.

Other species that are possibly present, although this is less likely, include jewelled geckos (*Naultinus gemmeus*), grand skinks (*O. grande*) and Otago skinks (*O. otagense*).

Nationwide trending decline of *Naultinus* spp. mean that remnant habitat is of high value. The preferred shrubland habitat of the jewelled gecko is present on the lease in Rocks Creek and in Dunstan Creek and its tributaries. Jewelled geckos are known approximately 40km away at Mount Buster.

Suitable, though not ideal, grand skink (*O. grande*) and Otago skink (*O. otagense*) habitat was present in low-mid altitude parts of the lease. The nearest known populations are in the Lindis Pass and Lake Hawea. The likelihood of these skinks being present on the lease today is low.

Threats

Two major threats to herpetofaunal values exist: predation by introduced mammals and habitat modification. The lizard populations on the lease will be exposed to predation by the full suite of introduced mammalian predators including feral cats, mustelids, rodents and hedgehogs. Habitat modification is particularly pertinent to lizards as jewelled gecko and green skink which rely on shrubland vegetation. The effect of habitat removal and degradation on lizards in other habitats is less well known. It is widely accepted that removal of cover, and a reduction in abundance and diversity of food sources will reduce the carrying capacity of habitat for reptiles.

Significance of Herpetofauna

Varied, intact, quality habitat, suitable to support a number of species, remains on the lease. This, combined with the poor weather conditions which compromised the success of the survey, means more species are likely to be present on the lease than were located during the inspection. The following species were not located but are likely to be present.

H. aff. nebulosus "Mount Roy" is listed as 'Nationally Critical' (Hitchmough 2002), and of 'high' conservation status in Otago (Whitaker *et al.* 2002) and is currently known from only five scattered locations in Otago. The populations on the Dunstan Mountains are recent discoveries that have resulted in a considerable extension of the previous known distribution. Population security and habitat protection is vital for this species (Whitaker *et al.* 2002).

Scree skinks (*O. waimatense*) are known in Otago only from the Mount St Bathans and Ida Ranges. These are also the southernmost known populations of this species. Scree skinks are classified as Gradual Decline in Hitchmough (2002) and of 'high' conservation status in Otago (Whitaker *et al.* 2002).

In Otago, green skinks (*O. chloronoton*) are widespread with patchy distribution and cryptic skinks (*O. inconspicuum*) are widespread with localised distribution. Both are

listed as chronically threatened in Gradual Decline (Hitchmough 2002) and of 'moderate' conservation status in Otago (Whitaker *et al.* 2002).

Management objectives for the scree skink listed in the Otago Conservation Management Strategy (CMS) include ensuring that several populations, representative of the geographic range and the variety of habitats occupied, survive in the long term; and that the southern limit of distribution of scree skinks is secured (Whitaker *et al.* 2002). For the green and cryptic skinks the CMS aims to "ensure the continued survival of populations at sites that secure the full geographic range and are representative of the major habitats occupied by the species" (Whitaker *et al.* 2002). Current phylogenetic assessments of each of these species may indicate the genetic significance of individual populations.

Recent genetic work with scree skinks indicates the southern most populations, those in southern Canterbury and Otago, are genetically different to others in the South Island. Recent genetic work with green skinks indicates that the Dunstan Mountain populations of green skinks are grouped with populations from west Otago and southwest Canterbury. These populations are genetically distinct from those elsewhere in the South Island including a nearby population at Falls Dam in the upper Manuherikia River (Hitchmough pers. comm. 2006). Further work is needed before the taxonomic implications are known. The importance of these populations is likely to increase.

McCann's skink (*O. maccanni*) and common skink (*O. nigriplantare polychroma*) are common throughout the ecological district and beyond. Both are listed as 'Not Threatened' in Hitchmough (2002) and of 'low' conservation status in Otago (Whitaker *et al.* 2002).

Southern Alps geckos (*H. sp.* "Southern Alps") are found in inland areas from Marlborough to Otago. In Central Otago they are restricted to and common in the northeastern mountain ranges. They are listed as 'Not Threatened' in Hitchmough (2002) and of 'low' conservation status in Otago (Whitaker *et al.* 2002).

2.6.3 Avifauna

Introduction

The dominant habitat is high tussock grassland. Shrublands are present on lower hill slopes and in river gullies. The lease also includes an area of rolling plains and river terrace alongside Dunstan Creek, Rocks Creek and the Manuherikia River. The presence and distribution of avian species on the lease is a reflection of these land and vegetation patterns. The avian fauna present during the tenure review inspection is described in the table below. The table also includes a summary of characteristics of each species (Heather and Robertson, 1996)

Table 4 Bird species present during tenure review surveys. Exotic species are denoted with a *

| Common name | Species name | Characteristics |
|----------------------------|---------------------------------|---|
| Black-fronted terns | <i>Sterna albostrata</i> | Protected rare endemic. Breed on the Manuherikia River Flats and in upper Dunstan Creek. Feed throughout lease. |
| Spurwinged plover | <i>Vanellus novaehollandiae</i> | Protected common self introduced native. Suited to arable and pasture habitats. Invertebrate diet including earthworms, grass grub and porina larvae. Breed June to November - prefer open pasture |
| Pipit | <i>Anthus novaeseelandiae</i> | Protected native. Widespread and locally common in open habitats such as tussock grassland. Mainly invertebrate diet with some seeds/grass. Nest at base of tussock, bracken between August and February. |
| Silvereve | <i>Zosterops lateralis</i> | Partially protected native, widespread and abundant. Relatively scarce in open habitats such as tussockland. Nest between September and February. Varied diet mainly invertebrates, fruit and nectar. |
| Grey warbler | <i>Gerygone igata</i> | Protected endemic. Widespread and locally common on mainland of South Island. Nest late September to late January. Diet mainly invertebrates but includes some fruit |
| Southern black-backed gull | <i>Larus dominicanus</i> | Unprotected native, widespread and locally common. In high country breed on riverbeds and tarns. Are opportunists and will take wide range of food. |
| Black Shag | <i>Phalacrocorax carbo</i> | Partially protected native. Widespread and moderately common. In waterways and bodies to subalpine zone. Diet mainly fish. |
| Skylark* | <i>Alauda arvensis</i> | Introduced. Widespread and locally abundant in open country. Diet mainly seeds of grass, cereals, sedges, clover supplemented with invertebrates. |
| Yellow hammer* | <i>Emberiza citrinella</i> | Introduced, widespread and locally common throughout South Island. Diet is a mix of seeds and invertebrates. |
| Dunnock* | <i>Prunella modularis</i> | Introduced, widespread and locally common in scrub and places with mix of dense cover and open spaces. Diet mainly small invertebrates. |
| Chukar* | <i>Alectoris chukar</i> | Introduced. Well established in dry rocky country including Central Otago. Main diet seeds, shoots and leaves, some insects. |
| Redpoll* | <i>Carduelis flammea</i> | Introduced. Common especially in high dry parts of South Island. Gregarious. Diet mainly small weed and grass seeds supplemented with invertebrates. |

Significance of Avifauna

Black-fronted terns are ranked as nationally endangered (Hitchmough, 2002). Their presence on the upper Manuherikia River Flats is associated with the Manuherikia River. This species feeds over the natural and semi-natural grasslands on the lease. The presence of this species indicates the lease is being used as part of a wider habitat. The presence of these birds in the upper Dunstan Creek is also of significance. This creek is much smaller than the upper Manuherikia River and it is likely that a

greater proportion of time would be spent foraging on terrestrial habitat areas inside the pastoral lease.

2.6.4 Aquatic fauna

Introduction

The NIWA New Zealand Freshwater Fisheries database was searched for previous fish records for this lease. Seven records (see Appendix 4) were found indicating the presence of native species including common bully (*Gobiomorphys cotidianus*) in the lower section of Rocks Creek and upland bullies (*G. breviceps*) in two of the lower tributaries of Rocks Creek. Longfin eel (*Anguilla dieffenbachia*) have been present in Pass Creek. The records show the introduced brown trout (*Salmo trutta*) is the most common species present on the lease, occurring at all seven sites recorded. A second introduced species, brook char (*Salvelinus fontinalis*), is in Pass Creek at its junction with Dunstan Creek and further down Dunstan Creek itself.

Survey Method

Ten sites were surveyed using a backpack electric fishing machine during the 1998 tenure review inspection. These included six sites in the Dunstan Creek catchment (four in unnamed tributaries, and one each in Humbug Gully and Browns Creek), three in Rocks Creek and its tributaries and one in a tributary of the Manuherikia River main stem. A number of tributaries with open connections to main stem streams were not fished as introduced salmonids were almost certain to be present.

Description of Aquatic Fauna

Brown trout (*Salmo trutta*) and brook char (*Salvelinus fontinalis*) are present on the lease, with brown trout being the most common species at eight of the 10 sites fished. Brook char are present at three sites and are present in conjunction with brown trout at two of those sites. No fish are present in the top-most site in Rocks Creek.

Significance of Aquatic Fauna

No native species were found during the tenure review inspection. The longfin eel *Anguilla dieffenbachii* identified on the lease in NIWA records has a threat rank of Gradual Decline.

Dunstan Creek and the Manuherikia River in the vicinity of the lease are recognised as providing valuable trout fisheries.

2.6.5 Problem Animals

Rabbits (*Oryctolagus cuniculus*) are present on the lower country and require regular control. Hares (*Lepus europaeus*), possums (*Trichosurus vulpecula*), feral cats (*Felis catus*), ferrets (*Mustela furo*), stoats (*Mustela erminea*), hedgehogs (*Erinaceus europaeus*) and rats (*Rattus* spp.) are probably present throughout the lease. These

undoubtedly reduce populations of palatable native plants, birds, reptiles and invertebrates.

2.7 HISTORIC

Maori Cultural Values

One recorded Maori archaeological site is present on the lease. The site of a silcrete blade find is present on a river terrace to the west of the Manuherikia River (New Zealand Archaeological Site Record H40/3). From the description of the find it appears to have been an isolated artefact with no other flakes being located in the area. The site was not relocated during tenure review inspections.

European Heritage Values

The current Mount St Bathans run is divided in two by Dunstan Creek. Last century the creek formed the boundary between the Lauder and Hawkdun stations from which the current run was created.

Gold was discovered in this area late in 1863. St Bathans, together with Gabriel's Gully near the town of Lawrence, were the major centre of hydraulic mining in Otago during the late 19th and early 20th centuries.

The run is adjacent to three goldfields - Cambrian, Vinegar Hill and St Bathans. No significant areas of workings are present on the lease. Associated race systems which cross the lower slopes of the Dunstan and St Bathans ranges are present within the lease. The most significant of these are the major races from the Manuherikia which are still named on recent topographical maps; The Scandinavian, Mountain and Enterprise and Otago water races. These are associated with the companies that worked at St Bathans.

Other features associated with mining include one large and two small storage dams behind Vinegar Hill. The two small simple earth dams are located on a small unnamed tributary of Pleasant Valley creek. These were probably intended to supply small water races early in the development of the Cambrians or Vinegar Hill gold fields. A much larger dam is present on the flat next to Shepherds creek. Being on the flat its only possible use in mining must have been for flushing a tail race.

Significance of Historic Values

The water races on the lease are of interest because of their association the large scale hydraulic mining of St Bathans and to a lesser extent Cambrians and Vinegar Hill. These features receive some protection under the archaeological provisions of the Historic Places Act 1993.

2.8 PUBLIC RECREATION

Physical Characteristics

This lease incorporates varied terrain. This is largely a consequence of the transition from the block mountain characteristics of the Dunstan Range, to the steeper more rugged St Bathans Range, and to the gently rolling Manuherikia River flats. Dunstan

Creek bisects the mountain ranges draining from a wide river valley to the north of the lease. Toward the southwest boundary of the lease, small river terraces form some of the rare, flat land along Dunstan Creek

Legal Access

Road

Several formed and unformed legal roads provide access to and through the lease. The main access to the western part of the lease is via Pauley Road. Pauley Road is a formed 2WD road which extends from the St Bathans Loop Road continuing to just beyond the St Bathans Station homestead. A continuation of Pauley Road extends through the lease following the true right of Dunstan Creek. The formed track is close to the legal line through much of the lease, but does deviate significantly in places, including frequent crossings of the creek. When on the opposite side of Dunstan Creek most of the track is located within the marginal strip. A section of track lies on the Dunstan Burn lease.

Hawkdun Runs Road provides access to the eastern part of the lease. This includes Rocks Creek, the Manuherikia River flats block and the Manuherikia River.

The main internal access route up the Dunstan Peak ridge runs off the end of Vinegar Hill Road. Approximately 1km of the route is an unformed legal road which crosses the Mount St Bathans freehold between the end of formed legal road and the boundary of the lease.

Access to the lease is also possible from several minor roads:

- The unformed legal road (Hangers Road) extends from Pauley Road approximately 1km from the intersection from the St Bathans Loop Road and extends west to the north/south lease boundary near Humbug Gully.
- The southwest corner of the lease can be accessed by an unformed extension of the Shepherds Flat Road.
- An unnamed and unformed road at the western boundary of the pastoral lease at approximately NZMS260 H40 500E 950N leads to a series of roads that end in the Lindis Valley.
- Adjoining the northeast boundary is a narrow strip of Crown Land (Tailing Reserve) which also connects to Loop Road.

Marginal Strip

A fixed Land Act marginal strip is in place on Dunstan Creek. The Dunstan Creek marginal strip extends from the Saint Bathans Loop Road and continues upstream beyond the boundary of the lease.

A movable Conservation Act marginal strip lies between the lease and the Manuherikia River, bounding the lease where the boundary is in close proximity to the river. The marginal strip provides some foot access although, given the braided nature of the riverbed, it may not always be adjacent to the water.

The lower area of Rocks Creek, Shepherd Creek and the creek in Humbug Gully also appear to be of adequate width to acquire marginal strips.

Activities

Fishing

Dunstan Creek and the upper reaches of the Manuherikia River are known as high quality trout fisheries.

Tramping, Mountain Biking and Horse Trekking

The St Bathans Range is one of the highest in Central Otago and traverses of its length are popular. Extensive areas of steeper country, particularly on the St Bathans Range are accessible by foot only and more suited to experienced trampers. Day walks to Mount St Bathans from Dunstan Creek and Dunstan Peak from the Vinegar Hill Road are also possible at most times during the year. The latter trip includes a section of track across private land at the end of Vinegar Hill Road in the vicinity of two legal roads. Rocks Creek provides a further route to the ridge of the St Bathans Range. The Dunstan Creek route is used as both a return trip route and as back country access to the upper Waitaki Valley. The route receives moderate-high use for mountain bikes and a lesser amount on foot and horse.

Skiing

Basic skiing facilities were established in the upper Rocks Creek basin in the late 1960's and early 1970's. These failed due to a lack of reliable snow. Some back country skiing opportunities exist when snow conditions allow, including ascents/descents of Mount St Bathans.

Four Wheel Driving

Internal tracks give 4WD access to the main ridges and valleys. The Dunstan Creek track provides a 4WD opportunity which is well used, particularly in summer. The Dunstan Creek route provides access for activities such as family picnics. The track is often not usable due to flood damage.

Hunting

Red deer are present on the lease. Pigs also range in this area.

General

The Hawkdun Runs Road has a moderate level of public use particularly in summer for local access (sightseeing, fishing and picnicking) and for round trips in the upper Manuherikia Valley. The isolation of this road and the surrounding area is likely to be part of its attraction.

Significance of Recreation Values

In 1992 the Department of Conservation compiled a Recreation Opportunity Spectrum for the Otago Conservancy (Harper 1992). All land regardless of land tenure was mapped according to setting, activity and recreational experience. Almost all the lease is considered 'Back Country 4WD drive-in'. These areas are characterised by a feeling of relative remoteness from populated areas and may be

associated with motivations of 'escape from town'. In this category four wheel drive vehicles are described as desirable to give access to high country tussock grasslands and block mountains. Recreational activities usually associated with these sites are tramping, hunting, camping, mountain biking, outdoor education and nature appreciation.

The higher areas on the St Bathans range are considered to be 'Remote'. These sites are characterised by a 'sense of complete isolation from human interaction and activity where the naturalness of the setting is an important part of the experience'. Sites classified as 'remote' are rare within the Central Otago landscape. Only two other such sites are recognised within the Central Otago Area Office boundaries.

The Dunstan Creek route and routes from the St Bathans Loop Road provide for access to the north Dunstan Mountains. These links provide strategic access to additional recreation opportunities in Central Otago and the Waitaki and Lindis valleys.

PART 3 OTHER RELEVANT MATTERS AND PLANS

3.1 CONSULTATION

An early warning meeting was held in Alexandra on 3 December 1998. Interest group representatives raised the following points with regard to the lease.

- Dunstan Creek access for walking, horses and 4WD vehicles.
- Access to Mount St Bathans.
- Access to Cluden Pass (and on to upper Clutha) for foot, bicycle and horse.
- Access to Dunstan Peak.

Written submissions were received from Federated Mountain Clubs and Public Access New Zealand. A summary of the key points contained in those submissions is outlined below.

Federated Mountain Clubs

- The lease has great significance for recreation and conservation. Recreation interests include tramping, possible winter ski touring, mountain bike riding, horse riding and possible limited 4WD use to minimise potential environmental and track damage due to this activity.

Public access easements should be provided for on important routes on the lease which include:

- Access through the Dunstan Creek corridor between Maniototo and the McKenzie Basin.
- Day trips to or over Dunstan Peak.
- Access through the Cluden Pass to the Lindis and Upper Clutha areas and through Dunstan Pass.
- Extended trips along the Mount St Bathans Range.
- A round trip extending up the Mount St Bathans run boundary and returning via the spur on the true right of Rocks Creek.

Features which should be protected include:

- Western face of the St Bathans Range from valley floor to crest at 2,000 m.
- Dunstan Ecological District PNAP Survey Recommended Areas for Protection.
- Landscape values of Dunstan Creek gorge.
- Head of Rocks Creek Catchment above approximately 1,000 m.
- Historic Scandinavian and Otago Water Races and other associated gold mining relics.
- The area of land from Dunstan Peak down to and including Dunstan Creek Gorge, up St Bathans face and over St Bathans crest to about half way down

Rocks Creek. Wetland features and red tussock between Hawkdun Runs Road and the Manuherikia River.

Other points of importance include:

- Conservation values are primarily focused on landscape values of higher country, Dunstan Creek Gorge, the St Bathans faces and the Recommended Areas for Protection.
- Mount St Bathans and Dunstan Peak are dominant landmarks and provide for extensive views of the surrounding area.
- Provision should be made for off road parking in the most secure places possible.
- All land classified LUC Class VIII or VII should become conservation or stewardship land because pastoral use of such land is not ecologically sustainable.
- Wilding pine spread from plantation on Manuherikia flats is a threat.
- A musterers hut on the Dunstan Creek route could provide shelter and should be made available through tenure review.
- Potential for increasing recreational use of Dunstan and Cluden pass should not be underestimated.
- 4WD and trail bikes are incompatible with passive recreation and damage tracks and wetland vegetation. However, these are a legitimate form of recreation and consideration should be given to which places might be suitable.

Public Access New Zealand

Rocks Creek Catchment

- Walking up Rocks Creek to summit of St Bathans Range is a rewarding experience and provides opportunities for most levels of ability. The whole of the 'retirement area' from approximately mid way up the valley should be reserved.
- The tussock grassland character should be retained.
- Year round secure access for foot, horse or mountain bike should be provided up Rocks Creek from Hawkdun Runs Road.
- *Pinus contorta* at stone hut in Rocks Creek should be removed.
- Wilding spread in the upper Manuherikia-Hawkdun area needs to be prevented.

St Bathans Western Face

- Existing retirement fence is in a practical position and could provide the lower boundary for a St Bathans Range Reserve.
- Overall undeveloped tussockland character needs to be retained.

Dunstan Peak

- Sawtooth Creek and Pass Creek Catchments warrant reservation

- The upper slopes of Dunstan Peak above the highest fences warrant reservation as it is predominantly natural in character.
- Access provision should provide for foot, horse and mountain bike access from Shepherds Flat Road up the leading ridge to Dunstan Peak and along to north end of the lease to allow connection to Dunstan Pass and through Cluden Pass into Richmond Valley. Also would provide access to North Dunstan Scenic Reserve for summer and winter recreation.
- Foot, horse and mountain bike access should be provided on track to the north of homestead to the tops, Cluden Pass and beyond, and down ridge north of Sawtooth Creek into Dunstan Creek to allow round trips via Dunstan Creek.

3.2 OTAGO REGIONAL POLICY STATEMENT

The Regional Policy Statement for Otago provides a policy framework for all of Otago's significant regional resource management issues. It does not contain rules. District Plans shall not be inconsistent with the Regional Policy Statement. In respect of natural values the Regional Policy Statement includes the following policy and method:

Policy: To maintain and where practicable enhance the diversity of Otago's significant vegetation and significant habitats of indigenous fauna, trout and salmon...

Method: Identify and protect Otago's significant indigenous vegetation and significant indigenous habitat of indigenous fauna, trout and salmon, in consultation with relevant agencies and with Otago's communities.

In respect of landscapes and natural features it includes the following policy and method:

Policy: To recognise and provide for the protection of Otago's outstanding natural features and landscapes.

Method: Prepare in conjunction with relevant agencies and in consultation with the community and affected landowners, an inventory of outstanding features and landscapes that are regionally significant.

3.3 DISTRICT PLAN

The lease is located within the Rural Resource Area of the Central Otago District Plan.

As at 23 February 2005, the proposed Central Otago District Plan (amended to incorporate Council decisions) requires resource consent (with certain exemptions) for the clearance of areas of indigenous vegetation greater than 0.5 hectares or in the case of snow tussock grassland 10 ha, or above 1080 m, or areas containing any threatened plants listed in a schedule. This requirement does not apply to land that has been freeholded under the Crown Pastoral Land Act 1998.

Resource consent is required for tree planting using certain tree species with wilding potential, subject to certain criteria; excavations or tree planting within specified distances of a water race or irrigation pipeline; and for development work within 10 m of any water body. There are no areas of significant indigenous vegetation and habitats of significant indigenous fauna and wetlands as set out in the schedules of the plan.

The protected landscape provisions of the Plan require resource consent for development of land over 900 m, with an exclusion for land that has been freeholded under the Crown Pastoral Land Act 1998. As of April 2006 these protected landscape provisions were in the process of going through the Environment Court.

There is one archaeological site noted in the plan. The site of a silcrete blade find is present on a river terrace to the west of the Manuherikia River (New Zealand Archaeological Site Record H40/3). Resource Consent is required for any activities that may adversely affect this site.

The entire lease is subject to the Otago Regional Plan: Water rule which requires resource consent for suction dredge mining.

Protection is limited to the controls set out above.

3.4 OTAGO CONSERVATION MANAGEMENT STRATEGY

The eastern part of the lease lies within Otago Conservation Management Strategy Special Place No.17 "St Bathans-Hawkdun-Ida". The key features of this special place which have relevance to the lease include:

- Transition zone between Otago schist and Torlesse sandstone.
- Almost totally indigenous biota at high altitude.
- Expansive remote character of the landscape.
- High recreational values.
- Historic features.

The objective and priorities set out in the CMS for Special Place 17 are:

Objective for St Bathans-Hawkdun-Ida Ranges

To protect, on an extensive scale, the high altitude landscape, nature conservation and historic resources of the area, principally by acquiring adjoining lands of high natural, historic and recreational value, through pastoral lease or occupation license tenure reviews, to link existing areas of land administered by the department thus providing for more recreational opportunities, better protection of values and efficient integrated management of those values.

Priorities for St Bathans-Hawkdun-Ida Ranges

Pastoral lease and pastoral occupation licence tenure review negotiations will be the priority method for implementation of the objective, along with continued vigilance with regard to the spread of wilding trees.

A small part of the lease lies within the northeast extremity of the Otago Conservation Management Strategy Special Place No. 21 "North Dunstan Mountains". Although the general description of the special place is more applicable to other areas, the objective and priorities have relevance.

Objectives for North Dunstan Mountains

To extend protection in the area to cover the remaining higher altitude areas of nature conservation importance, and to secure appropriate public access.

Priorities for North Dunstan Mountains

The negotiation of protection arrangements for areas of biodiversity importance and recreational opportunities and access are the priority activities in this special place.

3.5 NEW ZEALAND BIODIVERSITY STRATEGY

The New Zealand Government is a signatory to the Convention on Biological Diversity. In February 2000, Government released the New Zealand Biodiversity Strategy which is a blueprint for managing the country's diversity of species and habitats and sets a number of goals to achieve this aim. Of particular relevance to tenure review, is goal three which states:

- *Maintain and restore a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhance critically scarce habitats, and sustain the more modified ecosystems in production and urban environments, and do what is necessary to:-*
 - *Maintain and restore viable populations of all indigenous species across their natural range and maintain their genetic diversity.*

The strategy outlines action plans to achieve this goal covering terrestrial and freshwater habitat and ecosystem protection, sympathetic management, pest management, terrestrial and freshwater habitat restoration, threatened terrestrial and freshwater species management and so on.

PART 4 ADDITIONAL INFORMATION

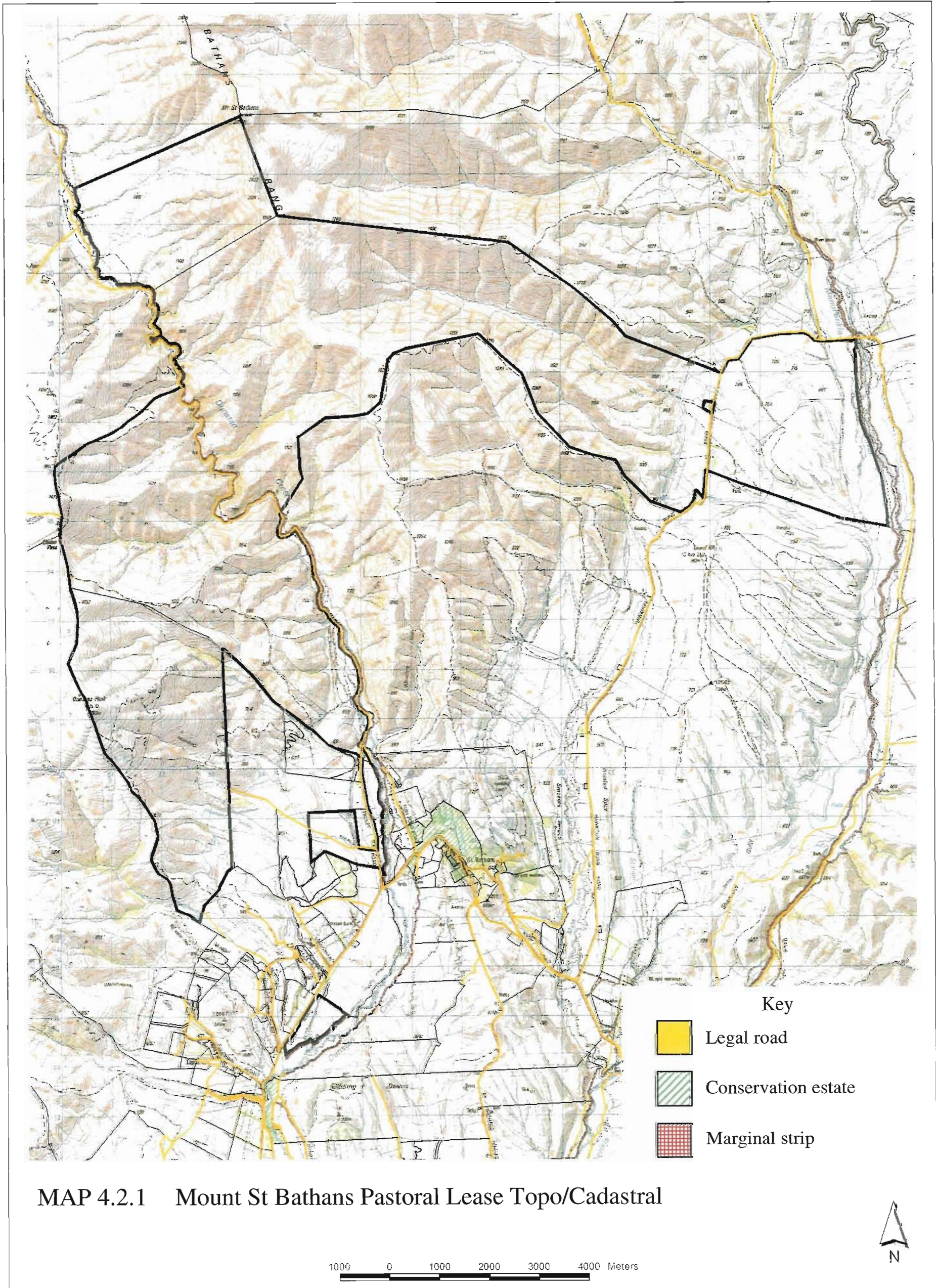
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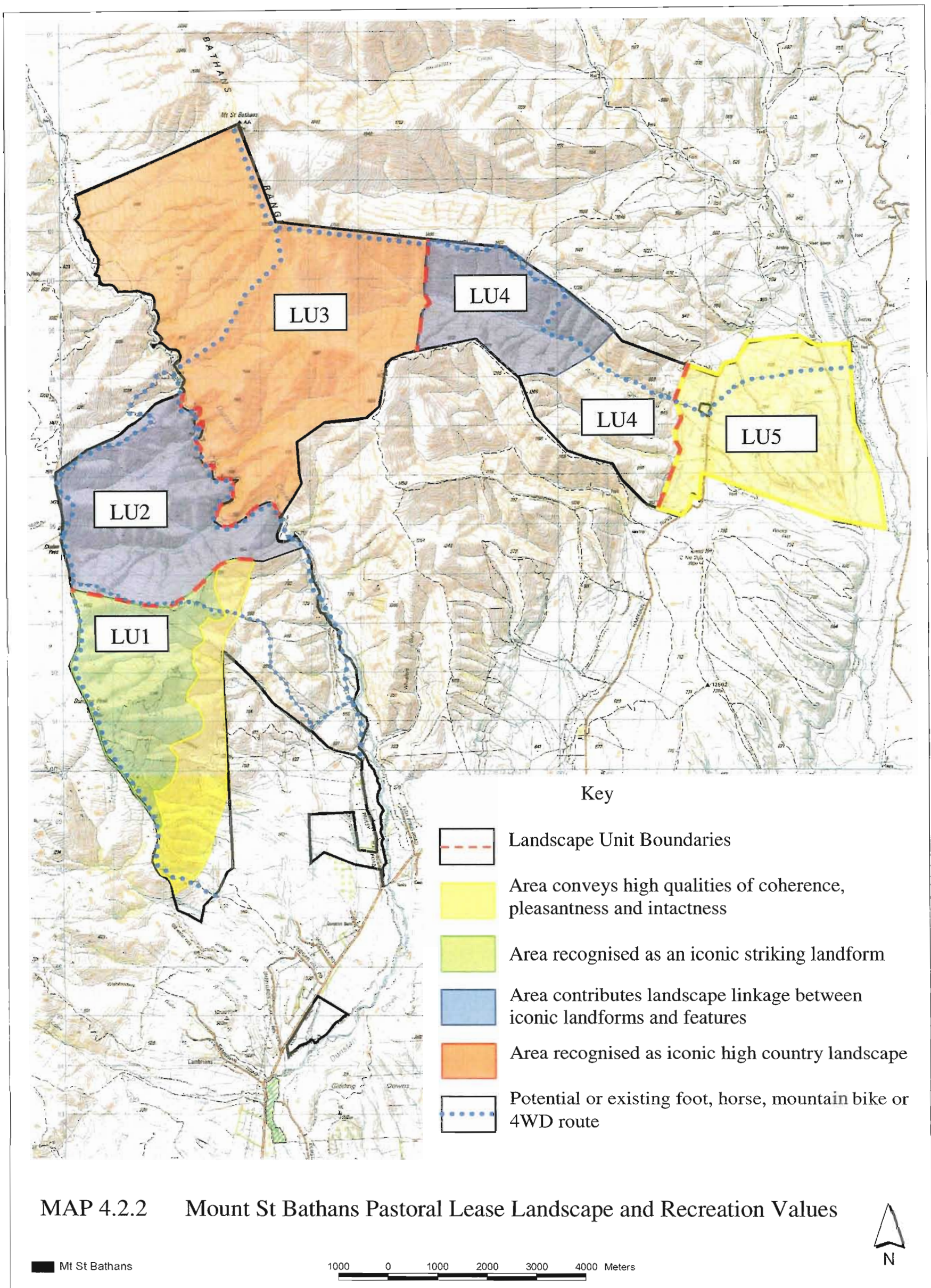
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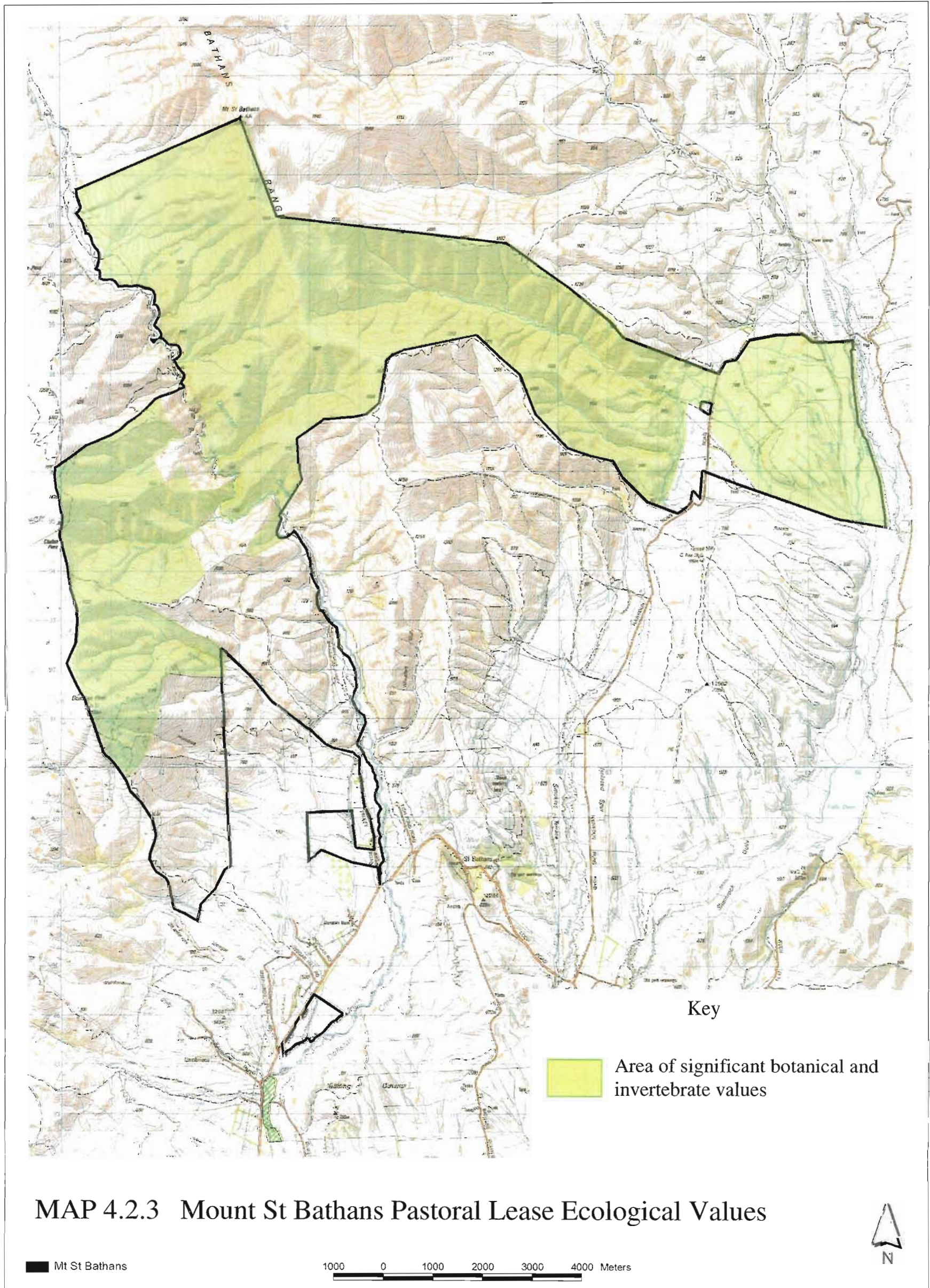
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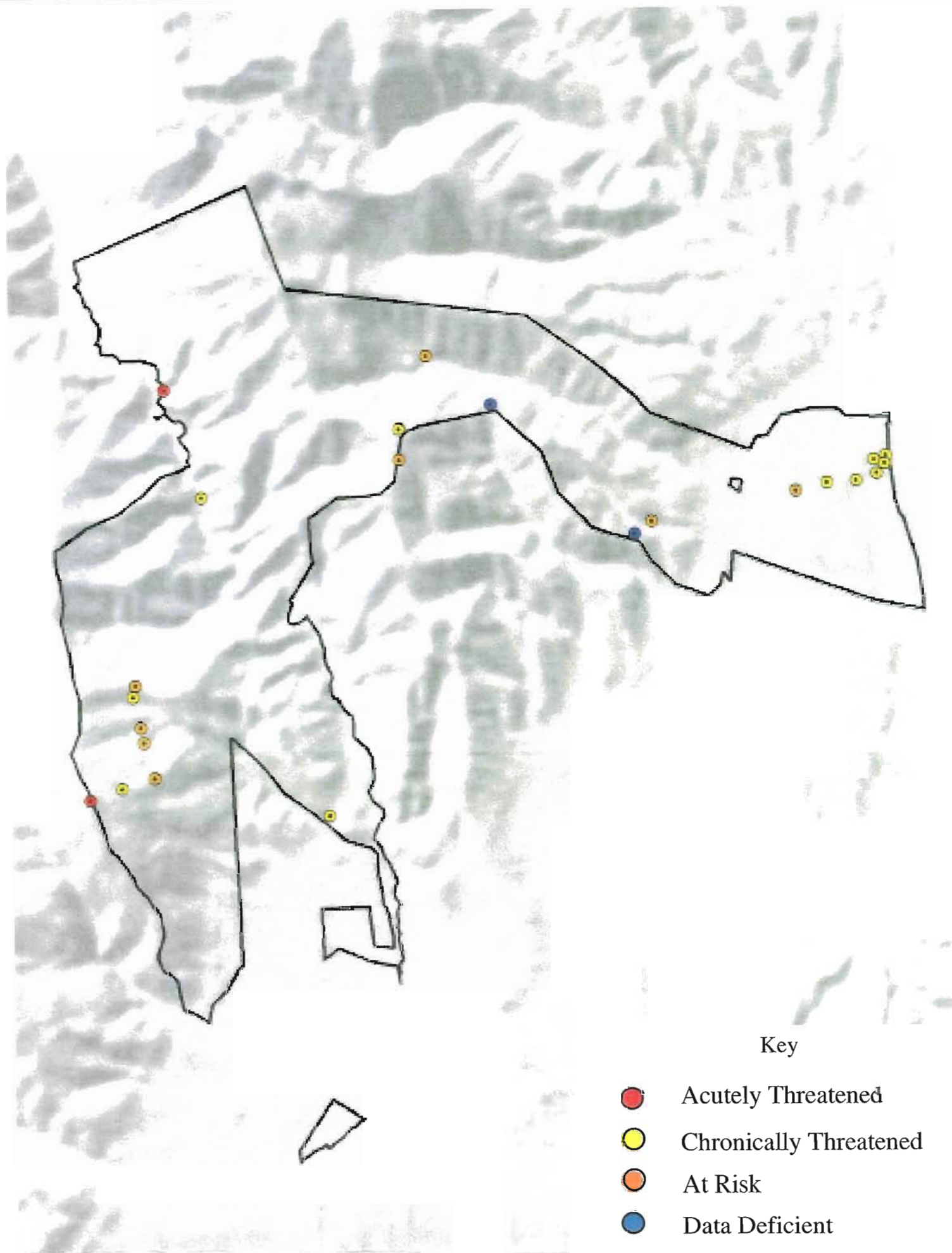
4.2 Illustrative Maps

- MAP 4.2.1 Mount St Bathans Pastoral Lease Cadastral/Topographical
- MAP 4.2.2 Mount St Bathans Pastoral Lease Landscape and Recreation Values
- MAP 4.2.3 Mount St Bathans Pastoral Lease Ecological Values
- MAP 4.2.4 Mount St Bathans Pastoral Lease Distribution of Threatened and Data Deficient Plants
- MAP 4.2.5 Mount St Bathans Pastoral Lease Herpetofaunal Values
- MAP 4.2.6 Mount St Bathans Pastoral Lease Land Environments of New Zealand Threat Map









MAP 4.2.4 Mount St Bathans Pastoral Lease Distribution of Threatened and Data Deficient Plants

1000 0 1000 2000 3000 4000 Meters



