Toitu te whenua
Land Information
New Zealand

Crown Pastoral Land Tenure Review

Lease name : Mt ASPIRING STATION

Lease number : PO 231

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.

November 05

DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF

MOUNT ASPIRING PASTORAL LEASE

UNDER PART 2 CROWN PASTORAL LAND ACT

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PART 1: INTRODUCTION

The lessees of Mt Aspiring Pastoral Lease have applied to the Commissioner of Crown Lands for a review of the property's pastoral lease tenure. Mt Aspiring Station is leased by Mt Aspiring Company Limited.

The 9674 ha property is located approximately 50 km west of Wanaka in Otago, at the head of the Matukituki Valley, and close to the main divide of the Southern Alps. The Lease spans several catchments. It includes the valley flats on both sides of the Matukituki River West Branch, but extends upslope on the southern side, to include Mt Tyndall (2465 m), and most of the numerous peaks located along the range as far as Glenfinnan Peak (1890 m). The property includes the head of the Shotover i.e. headwaters of Tyndall Stream and Tummel Burn.

Within the Matukituki River East Branch, the property includes the flats and small areas of hillslope below Homestead Peak as far as Glacier Burn, and all the hillslopes located above treeline on the eastern side of the river. The property also includes the Mill Creek catchment, a large mountainous area all above the treeline that extends into the head of the Albert Burn and Minaret Burn. All areas drain east to Lake Wanaka. The Mill Creek block includes numerous peaks including Dragonfly Peak (2155 m) and Mt Eostre (1995 m).

Access to the property is via the Wanaka Mount Aspiring Road. The homestead is located on the Glenfinnan faces, near the Niger Stream property boundary. The East Matukituki River flats and faces below Homestead Peak do not currently have any legal access to them.

The Lease lies mainly within the Aspiring Ecological Region (ER) and Arawata Ecological District (ED), with small portions of the property lying within the Lakes ER and Wanaka ED. No Protected Natural Areas Survey Programme (PNAP) of these districts have been carried out.

Much of its boundary adjoins Mount Aspiring National Park and conservation land, some of which has been designated as Te Wahi Pounamu – South West New Zealand World Heritage Area. The property was originally a licence with no perpetual renewal rights. It became a pastoral lease under the Land Act 1948 and portions of the Lease were revoked and added to the core of the park, which had been established in 1964.

The Old Homestead located on the flats of Matukituki River East Branch, is managed as Tititea Lodge, an outdoor education centre, which provides services to schools such as Dunstan High School and Otago Boys High School, and government health providers.

No parts of the Lease are currently subject to protection for conservation purposes.

The following areas which adjoin the property are managed by the Department of Conservation (Conservation Management Strategy Inventory Number in brackets):

- Mount Aspiring National Park (F38 500)
- Black Peak Conservation Area (F39 057)
- Shotover Conservation Area (E40 057)
- Albert Burn Conservation Area (F39 051)
- Mt Alta Conservation Area (F39 054)
- West Wanaka Conservation Area (F39053)

Marginal Strips:

- Matukituki River – East Branch (F39 060)
- Matukituki River – West Branch (F39 061)
- Niger Stream (F39 071)
- Glenfinnan Stream (F39 084)
- Sheepyard Creek (F39 085)
- Unnamed Creek- West Matukituki (F39 086)
- Raspberry Creek (F39 087)
- Big Creek (F39 088)
- Downs Creek (F39 089)
- MacPherson Creek (F39 090)
- Homestead Creek (F39 091)
- Unnamed Creek – East Matukituki (F39 092)
- Corner Burn or Mill Creek (F39 093)
- Glacier Burn (F39 094)
- Brides Veil (E39 052
- Red Rock Stream (E39 053)
- Unnamed Stream – West Matukituki (E39 054, E39 055)
- Rob Roy Stream (E39 056)

The tenure review inspection of the Lease was undertaken between January 31st and February 5th 2005 by a range of specialists, their reports forming the basis of the Conservation Resources Report.

PART 2: INHERENT VALUES: DESCRIPTION OF CONSERVATION RESOURCES AND ASSESSMENT OF SIGNIFICANCE

2.1 LANDSCAPE

Landscape Context

Mount Aspiring Pastoral Lease is at the head of the Matukituki Valley, and close to the main divide of the Southern Alps. The Lease is within a truly mountainous landscape, in the shadow of Mount Aspiring and close to major glaciers.

Glaciation is the primary formative process responsible for the appearance of the land within the Lease. Ice has formed U-shaped valleys, steep-sided mountain slopes and other landforms that form the main physical features. Beech forest, shrubland, bracken and tussocklands are the main vegetation types and these also contribute strongly to the character of the landscape. Many areas of the Lease retain their natural character, though the flats and lower slopes have been modified by pastoralism and agriculture.

Large parts of the Lease adjoin either Mount Aspiring National Park or other conservation land. Many people enter the Park through various parts of the Lease.

Methods

The Lease has been divided into defined landscape units (LUs). These units reflect areas of similar landscape character. Landscape character is the quality that makes an area different from another and can be defined as follows:

'Landscape character results from a particular combination of characteristics formed by the interaction of natural processes and cultural (human) activities.'
NZ Institute of Landscape Architects

For each unit a landscape character description is provided along with a description of the key visual and scenic attributes present. An evaluation summary using a range of criteria to assess each unit and assist with determining each unit's high inherent values is presented. The criteria include:

1. Intactness: - refers to the condition of the natural vegetation, patterns and processes and the degree of modification present.

2. Legibility: - refers to its expressiveness - how obviously the landscape demonstrates the formative processes leading to it.

3. Aesthetic Factors: - include criteria such as *distinctiveness* - the quality that makes a particular landscape visually striking. Frequently this occurs when contrasting natural elements combine to form a distinctive and memorable visual pattern. A further criteria assessed under aesthetic factors is *coherence*. This is based on characteristics including

intactness, unity, continuity, and compatibility. Intrusions, alterations, disruptions tend to detract from coherence.

4. Historic Factors: - refers to historically valued attributes in the context of a high country landscape.

5. Visibility: - refers to the visibility from public places such as highways, waterways or local vantage points.

6. Importance: - is the importance of the characteristics and features, or combination of characteristics and features within individual units and whether they are locally, regionally or nationally significant.

7. Vulnerability: - is a measure of each landscape unit's susceptibility to further ecological deterioration, which would impact on landscape values.

Landscape Description

For this assessment, the Lease is divided into four landscape types (refer Map 4.2.2 and Appendix 1 for photos). These include:

- Matukituki River West Branch (LU1)
- Mill Creek (LU2)
- Homestead Flats and Faces (LU3)
- Glenfinnan Faces (LU4)

Matukituki River West Branch- Landscape Unit 1

Character Description

This landscape unit includes a large part of the Lease and comprises flats, fans and toe slopes on both sides of the river. It also includes the north facing mountain slopes of the Matukituki River West Branch, and the area that extends over into the Upper Shotover.

The unit as a whole contains similar landscape patterns and features. In broad terms these characteristics are analogous to the western mountain zone of Otago, and include a U-shaped glacial valley profile and an alluvial valley floor with prominent fans and terraces. The valley floor is predominantly grass covered. Shrubland is associated with fans and toe slopes. Beech forest spills down onto the valley floor, especially towards the west, and remains in gullies, watercourses and on steeper terrain. Elsewhere, mountain slopes are a mix of bracken, pasture and shrubland, with tussock grassland and herbfield above about 1100 m. Grazing and burning has had a significant influence on vegetation patterns on the lower slopes and valley floor.

Cultural activities and patterns also contribute to the character of the Matukituki River West Branch. Cattle grazing and a steady stream of vehicles traveling to and from Raspberry Creek, as well as trampers following the track beyond Raspberry Creek, are all now part of the landscape.

To aid description, the landscape unit is divided into valley floor flats and fans, and the mountain slopes.

(i) Valley Floor Flats and Fans

The river is the dominant feature within the valley floor, and is generally confined within low river terraces. Expanses of tawny fine textured grassland form the dominant cover on the valley floor and fans. The grassland contrasts with various shades of green of beech forest, shrubland and tussock. Shrubland (mainly matagouri) occurs in drifts along the river and stream margins and as scattered shrubland on open fans, especially on the true left of the river.

Natural patterns are generally more intact upstream of Downs Creek. Below here shelterbelts of exotic conifers, and poplar and willow plantings, fenced paddocks and hay paddocks convey the feeling of a more developed landscape.

The road end carpark for recreational users is located at Raspberry Creek.

(ii) Mountain Slopes

The mountain slopes are steep to very steep. Glacial landform patterns are highly legible and include ice worn slopes and lumpy ice shaped topography, rocky bluffs and boulderfields. Waterfalls cascading over steep slopes and bluffs are a feature.

The pattern of vegetation on the lower slopes has been heavily influenced by grazing and burning. Shrubland and bracken occurs on the steep slopes and rocky bluffs while toe slopes and colluvial slopes are a mix of pasture and bracken, extending up to about 900-1000 m. Recent burning is apparent on slopes east of Downs Creek. Snow tussock above this zone appears as intact tussock grassland. The boundary between the Lease and Mount Aspiring National Park is visually distinct as a result of the different management practices.

The high alpine zone is very natural. In the Shotover Saddle area, lumpy ice-formed terraces are a feature along with snow hollows and small tarns. Further along, Craigroyston Peak and Sharks Tooth Peak (outside the Lease) form prominent sharp peaks along the range. Extensive slabby, grey schist rock and screes are a feature along the tops and into the Shotover.

A further prominent landmark near the Shotover Saddle is Red Rock. The name is derived from the distinctive localised red colour of the basement rock.

Visual & Scenic Values

The valley as a whole has highly significant visual and scenic values forming part of a grand and spectacular glacial valley close to the main divide. High mountains, dramatic glacial landforms, intact upper level tussock grasslands and herbfields combined with extensive shrublands, bracken, beech forest and the open grass covered valley floor form the key ingredients of this landscape.

Views and vistas to mountain peaks, steep rugged slopes, as well as views to the head of the valley and the Rob Roy Glacier, are spectacular and visually impressive.

Over one hundred years of pastoralism has had a significant effect on vegetation patterns. While this has changed the landscape, visual values remain high. The dramatic physical landform and relief remain. Natural patterns are entirely intact on the upper slopes.

The lower slopes and valley floor form a coherent landscape of developed pasture with indigenous vegetation remaining on steep slopes, associated with watercourses, gullies and along the river margin. Farming practices on the lower end of the Matukituki River West Branch valley floor, such as hay paddocks, are now an established part of the present landscape. The resulting landscape is visually pleasing and coherent, and integrates natural and cultural elements in a harmonious way. However, natural character remains dominant overall.

From a conservation point of view, the level of vegetation modification such as burnt and /or sprayed faces and the lost potential of shrublands to regenerate, however, do impact on visual and landscape values.

Evaluation Summary

Table 1: Evaluation Summary for Landscape Unit 1.

Criteria	Value	Comment
Intactness	Medium to High	High on upper slopes. Valley floor and lower slopes modified but natural character remains dominant.
Legibility	High	Glacial origins highly legible.
Aesthetic Factors	High	Visually very impressive and memorable. Coherence diminished by impact on vegetation patterns from grazing and burning.
Historic Factors	Medium	Pastoralism and early tourism contribute to 'the flavour' of the area.
Visibility	High	Highly visible from track to Mount Aspiring National Park (M.A.N.P) used by thousands of visitors every year.
Significance	Highest	Forms the entrance to M.A.N.P. and holistically is part of the same landscape.
Vulnerability	High	Landscape values vulnerable to degradation from commercial tourism and farm intensification.

Mill Creek - Landscape Unit 2 (LU2)

Character Description

Landscape Unit 2 comprises the Mill Creek catchment, the upper slopes (within the Lease) of the Matukituki River East Branch below Mt Eostre and Dragonfly Peak, and the upper Minaret Burn and Albert Burn.

The whole of this unit is within the alpine zone, rising above treeline to a height of 2189 m at Dragonfly Peak. To aide description, it is divided into Matukituki River East Branch faces, and Mill Creek and Upper Minaret/Albert Burn.

(i) Matukituki River East Branch Faces
These upper mountain slopes support a tussock and alpine herbfield that extends from treeline to the ridge. Landform patterns include a series of glacial benches, hummocky topography and incised watercourses cut into the upper slopes. The southern end, below Mount Eostre, is highly natural and supports a rich plant association of snow tussock, speargrass, mountain daisy, *Dracophyllum* and whipcord *Hebe*. Wetlands and snowbank plant communities are a feature. To the north, clover and exotic grasses becomes more common with increasing signs of grazing. Natural vegetation patterns though remain intact.

On the slopes below Dragonfly Peak, ice-shorn rock faces, boulderfields and a series of deep gullies extend down into the treeline from the upper slopes. The gullies support shrublands and dense subalpine scrub, protected from grazing. Wetlands are also a feature, though exotic grasses and clover are a significant component within the wet zones. Elsewhere, there is a dense tussock-shrubland-herbfield cover. Above treeline, there is a dracophyllum shrubland association with ribbonwood and celery pine present within gullies.

Further north still is another zone that has sustained greater grazing pressure, and consists of pasture, scattered shrubland and lotus. The yellow flowers of lotus were a dominant feature at the time of the inspection and stood out amongst the surrounding indigenous vegetation.

(ii) Mill Creek and Minaret/Albert Burn
This entire area comprises heavily glaciated mountains with U-shaped glacial troughs, extensive bare rock, scree and steep to precipitous slopes. Vegetation consists of snow and alpine tussock grassland and herbfield; subalpine and alpine scrub; fellfield and scree vegetation. Within Mill Creek, above the treeline, other features include huge boulderfields and extensive lumpy glacial landform. Naturalness is high throughout.

Some evidence of grazing is apparent on the valley floor within the two main valley systems of Mill Creek. A recent hut on the exposed Albert Burn ridge is about the only other indication of human intervention.

Visual & Scenic Values

This landscape unit has outstanding visual and scenic values, analogous with the Mount Aspiring National Park and the western mountains zone. The glacial landforms and

vegetation patterns are inherently visually highly spectacular and impressive. Impressive rocky peaks and scree, exposed ridgetops, glacial valleys and ice-carved rockforms and landforms, together with alpine and subalpine vegetation, combine to form a landscape with outstanding visual and scenic values.

The tussock and alpine herbfields on the mountain slopes below Mount Eostre and within Mill Creek are also impressive. The colours and textures and effects formed by the plant associations in this dramatic setting are quite outstanding. Views at very close range to Mount Aspiring are also highly memorable.

Evaluation Summary

Table 2: Evaluation Summary of Landscape Unit 2: Mill Creek

Criteria	Value	Comment
Intactness	High	Very high throughout except for modified zone north of Mount Eostre
Legibility	High	Glacial patterns highly legible
Aesthetic Factors	High	Visually very distinctive and memorable
Historic Factors	Low	Not significant
Visibility	Medium	East Branch Faces visible from walking tracks below. Mill Creek less visible
Significance	High	High alpine area with similar values to Mount Aspiring National Park
Vulnerability	High	Vulnerable to any human intervention

Homestead Flats and Faces – Landscape Unit 3 (LU3)

Character description

This landscape unit includes the river flats adjacent to the Old Homestead and mountain slopes either side of Homestead Creek and Cameron Flat.

The valley floor river flats are developed farmland with cultivated paddocks, hay barns and amenity and river protection plantings of predominantly poplar and willow species. Scattered matagouri remains in places, especially in the less developed flats upstream of the Old Homestead. Amenity and shelter plantings are associated with the Old Homestead. Cameron Flat has similar features and is dominated by farming patterns and amenity and river protection plantings. Amenity and shelter plantings occur around the new homestead. The flats are unremarkable on their own, but in association with their mountainous setting form a distinctive and memorable landscape.

The mountain slopes between the Glacier Burn and the confluence of the Matukituki River East and West Branches, are a mosaic of beech forest, regenerating shrubland and immediately behind the Old Homestead, garden escapees that have colonised the bush edge. Seedlings include rowan, *Prunus* species, and cotoneaster. A large area of dense beech forest occurs on steep slopes south of the Glacier Burn.

Visual & Scenic Values

The flats are unremarkable on their own. However, their setting within the splendour of the Matukituki Valley is their distinguishing feature. The natural landform and vegetation patterns dominate on the mountain slopes, and provide the setting and context for the cultural (agricultural) patterns on the valley floor. The combination forms a visually striking and memorable landscape. Views from the flats to surrounding mountain slopes and peaks are magnificent.

The homestead faces form part of the steep Homestead Peak mountain slopes to the Matukituki River East Branch. Vegetation cover is either mature beech forest or shrubland in a semi or advanced stage of regeneration. Visual values are high.

Evaluation Summary

Table 3: Evaluation Summary for Landscape Unit 3

Criteria	Value	Comment
Intactness	Medium	Valley floor low. Homestead faces medium to high.
Legibility	Medium	Farming partially masks alluvial and fluvial glacial processes.
Aesthetic Factors	High	Visually striking and memorable.
Historic Factors	Medium	Early pastoralism and tourism has contributed to the appearance and character of the present day landscape.
Visibility	Medium to High	Areas are highly visible to the many visitors who drive and recreate in the Matukituki Valley.
Significance	High	Homestead faces contain significant natural vegetation in a key area. Agricultural patterns on flats in association with the montane setting are significant.
Vulnerability	High	Flats vulnerable to excesses of tourism development and faces vulnerable to further depletion of vegetation.

Glenfinnan Faces - Landscape Unit 4 (LU4)

Character Description

The Glenfinnan Faces Unit includes the north-facing slopes below Glenfinnan Peak and area adjacent to the confluence of the two branches of the Matukituki River. The slopes are at the end of the range, forming the enclosing mountain slopes to the main valley of the Matukituki. Niger Creek is the property boundary.

The toe slopes above the new homestead, farm buildings and facilities are developed farmland fenced into paddocks with some shelterbelts. The bracken zone above has also been completely developed into pasture with slope debris visible on the surface. Beyond this, there is a transition zone of developed pasture and native grasses. This zone extends

up to about 1100 m with tall tussock gradually assuming dominance above this elevation. The upper slopes appear relatively natural. Pockets of beech forest occur within Niger Creek and other smaller remnants within adjacent incised streams.

A large ice shorn bluff, located immediately above Cameron Flat at the junction of the two branches of the Matukituki River, forms a significant feature. The cover is predominately bracken with some emerging shrubland, indicating recovery from burning.

Visual & Scenic Values

Glenfinnan Peak, of which the Glennfinnan Faces are part, is one of a series of peaks along the mountain range which continues up the Matukituki River West Branch. The Glenfinnan Faces are visually important as part of the enclosing mountain slopes.

Significant visual features include the beech forest remnants within Niger Creek and watercourses, and the bluff above Cameron Flat. The denuded state of the lower slopes, and particularly the steep bluff, detracts from visual and scenic values to a degree.

Evaluation Summary

Table 4: Evaluation Summary of Landscape Unit 4

Criteria	Value	Comment
Intactness	Medium	Low and mid slopes, high on upper slopes.
Legibility	High	Formative processes very legible.
Aesthetic Factors	Medium	Not visually striking or distinctive but typical of Matukituki mountain slopes. Denuded nature of lower slopes and bluff adjacent to Cameron Flat detracts visually.
Historic Factors	Low	Not significant.
Visibility	High	Visible from Wanaka Mount Aspiring Road.
Significance	Medium	Not significant on its own but significant as part of the whole mountain valley system.
Vulnerability	Low	Lower slopes already modified.

Significance of Landscape Values

The following areas of Mount Aspiring Pastoral Lease are identified as having significant inherent landscape values (refer Map 4.2.2):

- The whole of LU1 (the Matukituki River West Branch)
- The whole of LU2 (Mill Creek including the upper east faces of the Matukituki River East Branch)
- The whole of LU3 (Homestead Flats and faces including Cameron Flat)
- Part of LU4 (i.e. the upper slopes of the Glenfinnan Faces above about 1100 m and the ice shorn bluff adjacent to Cameron Flat).

Matukituki River West Branch

The whole of the Matukituki River West Branch Landscape Unit (LU1) is assessed as having significant inherent landscape values. This area (contained within the Lease) forms part of a spectacular and highly scenic landscape. This striking and visually impressive montane landscape comprises spectacular physical features including a glaciated trough landscape and landforms, and fluvial-glacial valley floor landforms and features. Natural vegetation patterns and features remain dominant and appear natural despite considerable modification on the valley floor and lower slopes.

The upper valley is less culturally modified, although grazing and burning is evident on the lower slopes and valley floor, and cattle are present.

The lower valley (below Raspberry Creek) is more modified, and farming patterns such as hay paddocks and shelterbelts are now part of the valley floor landscape. These patterns change but do not diminish the grandeur and sheer beauty of this landscape as a whole. On the other hand, the raw and denuded appearance of burnt/sprayed lower slopes does detract from landscape values. Valley floor grazing impacts on the margins of the beech forest, but elsewhere appears to be minimal.

The Matukituki River West Branch is significant as a major entrance to the Mount Aspiring National Park.

The upper slopes and ridge of the West Branch and the adjoining area of the Shotover catchment are one of the best remaining representative examples of landscapes that characterised New Zealand before humans arrived.

Mill Creek and Upper Faces of the East Branch

The Mill Creek catchment, upper slopes of the East Branch (below Dragonfly Peak and Mount Eostre) and the head of the Minaret Burn and Albert Burn have significant inherent landscape values. The area is one of the best remaining representative examples of landscapes that characterised New Zealand before humans arrived. The glaciated landforms, combined with highly natural vegetation patterns, contain inherently high natural landscape values. Extensive bare rock, scree and steep to precipitous slopes, ice shaped rockforms and landforms are significant features, together with alpine and subalpine vegetation, and superb alpine views to Mount Aspiring, adjacent mountains and valleys. The area of modified vegetation on the Matukituki River East Branch faces is a relatively small area that appears out of context and discordant within the wider landscape.

Homestead Flats and Faces

On the valley floor the agricultural land use patterns within a dramatic and spectacular mountain setting contributes to the significance of this landscape unit.

The Homestead faces are part of the steep and highly natural mountain slopes below Homestead Peak near the confluence of the West and East Branches of the Matukituki. The steep slopes are either beech forest or regenerating bracken and shrubland. They

form an important part of the Matukituki Valley landscape at the terminus of the main valley and confluence of the East and West Branch. Adjoining steep mountain slopes are Conservation Land.

The Matukituki River East Branch is a recognised iconic high country landscape, which is often used in artworks and promotional material to exemplify backcountry New Zealand. Parts of the area have been modified. There are opportunities to increase the natural character of this iconic high country landscape.

Upper Glenfinnan Faces and Bluff adjacent to Cameron Flat

The steep upper mountain slopes contains impressive landforms and intact tussock and subalpine and alpine vegetation representative of the pre-human indigenous landscape. It also represents a continuum of the upper range natural landscape that extends along the length of the Matukituki Valley.

The bluff adjacent to Cameron Flat forms a significant landscape feature at the junction of the East and West Branches of the Matukituki River. There is an opportunity to restore natural character by protecting the unit from burning and grazing.

2.2 GEOLOGY, LANDFORMS AND SOILS

a) Geology

The underlying geology of the property is predominantly Rakaia terrane foliated schist (Wood 1962, Mutch and McKellar 1964 and Turnbull 2000). There are also bands of distinctive porphoroblastic schist and greenschist present (see Turnbull 2000), especially at the northern part of the property.

A number of faults are present on the property, the most extensive being the Moonlight Fault which runs in a roughly south to north east direction. Manganese is present on a fault line which runs from Sharks Tooth Peak to its lower slopes east of Raspberry Creek hut.

A striking feature is Red Rock Peak, located on a fault line. The red coloration of the greenschist is visible where the dipping foliation is exposed.

b) Landforms

Glacial landforms are a dominant feature of the property. The Matukituki Valley is a typical U-shaped glaciated valley with steep sides and a flat floor formed by old glacial outwash terraces. There is a spring line at the junction of the terraces and the foot of the mountains.

The Matukituki River West Branch has ice worn slopes and lumpy ice shaped topography and rocky bluffs. Ice formed terraces occur in the Shotover Saddle area. A series of glacial benches and hummocky topography are present on the upper mountain slopes of Matukituki River East Branch. The entire Mill Creek and Minaret Burn/Albert Burn area

comprises heavily glaciated mountains with U-shaped glacial troughs, extensive bare rock and lumpy glacial landforms. The alpine parts of the property exhibit more recent signs of glaciation, with several pockets of permanent ice present under Mt Tyndall and Dragonfly Peak.

A large ice shorn bluff, located immediately above Cameron Flat at the junction of the two branches of the Matukituki River, forms a significant feature.

Extensive slabby, grey schist rock and screes are a feature along the Craigroyston Peak and Sharks Tooth Peak tops and into the Shotover. Within the Mill Block, rocky peaks, scree and deposits of angular bouldery till occupying cirque moraines and some of the larger valleys, are present.

Fluvial processes are particularly evident along the upper mountain slopes of Matukituki River East Branch, where streams have incised deep gullies. Fluvioglacial and fluvial gravel and sand deposits are present on alluvial fans in the Matukituki valley. These deposits grade into scree and valley alluvium. Where the river flows across outwash gravels at a relatively gentle gradient, a braided riverbed has resulted. Along the footslopes are active and inactive scree, colluvium and slopewash deposits.

c) Soils

Matukituki Recent Soils, derived from alluvium, occupy the flood plains and young fans along the Matukituki River East and West Branches. Soils on the fans are generally more leached than those on flood plains.

Upland and High Country Yellow-Brown Earths occupy the steep to very steep mountain slopes on the property. Moonlight Steepland Soils are present at the western end of the Lease, as well as within the Mill Creek catchment. These soils are derived from schist and slope deposits, and locally from schist derived loess. They have low to very low natural nutrient status. Dunstan Steepland Soils occur at the eastern end of the property, on the true right of the Matukituki River. These soils are derived from schist and slope deposits and some bare rock and have very low natural nutrient status. They are liable to severe soil erosion including landslides.

Along the mountain tops of Dragonfly Peak, and the ridgeline between Mt Tyndall and Sharks Tooth Peak are Alpine Steepland Soils. These soils are derived from schist and occur mostly on steep to very steep country. They are characterised by much bare ground, scree and rock.

Significance of Landforms, Geology and Soils

The range of glacial landforms (i.e. U shaped valleys, alpine cirque basins, ice worn cliffs, glacial terraces, hummocky topography and braided riverbed) rarely found together on a pastoral lease property, and are all significant. These landforms also contribute to the significance of landscape values (see section 2.1).

There are no geologically significant sites requiring protection listed in Kenny and Hayward (1993). There are no significant soils recorded on the Lease.

2.3 LAND ENVIRONMENTS OF NEW ZEALAND (LENZ)

There are two databases that have been used to assess biodiversity protection (Walker *et al* 2005):

- The environmental distinctiveness of an area can be assessed through the Land Environments of New Zealand (LENZ). This is a classification of New Zealand lands 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). LENZ is a useful tool for measuring conservation initiatives against the New Zealand Biodiversity Strategy (see Section 3.6). It is presented at four levels of detail containing twenty, 100, 200 or 500 environments nationally. The most detailed is called LENZ Level IV.
- The area of unprotected indigenous cover in threatened land environments has been identified in the national land cover database (LCDB).

From the above databases, spatial data depicting indigenous vegetation cover and legal protection were overlaid on LENZ Level IV environments to identify biodiversity that is most vulnerable (i.e. most likely to be lost). This provides a measure for: a) percentages legally protected and b) percentages of remaining indigenous vegetation cover.

Based on these two criteria, five categories of threatened environments have been used to identify environments containing indigenous biodiversity at most risk of loss. They are classified as follows:

Acutely threatened:	<10% indigenous vegetation cover remaining
Chronically threatened::	10-20% indigenous vegetation cover 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.

At the level IV (500 environments nationally) the areas present at the Lease fall predominantly within Environments R1.1b, R1.1a, P5.1e, Q1.1c and H2.2b, with smaller contributions of M2.3a, R1.2b, P5.1d, T1.1a, P5.2a, Q2.2b, Q1.1a, P5.1b, O1.2a, Q2.1a, O2.3b and O1.4a. See Appendix 2 for descriptions of these LENZ units and Appendix 3 for their distribution on the property). The extent to which Level IV environments are protected nationally for conservation purposes is shown in Table 5 below.

Table 5: Land Environments of New Zealand Units on Mount Aspiring Pastoral Lease.

Threat Category	LENZ Level IV Environments on the Lease	Area of LENZ unit on Mount Aspiring Pastoral Lease (ha)	Percent protected nationally for conservation purposes	% of Indigenous vegetation cover remaining	Change in Indigenous Vegetation Cover between 1997 and 2002
At Risk	M2.2b	757.3	13.44	22.1	No Change
Critically Under-protected	Q2.1a	0.8	9.3	38	Decrease
	Q2.2b	17.6	6.5	44.7	No Change
Under-protected	Q1.1c	816.6	17.9	91.2	No Change
No Threat	M2.3a	59.5	70	62	No Change
	O1.4a	0.1	53.5	66.8	Decrease
	O2.3b	0.5	98.2	99.6	No Change
	P5.1b	2	77.0	92.6	Decrease
	P5.1d	38.9	92.5	97.1	Decrease
	P5.1e	1245.9	33.6	86.0	No Change
	P5.2a	29.4	53.6	72.6	Decrease
	Q1.1a	14.1	24.8	98.4	No Change
	Q1.2a	0.9	37.2	99.0	No Change
	R1.1a	3493.5	75.6	99.5	No Change
	R1.1b	3991.9	59.6	99.9	No Change
	R1.2b	42.3	99.4	~100	Decrease
	T1.1a	35.9	97.4	~100	No Change

Significance of Land Environments of New Zealand

The Lease has three Level IV land environments that are significant because, on a national level the indigenous vegetation has largely been removed, and/or little of the environment is represented in lands protected primarily for conservation purposes:

- 7.3% of property has one "At Risk" Level IV LENZ unit (M2.2b) that has 20-30% of its land area still in indigenous cover.
- 0.2% of property has two "Critically Underprotected" Level IV LENZ units (i.e.Q2.1a and Q2.2b) that nationally have >30% of their land area still in indigenous cover and less that 10% of the unit is protected.

2.4 CLIMATE

Climate is typical of the west Otago/Lakes region with warm but variable summers and cold winters. Frosts can occur throughout the year. Winters bring intermittent snow to lower parts of the property. Snow can lie for over 8 months at higher altitudes, with patches of permanent snow present at Dragonfly Peak and Mt Tyndall. Annual rainfall at the homestead is about 2700 mm, increasing with altitude, and towards the west. The Lease has about 138 rain days per year (Mark 1977). Strong north westerly winds are frequent, especially at higher altitudes.

2.5 VEGETATION

Introduction

Much of the existing indigenous vegetation on the Lease is indicative or representative of the likely pre-human vegetation. However, beech forest would have once extended up to the natural treeline limit of c. 1000 m throughout the West Matukituki Valley. Subalpine shrubland is likely to have been more extensive in gullies and above the treeline, particularly on the true right of the Matukituki River West Branch, where it has been replaced by tall tussock.

At the northern end of the Matukituki River East Branch, fire has depressed the upper treeline, which would also once have extended to c. 1000 m.

In both valleys beech, forest is likely to have extended further on to the valley floors than currently, and matagouri, mountain toatoa, and tree daisy shrubland were probably far more extensive. Other communities on the valley floors are likely to have included sedgelands, short tussockland, herbfield and gravelfield, of which only relict examples now exist.

Vegetation Description

The Lease has been broken up into units and sub-units to assist the description of vegetation on the property. These units are based primarily on topography:

- Matukituki River West Branch
  - *(i) Flats and Fans*
  - *(ii) Mountain Slopes*
- Glenfinnan Faces
- Matukituki River East Branch
  - *(i) Cattle Faces*
  - *(ii) Old Homestead Flats*
  - *(iii) Old Homestead Toe and Hillslopes*
- Mill Creek
- Minaret Burn Headwaters

Matukituki West Branch

(i) Flats and fans

Alluvial flats and gently sloping fans of varying dimensions flank the Matukituki River West Branch on both sides, from near Cascade Hut in the upper reaches, down to its junction with the East Branch near Cameron Flat. Blocky colluvial fans, comprised of rock from mountain slopes above, occur intermittently along the junction between the hill slopes and flats.

Introduced pasture species dominate the flats and fans along with associated common pasture weeds such as selfheal (*Prunella vulgaris*), ragwort (*Senecio jacobea*), Californian thistle (*Cirsium arvense*) and Scotch thistle (*C. vulgare*). Indigenous herbs are also abundant, especially in pasture up valley from Raspberry Creek. Common species include native

dock (*Rumex flexuosus*), *Anaphalioides bellidioides, Muehlenbeckia axillaris, Leptinella squalida* subsp. *mediana, Ranunculus foliosus, Geranium microphyllum* and harebell (*Wahlenbergia albomarginata*). Dry terraces on the true left are often dominated by browntop, chewings fescue (*Festuca rubra*) and lotus (*Lotus pedunculatus).*

Wet areas within pasture have a suite of plants adapted to periods of water lie. They include sedges such as sharp spike-sedge (*Eleocharis acuta*) and *Carex gaudichaudiana*, and the herbs *Viola cunninghamii, Hydrocotyle sulcata, Euchiton traversii* and exotic musk (*Mimulus moschatus*). Damp flats have rautahi (*Carex coriacea*).

Outwash fans, particularly those on the true left such as that formed from MacPherson Creek, exhibit a chronological sequence of gravel deposition (terrace formation) with associated vegetation succession. Most recent gravels are largely bare but slightly older ones have developed cushionfield of *Raoulia hookeri, Muehlenbeckia axillaris* and *Pimelea* aff. *prostrata* intermixed with *Epilobium microphyllum, E. melanocaulon* and exotic grass. More stable fans show shrubland development with native broom (*Carmichaelia petriei*), matagouri (*Discaria toumatou*), *Coprosma propinqua* and juvenile silver beech (*Nothofagus menziesii*).

Some rocky colluvial fans have regenerating shrublands of high diversity. Common tree and shrubs are kohuhu (*Pittosporum tenuifolium*), broadleaf (*Griselinia littoralis*), *Coprosma propinqua, C. rugosa, Podocarpus nivalis, Corokia cotoneaster, Olearia avicenniifolia*, manuka (*Leptospermum scoparium*), porcupine shrub (*Melicytus alpinus*), mountain wineberry (*Aristotelia fruticosa*), tutu (*Coriaria sarmentosa*) and false beech (*Gaultheria antipoda*). A rich understorey of predominantly ferns includes prickly shield fern (*Polystichum vestitum*), thousand-leaved fern (*Hypolepis millefolium*), *Blechnum montanum, B. penna-marina, B. vulcanicum*, hanging spleenwort (*Asplenium flaccidum*), necklace fern (*A. flabellifolium*) and hound's tongue (*Microsorum pustulatum*). Lianes are also abundant, climbing over and through the shrub canopy. Common species include native jasmine (*Parsonsia heterophylla*), clematis (*Clematis marata*), pohuehue (*Muehlenbeckia australis*) and bush lawyer (*Rubus schmidelioides*).

Some of these shrub and tree species are also present in a narrow, strictly riparian zone, immediately adjoining the Matukituki River. They are supplemented by occasional beech trees, mostly mountain beech (*Nothofagus solandri* var. *cliffortioides*) and silver beech, with *Chionochloa conspicua* and inaka (*Dracophyllum longifolium*).

Down valley of Raspberry Creek on the true right, as far as Glenfinnan Stream, are scattered populations and individuals of the threatened tree daisy *Olearia hectorii*. While these are sometimes associated with regenerating shrublands, they are more often isolated within pasture. A large population of c. 55 trees occurs near the Otago Boys High School Bridge. Smaller concentrations occur near Wishbone Falls and at the base of a gully issuing from Sharks Tooth Peak. Many of the trees have a preponderance of broken limbs attributable to cattle rubbing.

Silver beech is also widespread as groves and individuals on the fans of the true left of the river. It is associated with occasional Hall's totara (*Podocarpus hallii*) and mountain celery pine (*Phyllocladus alpinus*) with a sparse understorey that includes *Coprosma ciliata*, button fern (*Pellaea rotundifolia*), water fern (*Histiopteris incisa*), *Viola filicaulis*, and the orchids *Chiloglottis cornuta* and *Aporostylis bifolia*. Beech regeneration at the margins of the forest is absent and reflects stock usage of these areas for grazing and shelter.

Rock bluffs on the true left of the river, in the vicinity of the footbridge, support the threatened cress P*achycladon cheesemanii.* At the foot of the bluffs, the locally uncommon shrub kanuka (*Kunzea ericoides)* is present.

A small roadside pond located between the Otago Boys High School Bridge and Cameron Flat (on the true right of the river) supports several species not encountered or rare elsewhere on the property including sharp spike-sedge, *Myriophyllum propinquum*, *Carex sinclairii* and *Elatine gratioloides*.

(ii) Mountain slopes

This unit incorporates the mountain slopes on the true right of the Matukituki Valley from Red Rock stream and Mt Tyndall in the west to near Fog Peak and Cameron Flat in the east. It also extends into the headwater basins of Tyndall Stream and Tummel Burn, both within the Shotover River catchment. The terrain is especially steep and broken east of Downs Creek, through Big Creek, Raspberry Creek and Sheepyard Creek.

At highest altitudes (above 1800 m) alpine scree and fellfield communities predominate. These are generally sparsely vegetated with *Anisotome imbricata, Epilobium purpuratum, Colobanthus buchananii, Leptinella pectinata* subsp. *wilcoxii, Parahebe planopetiolata, Ranunculus buchananii, Luzula pumila, Neopaxia sessiliflora, Haastia sinclairii, Poa novae-zelandiae* and *Schizeilema exiguum*. At the more eastern extent *Marsippospermum gracile* and *Chionochloa oreophila* are locally common. Rock outcrops in this zone have a similar flora along with *Gingidia decipiens* and *Schizeilema haastii.*

Alpine talus slopes also share many of these species along with the alpine shield fern (*Polystichum cystostegia*), yellow snow marguerite (*Dolichoglottis lyallii*), *Brachyglottis bellidioides, Celmisia angustifolia* and the clubmoss *Huperzia australiana.* An area of damp outwash gravels below talus from Red Rocks has *Myosotis pygmaea* var. *drucei* along with *Anaphalioides bellidioides, Cardamine* sp., and *Acaena saccaticupula.*

More subdued topography, such as around the slump features near Shotover Saddle (c. 1500 m) and further east, support a dense vegetation of mixed grassland, cushionfield and herbfields. Dominant species are mid-ribbed snow tussock (*Chionochloa pallens*), *Marsippospermum gracile*, blue tussock (*Poa colensoi*) and *Dracophyllum muscoides* but the hump and hollow features support high diversity. Common species include *Phyllachne colensoi, Celmisia lyallii, C. hectorii, Aciphylla kirkii, Ourisia glandulosa, Euphrasia zelandica, Anisotome aromatica, Hectorella caespitosa, Chionohebe thomsonii, Coprosma niphophila, Gentianella* sp., *Leucopogon fraseri, Abrotanella inconspicua*, mosses and lichens.

At c. 1400 m narrow-leaved tussock (*Chionochloa rigida* subsp. *rigida)* is present along with an increasing array of shrubs and large herbs. These include turpentine shrub (*Dracophyllum uniflorum), D. kirkii, Hebe hectorii, Coprosma foweraker*i, *C. cheesemanii,* creeping mapou (*Myrsine nummularia),* cottonwood *(Ozothamnus vauvilliersii), Astelia nervosa, A. petriei, Aciphylla divisa* and *Celmisia verbascifolia. Hebe hectorii* and *H. odora* form narrow shrubby belts along seeps. This community is widespread and extends well down slopes.

As the terrain steepens, numerous small seepages coalesce into small cascades, the sides of which are festooned with *Celmisia verbascifolia*, Mt Cook lily (*Ranunculus lyallii*), yellow

snow groundsel (*Dolichoglottis lyallii)*, *Anaphalioides bellidioides, Hebe pauciramosa* and *Astelia petriei.*

Mid-slope rock outcrops and dry spur crests have a more dry-tolerant flora including mountain flax (*Phormium cookianum*), *Coprosma serrulata, C. atropurpurea, Blechnum montanum, Leucopogon fraseri, Lycopodium fastigiatum, Celmisia gracilenta, Gaultheria crassa, Pentachondra pumila* and *Gentianella* sp. Ravines at c. 1000 m have dense riparian shrublands dominated by turpentine shrub and *Hebe subalpina* along with cottonwood, mountain flax, *Coprosma ciliata, C. rugosa*, native broom, koromiko (*Hebe salicifolia), Olearia arborescens*, feathery tutu (*Coriaria plumosa*), prickly shield fern, and *Chionochloa conspicua.*

Between c. 900 – 1000 m, depending on steepness and brokenness of terrain, an abrupt vegetation change to introduced pasture grasses demarcates the extent of pastoral development. Below this altitude, indigenous vegetation is restricted to unpalatable species within pasture i.e. bracken (*Pteridium esculentum*), prickly shield fern, thousand-leaved fern and tutu, and vegetation associated with various fire refuges. These include riparian shrublands and beech forest (some with mountain lacebark [*Hoberia lyallii*]) and rock bluff/overhangs with shade-tolerant plants such as *Stellaria parviflora, Athropodium candidum* and *Polystichum neozelandicum* subsp. *zerophyllum.* A diverse shrubland remains on steep slopes between the Otago Boys High School Bridge and Cameron Flat. This includes kowhai (*Sophora microphylla*), koromiko, *Coprosma propinqua, Olearia avicenniifolia*, tutu, *Hebe rakaiensis*, native broom, broadleaf and Hall's totara.

Glenfinnan Faces

This unit lies east of the ridge line running north from Glenfinnan Peak, and includes the catchment of Glenfinnan Stream, part Niger Stream and several small un-named creeks flowing north towards Cameron Flat. It is particularly steep and bluffy below 800 m on the slopes above Cameron Flat.

Alpine plant communities are similar to those described above for the Matukituki Valley mountain slopes. Two areas of special note occur on a shoulder 1.5 km north of Glenfinnan Peak. A sphagnum bog, dominated by *Carex gaudichaudiana* has a typical flora of plants tolerant of acidic conditions and low fertility. These include *Celmisia* "rhizomatous bog", sundew (*Drosera arcturi*) and comb sedges (*Oreobolus* spp.). This wetland shows evidence of cattle pugging and is consequently in moderate overall condition.

A nearby schist gravel outwash fan is colonised by *Carex petriei*, along with *Epilobium* spp., *Muehlenbeckia axillaris* and *Raoulia* spp. mats. Older surfaces have narrow-leaved tussock intermixed with exotic grasses and white clover (*Trifolium repens*).

Riparian vegetation in steep gullies is dominated by *Coprosma* spp. and *Dracophyllum* spp. with hebe, *Gaultheria antipoda* and large herbs such as *Celmisia semicordata* and *Aciphylla scott-thomsonii* also common. Patches of silver beech and occasional broadleaf are present at lower altitude.

Matukituki East Branch

(i) Cattle Faces

This unit encompasses the west-facing mountain slopes between the ridge running southwest from Mt Eostre, to Dragonfly Peak and down to the Lease boundary on the upper margins of the beech forest. Plant communities are most intact at the southern end and become progressively modified along the northern half of the face.

High alpine communities were not examined but are expected to be similar in composition to those described for the mountain slopes of the Matukituki River West Branch. Between 1200 – 1500 m a tussock-shrubland prevails. The two dominant plants are narrow-leaved snow tussock and turpentine scrub and they provide a dense cover. Other associated species include *Astelia nervosa, Aciphylla* "lomond", inaka, *Coprosma cheesemanii, Hebe hectorii, Gaultheria depressa, Celmisia semicordata* and *C. lyallii*. Small damp hollows amongst the tussock have sphagnum moss and comb sedge. Drier hummocks and spurs have *Lycopodium fastigiatum* and *Kelleria dieffenbachii*. Damp creek margins provide more diversity with cottonwood, *Coprosma rugosa, Aciphylla crenulata*, Mt Cook lily and yellow snow groundsel.

Wet seepages within the tussock-shrubland have a mixed exotic/native cover of herbs, grasses and sedges. Common species include white clover, browntop (*Agrostis capillaris*), tussock hawkweed (*Hieracium lepidulum*), alpine hard tussock (*Festuca mathewsii*), blue tussock, *Oreomyrrhis ramosa, Carex gaudichaudiana* and *Celmisia glandulosa*. Minor stock pugging is evident.

A small mossy bog on a bench at c. 1240 m has a diverse range of wetland herbs, grasses, sedges and rushes. The predominant cover is provided by moss, Yorkshire fog (*Holcus lanatus*), and browntop but other common associates include *Schoenus pauciflorus, Leptinella squalida* subsp. *mediana, Plantago novaezelandiae, Psychrophila obtusa, Celmisia glandulosa*, *C.* "rhizomatous bog", *Galium perpusillum, Pratia angulata, Nertera balfouriana* and *Craspedia* sp.

Wet rock exposures amongst the shrubland have additional diversity with *Coprosma serrulata, Gingidia montana, Oxalis magellanica, Lobelia linnaeoides, Parahebe lyallii* and *Euphrasia zelandica.*

Below 1200 m, a dense *Dracophyllum* dominated shrubland extends to the treeline on the southern half of the face. Many of the species mentioned above are also present, particularly in gullies and along streamsides. Other shrubs and trees become important in these habitats at lower altitude. They include *Olearia moschata, O. nummularifolia, O. bullata, O. ilicifolia, O. arborescens, Coprosma foweraker*i, *Brachyglottis rotundifolia, Phyllocladus alpinus, Coprosma* sp.'t', and mountain lacebark. At c. 1080 m old burnt beech tree stumps indicate a previous forest cover, despite the current upper forest edge in this locality being at c. 900 m.

Stature and density of shrublands declines north of the unnamed stream which drains west off Mt Eostre. Turpentine shrub and *Coprosma* sp."t" co-dominate but increasing large canopy gaps are covered in comb sedge, tussock hawkweed, browntop and sweet vernal (*Anthoxanthum odoratum*). This further deteriorates to an abrupt transition to pasture grasses and herbs, especially timothy (*Phleum pratense*) and lotus (*Lotus pedunculatus*) on slump-prone slopes. Many agricultural weeds are present including selfheal, musk, Scotch thistle and burdock (*Arctium minus*). Resilient native species include patches of tutu, prickly shield fern and alpine hard fern (*Blechnum penna-marina*) and small pockets of

Coprosma sp. "t', *C. rugosa*, mountain lacebark, inaka, koromiko and occasional mountain toatoa.

(ii) Old Homestead Flats

This unit is the flat land encompassed by Matukituki River West Branch in the south, Matukituki River East Branch in the east, Glacier Burn in the north, and mountain slopes to the west. It is almost entirely improved pasture. In places, the beech forest margin extends on to the flats from the slopes above (particularly behind the Old Homestead) and there are occasional outliers of both silver beech and red beech (*Nothofagus fusca*).

The Old Homestead gardens contain a wide variety of exotic trees and shrubs, some of which have naturalised and are spreading beyond the confines of the gardens.

In the south western corner a rock talus fan supports a large population of the threatened tree daisy *Olearia hectorii* which is the dominant canopy cover over much of the site. Other common species include *Coprosma propinqua, C. rugosa, Olearia avicenniifolia*, mountain wineberry, wineberry, fuchsia, and mountain lacebark. Much less common are silver beech and lowland ribbonwood (*Plagianthus regius*). The understorey is predominantly prickly shield fern and thousand-leaved fern, less common are tussock hawkweed, wall lettuce (*Mycelis muralis*) and creeping buttercup (*Ranunculus repens*).

Periodically disturbed alluvial riverbed supports a sparse vegetation of *Raoulia* spp. and *Muehlenbeckia axillaris* mats along with *Epilobium microphyllum* and *Colobanthus* sp. Mosses occupy stable sites.

(iii) Old Homestead Toe and Hillslopes

This unit comprises the footslopes and mountain slopes west of the Old Homestead Flats. The vegetation on these slopes has been subject to considerable disturbance, disrupting original forest patterns. Intact red and silver beech occurs at the north end of the unit but elsewhere it is fragmented or absent. The beech understorey in steeper areas is good with a range of small tree species including *Pseudopanax colensoi* var. *ternatus*. Where stock have easy access, regeneration of beech and other tree species is conspicuously absent.

The steep rocky face southwest of the Old Homestead is a mix of vegetation types reflecting different successional stages from fire. Bracken is common along with inaka. There are scattered Hall's totara, *Olearia avicenniifolia* and silver beech saplings. Lower slopes are dominated by fuchsia, mountain lacebark and patches of pohuehue and *Rubus cissoides*. Some small silver beech groves are present.

Mill Creek

This unit incorporates the entire catchment of Mill Creek and the small section of the Albert Burn headwaters (including Albert Burn Saddle), that lies within the Lease. This is land mostly over 1000 m rising to 2165 m on Dragonfly Peak.

A large proportion of this unit (above c. 1600 m) is comprised of high alpine scree, fellfield and rock outcrop communities, and is dominated by a large range of cushion-forming herbs and sub-shrubs as described for similar communities for West Matukituki mountain slopes. Other common plants include *Aciphylla kirkii, Chionochloa oreophila, Celmisia lyallii, Poa novae-zelandiae* and blue tussock. The only exotic plant present is tussock hawkweed at very low density.

The head basins of both branches of Mill Creek have snowbank herbfield communities and infant water courses along which large alpine herbs such as *Ranunculus buchananii* and *Dolichoglottis* spp. dominate. More open rocky sites nearby support *Epilobium purpuratum, E. rubomarginatum* and *E. glabellum,* intermixed with *Poa novae-zelandiae* and *Craspedia* sp.

Tall tussocklands prevail on the mid and lower slopes, except where bands of very steep rock bluffs intercede, as they do on the true left of the east branch. Both mid-ribbed snow tussock (*Chionochloa pallens* subsp. c*adens)* and narrow-leaved tussock are present with good diversity of inter-tussock species, especially in damper sites. Bluffs support a community of mountain flax, *Coprosma serrulata, Anaphalioides bellidioides* and native grasses.

Rockfield shrublands are a feature of both branches of Mill Creek and along the main stem. These occur on moderate slopes and their jumbled nature affords a degree of protection from grazers. Common species include *Aciphylla scott-thomsonii, Coprosma cheesemanii, C. propinqua, Hebe hectorii,* and turpentine shrub. These are intermixed with many native herbs and grasses, especially *Poa novae-zelandiae* along creek margins.

A series of mountain slope benches at c. 1600 – 1660 m on the south slopes of Mt Eostre support a large wetland complex. A variety of wetland types are present, fed in part by melting snow banks but also including seepages, bogs, ephemerally wet hollows and tarns. Vegetation composition also varies widely reflecting subtle differences in hydrology, chemistry and fertility. Distinctive wetland species include *Carex gaudichaudiana, Schoenus pauciflorus, Psychrophila obtusa, Plantago lanigera, Carpha alpina, Ranunculus maculatus* and *R. pachyrrhizus*. Adjoining drier rounded knolls support snow patch grass (*Chionochloa oreophila), Phyllachne rubra, P. colensoi, Celmisia haastii, Ourisia glandulosa, Raoulia grandiflora, Gaultheria nubicola* and *Celmisia sessiliflora.* The tiny herb *Crassula sinclairii* dominates the seasonally damp hollows.

Very small areas of *Crassula sinclairii*-dominated ephemerally wet hollows occur along the floor of the east branch of Mill Creek. Differences in water regimes are reflected in the vegetation, with some drier areas supporting *Raoulia* dominated herb grassland. Apart from cattle pugging, these areas are generally in good condition.

Damp wetland herb and sedge-dominated flats stretch from the gorge in the main stem Mil Creek, to near the headwaters of the east branch. In contrast, the west branch of Mill Creek is drier and less wooded, and the valley floor is dominated by blue tussock with more *Aciphylla* species.

The locally and regionally uncommon cushion plant *Myosotis pulvinaris* is present on a rocky ridge above Mill Creek.

Minaret Burn Headwaters

The true right branch of the headwaters of Minaret Burn form the north-eastern extent of the Lease. This is predominantly an alpine environment with an altitudinal span 1000 m – 2000 m. There is little evidence of any browsing or grazing, apart from minor deer sign. At its lowest elevation, a large dense *Dracophyllum* dominated shrubland occupies broad north-facing slopes. Similar shrublands, although much smaller in extent, occur on other aspects, particularly on the small ledges between bluffs on the true left of the valley.

At higher altitude on dissected slump topography, a more diverse tussock/shrubland prevails. Slim snow tussock (*Chionochloa macra*) is common along with *Hebe hectorii, H. subalpina, Dracophyllum uniflorum*, cottonwood*, Coprosma cheesemanii* and *C. ciliata.* Large herbs are also abundant, especially *Astelia nervosa, A. petriei, Celmisia semicordata, C. lyallii* and Mt Cook lily. These species, with the addition of yellow snow marguerite and *Dolichoglottis scorzoneroides*, line the many small watercourses. Small herbs amongst the tussock shrubland include *Brachyglottis bellidioides, Anisotome aromatica, Acaena caesiiglauca, A. saccaticupula*, tussock hawkweed, and occasionally *Anemone tenuicaulis.*

Small seepages are dominated by bog rush, often in association with *Acaena saccaticupula, Craspedia sp., Oreomyrrhis ramosa, Psychrophila obtusa* and *Galium perpusillum.* The highly disturbed alluvial gravels of the main riverbed support a distinctive sparsely vegetated community comprising *Raoulia tenuicaulis, Acaena saccaticupula, Epilobium purpuratum, Scleranthus brockiei, Celmisia angustifolia* and mouse-ear chickweed (*Cerastium fontanum*).

Rock outcrops lining the river gorge also have a distinctive flora comprising a mix of herbs, grasses and shrubs. Common species include *Coprosma serrulata, Carmichaelia petriei,* cottonwood, *Poa novae-zelandiae, Elymus* sp., *Lobelia linnaeoides, Grammatis poeppigiana, Schizeilema haastii, Gingidia montana*, feathery tutu and *Parahebe brevistylus.*

A gravely toe-slope fan is dominated by *Rytidosperma setifolium* with a range of associated species including *Luzula pumila, L. rufa, Agrostis muelleriana, Muehlenbeckia axillaris, Anaphalioides bellidioides, Poa colensoi, Geranium microphyllum, Euphrasia zelandica* and *Uncinia divaricata.*

Alpine communities above the tussock zone were not investigated but are expected to be similar in composition to those described for West Matukituki mountain slopes.

Significance of Vegetation Values

Areas of significant inherent botanical values are shown on Map 4.2.3.

Mt Aspiring Pastoral Lease falls predominantly within the Arawata Ecological District, with parts of it also in the Dart, Wanaka, and Richardson Ecological Districts (spanning the Aspiring and Lakes Ecological Regions). It contains excellent representation of the plants and plant communities of the primary Arawata Ecological District, particularly in the subalpine, low-alpine and high alpine bioclimatic zones. At least 416 native vascular species (see Appendix 4) are present, representing approximately 80 % of the plant diversity recorded for the much larger and ecologically diverse Mt Aspiring National Park (Mark 1977). It has a similar size flora to that of the nearby and more eastern Mt

Alta/Buchanan Peaks (Druce *et al.* 1993).). It is part of one of several mainly mountain regions just east of the main divide in western Canterbury, Otago and Southland which are unusually species rich (Rogers and Overton 2001).

Of the native vascular plant species present, at least six 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 Lease is provided below in Table 6 and are mapped in Appendix 5.

Of highest significance is the occurrence of the tree daisy *Olearia hectorii* which has a threat ranking of 'Nationally Vulnerable'. Taxa in this category are facing a very high risk of extinction in the wild. Nationally the species is subject to increasing modification of its remnant forest habitat by pastoral practices, recent extinction of some populations and lack of natural regeneration opportunities in many habitats (Rogers 1996). The Matukituki Valley is a stronghold for the species in Otago but almost all sites are unprotected and in decline (Thorne 2000). This decline is brought about by the non-replacement of adult trees; their demise is exacerbated by limb breakage caused by cattle.

Approximately 800 adult *Olearia hectorii* are known from the Matukituki Valley of which c. 450 are present on Mt Aspiring Pastoral Lease. One population near the confluence of the East and West Branches of the Matukituki River has an estimated 300 trees. This site and another near the Otago Boys High School Bridge have already received some protection through the goodwill and co-operation of the lessee. Natural regeneration opportunities are present through ongoing rock fall, flooding, and other disturbance events and tools for enhancing regeneration through the use of herbicides to kill competing grasses, are being developed. This tree is the subject of a draft national recovery plan (Rance in prep.) which promotes the formal protection of its habitat.

Species listed in the category 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.

Table 6: Threatened plant species found on Mount Aspiring Pastoral Lease

Threat Division	Threat Category	Species	Location on lease
Acutely Threatened	Nationally Vulnerable	*Olearia hectorii*	Toe slopes and valley floor of Matukituki Valley
Chronically Threatened	Gradual Decline	*Pachycladon cheesemanii*	Rock bluffs along true left of West Matukituki
At Risk	Sparse	*Anemone tenuicaulis*	Tussockland in upper Minaret Burn; East Br. Mill Creek
		Epilobium purpuratum	Gravely terrace in Minaret Burn; scree slopes above Shotover Saddle; Albert Burn Saddle; Glenfinnan Peak; East Br. Mill Creek
		Ranunculus maculatus	Wetlands in Mill Creek
	Range Restricted	*Brachyscome humilis*	Shotover Saddle; Fog Peak
	Data Deficient	*Lachnagrostis uda*	Mill Creek wetlands

Several other species, although not ranked as nationally threatened, are notable in a regional and local context and include *Myosotis pygmaea* var. *drucei, M. pulvinaris, Kunzea ericoides, Crassula sinclairii*, and *Elatine gratioloides*.

Subalpine, low alpine and high alpine communities (shrublands, snow tussockland, cushionfield, fellfield, snowbank and rock outcrops) are extensive and well represented on the property and show little evidence of recent disturbance from pastoral activities. In these respects they have much in common with similar communities in the adjoining national park.

The impact of past fires, herbicide use, and subsequent grazing is greatly evident in the montane zone. Natural vegetation patterns have been much altered and pasture grasses now occupy slopes and flats that previously supported forest, and in more recent times tussock grasslands and regenerating shrublands. Areas of indigenous vegetation, particularly woody remnants remaining in this zone, are significant for their representativeness.

The alpine wetlands are significant based on their extent and condition. Numerous mostly small seepages and bogs occur within an essentially unmodified alpine setting. As areas of high species richness, they make a disproportionately high contribution to the biodiversity of the property. Wetlands nationally have undergone a 90% reduction and remaining examples are a priority for protection. Two threatened species in Table 6 and two regionally uncommon species (*Crassula sinclairii* and *Elatine gratioloides)* are restricted to wetland habitats.

The occurrence of small ephemeral wetlands and their associated flora in Mill Creek is highly significant. This distinctive class of wetland is found in closed depressions lacking a surface outlet, in climates where seasonal variation in rainfall and evaporation leads to ponding in winter and spring, and with fluctuation so pronounced that it can lead to complete drying in summer months or in dry years. In commenting on the conservation

significance of ephemeral wetlands and their turfs, Johnson and Rogers (2003) note that "despite their scattered occurrence and small total area in new Zealand, ephemeral wetlands are diverse in their plant communities, extremely rich in their flora, and clearly important as the sole or principal habitat for a high proportion of threatened plant taxa". New Zealand wetland turf plants and their communities may be of high significance in a global context for they appear to have no analogues in the Northern Hemisphere, where ephemeral wetlands are typically vegetated with plants of much taller stature.

Ephemeral wetlands are vulnerable to a number of impacts including hydrological alteration, alteration to soil aeration, sedimentation, mechanical disturbance, nutrient enrichment, pollutants, trampling impacts of mammals, and weeds (Johnson and Rogers 2003). The latter two in particular are of relevance to management at these Mt Aspiring sites. While native avifauna, including now-extinct birds would have congregated on turf vegetation adjacent to water bodies, their physical impacts would have been much less than those of introduced livestock. Large-hoofed animals, especially sharp-hoofed cattle have undesirable soil disturbance impacts. A flow-on effect of this disturbance is that it provides microsites suitable for germination and establishment of weeds.

2.5.1 Problem Plants

At least 89 exotic species of plants are present on the Lease, but relatively few are of conservation concern. Many are plants of agricultural importance or are common pastoral weeds. Of greatest threat to significant inherent values is the spread upslope of several shrubs originally planted in the vicinity of the Old Homestead. These include Buddleia (*Buddleja davidii*), Khasia berry (*Cotoneaster simonsii*), barberry (*Berberis wilsonae), C. microphyllus*, elder (*Sambucus nigra*) and gooseberry (*Ribes uva-crispa*). Barberry, in particular, is of note, as it was originally recorded only from two naturalised sites in the South Island (Webb *et al.* 1988), but has, in more recent times been found elsewhere on the Otago Peninsula and Mount Iron near Wanaka (P. Johnson *pers. comm.*). Most of these plants are dispersed by birds, and pose a threat to the nearby Mount Aspiring National Park and conservation areas. The Department aerial sprayed the Homestead Faces in Summer 2005 to control these weeds. Other plants with potential for spread lie in abeyance within the homestead gardens.

Buddleia (*Buddleja davidii*) is also recorded from near the confluence of the two branches of the Matukituki River. Elsewhere it is regarded as a serious pest of riverbeds, disrupting normal flow regimes and affecting recreational user access. Its early eradication would be highly desirable.

The Department has, over the last two years, undertaken control of wilding conifers located midslope on Glenfinnan Faces. *Pinus contorta, P. radiata*, larch and Douglas fir trees have been removed. However, young seedlings remain, and pose an on-going threat to surrounding tussocklands, both on and off the Lease.

Oval sedge (*Carex ovalis*) is present at some higher altitude wetlands but is absent from others. Its spread may be assisted by stock. Preventing its spread into wetlands currently free of it would help maintain the biodiversity values of those wetlands.

Three hawkweeds (*Hieracium pilosella, H. lepidulum* and *H. praealtum*) are present in tussockland, talus slopes and shrublands. Maintenance and/or restoration of a dense tall

tussock cover may reduce the impact of mouse-ear hawkweed. *Hieracium praealtum* is locally common where cattle have caused dieback of taller vegetation, and damaged wetland areas. Tussock hawkweed (*H. lepidulum)* is capable of establishing under fairly dense tussock canopies and under beech forest. The extent of its invasion is likely to depend more on environmental factors than on current grazing levels, and is likely to be a component of these communities in the long term, irrespective of grazing management. However, in the long term, grasslands will have a better chance of resisting invasion by tussock hawkweed and other weeds, if the tussocks are tall and dense, with deep litter layers (Dr. A. Rose *pers. comm*.).

Tussock hawkweed also presents particular risks to rare species on rock bluff sites (Wardle 1999) which may necessitate site-specific control measures.

In the context of *Olearia hectorii* conservation, pasture grasses and pasture weeds are preventing seedling recruitment. Localised control of these grasses and weeds, such as that being trialled experimentally, is likely to be essential to maintain populations of *Olearia.*

Amenity plantings around the homestead include other trees and shrubs which are likely to spread onto surrounding areas of indigenous vegetation.

2.6 FAUNA

2.6.1 Invertebrates

Introduction

Previous invertebrate surveys on the Lease and within the Matukituki Valley, have recorded nine threatened moth species on the property (Patrick, *pers. comm*.). *Asaphodes stinaria* (ranked Nationally Endangered) is associated with 'hairy' *Ranunculus* species, which grows within the beech forest margin. A comprehensive survey of Lepidoptera moths which host on small leaved *Olearia* species, conducted by Brian Patrick (see Patrick 2000), identified the larva and/or adults of 9 threatened moths: *Stathmodpoda campylocha* (ranked Nationally Critical), *S. albimaculata* as well as the following acutely threatened moths *Declans* 'grey toreuta'', *Maoritenes* n. sp., *Pasiphila* n. sp., *Protosynaema n.sp.* (all ranked Nationally Endangered)*, Graphania tetrachroa,* and the noctuid moths *Meterana grandiose* and *M. exquisita* (both ranked Gradual Decline).

The purpose of the current survey was to determine the conservation value of invertebrates occupying the Lease and significance of habitats that support a range of invertebrate diversity. Invertebrates were collected from a number of sites on the Lease and ecological information was recorded to identify areas important for sustaining a range of invertebrate values. This report provides an inventory of specimens collected, an outline of the conservation value of species collected based on current knowledge, and an assessment of the significance of the habitats on the Lease.

Methods

A map and details of invertebrate collection sites are provided in Appendix 6. Invertebrates were collected by hand searching beneath rocks and logs, sweeping and beating vegetation, using pitfall traps, a Malaise trap and by searching leaf-litter. Specimens collected included the following invertebrate Orders (three particular groups were targeted); beetles (particularly Carabidae, Tenebrionidae and Curculionidae), spiders, and moths. These groups were chosen because they often display local endemism, can be useful ecological indicators, and are able to be identified by specialist taxonomists (see acknowledgements). Limited information exists regarding the taxonomy and conservation status of the remaining invertebrate Orders.

Invertebrate Fauna Description

A total of 133 species of invertebrates were identified from the survey (see Appendix 7). Overall, the invertebrate diversity was indicative of intact vegetation and habitats. Invertebrates collected included: 3 weta species, 3 grasshopper species, 68 moth species, 17 beetle species and 3 cicada species and approximately 9 spider species. Also collected were a range of Diptera (flies), Psocoptera (booklice), Platyhelminths (flatworms), Hymenoptera (wasps and bees), Odonata (dragonflys), Blattodea (cockroaches), Diplopoda (millipedes), Isopoda (slaters) and aquatic insects including mayflys, and caddisflys.

The invertebrate composition for the following twelve collection sites is described:

A. Matukituki Valley West Branch
- Brides Veil Flats and Rob Roy Stream Flats (True Right of Matukituki River)
- West Branch Flat and Raspberry Flat
- Shotover Saddle
- Glenfinnan Face
- Fog Peak

B. Mill Creek Block
- Albert Burn Saddle
- Minaret Burn Headwaters
- Cattle Face – South End
- Mt Eostre
- Lower Mill Creek

C. Old Homestead Block & Cameron Flat
- Beech forest at Homestead Creek
- *Olearia hectorii* sites (Exclosure at Otago Boys High School Bridge, Old Homestead Block & Cameron Flat)

A: Matukituki West Branch

Brides Veil Flat and Rob Roy Stream Flats (True Left of Matukituki River)

The area primarily consisted of developed pasture and secondary mountain beech forest edges with evidence of cattle grazing/disturbance. Invertebrate species present included mountain dragonfly *Uropetala chiltoni* (Odonata: Petaluridae), tussock ringlet butterfly *Argyrophenga spp.* (Lepidoptera: Nymphalidae), common blue butterfly *Zizina spp.* (Lepidoptera: Lycaenidae), magpie moth *Nyctemera amica* (Lepidoptera: Arctiidae), southern tussock grasshopper *Sigaus australis* (Orthoptera: Acrididae) and native bee *Leioproctus* spp. (Hymenoptera: Colletidae). This site provided important valley-floor habitat for invertebrates. Also commonly recorded at this site was the native hoverfly *Melangyna novaezelandia* (Diptera: Syrphidae).

The beech forest margin contained the host plant 'hairy *Ranunculus*' (Ranunculaceae) for the rare moth *Asaphodes stinaria.* Also encountered were *Gingidia montana* plants which host moths of conservation value *(Gingidiobora* spp.*)* on the margin of the Rob Roy Stream. However, neither *Asaphodes stinaria* nor *Gingidiobora* spp. moths were collected during this survey.

West Branch Flat and Raspberry Flat (True Right of Matukituki River)

There was slightly less pasture development in this area, with some remnant shrublands on recently disturbed soils and small groups of beech trees remaining on the hillsides. Clearance of forest for grazing has resulted in modification of flora and fauna on the hill slopes occupying this area. As with the true left side of this valley, the flats provide important valley-floor habitat for invertebrates.

Invertebrate fauna recorded was typical of such landscapes with open grassland moths (Crambidae), common blue butterflies, native cicadas and grasshoppers. Commonly recorded at this site was the native hoverfly *Melangyna novaezelandia* (Diptera: Syrphidae). The presence of flatworms, millipedes and beetle larvae beneath rocks is typical of this habitat type. Also present was the introduced pest, the black vine weevil *Otiorhynchus sulcatus* (Fabricius) (Coleoptera: Curculionidae).

Shotover Saddle

The Shotover Saddle area is an excellent example of high alpine habitat that appears undisturbed. There are a number of alpine tarns which are important habitat for aquatic insects. The vegetation in this area consisted of low mat forming plants which are dependant on invertebrates to complete life sustaining processes, such as pollination and the recycling of nutrients. The moth fauna was particularly diverse, and the undescribed alpine spider (Araneae: Salticidae) was also collected at this site. The large weta *Deinacrida connectens* (Orthoptera: Stenopelmatidae) (see Section 4.1.3 for photo) was collected from scree slopes. The moth *Notoreas mechanitis* (Lepidoptera: Geometridae) which is restricted in its distribution and *Orocrambus clarkei eximia* (Lepidoptera: Crambidae), a rarely collected alpine species, were also at this site. The velvet worm *Ooperipatellus viridimaculatus* was collected from beneath rock slabs.

Glenfinnan Face

This site consisted of unmodified native alpine grasslands which provided habitat for tussock ringlet butterfly *Argyrophenga spp.* (Lepidoptera: Nymphalidae), orange grassland looper moth *Aponotoreas insignis* (Lepidoptera:Geometridae), and grass moths which included *Orocrambus philpott* and *O. aethonellus* (Lepidoptera: Crambidae). The southern tussock grasshopper *Sigaus australis* (Orthoptera: Acrididae) and soldier fly (Stratiomyidae) were also collected.

Fog Peak

This unmodified alpine area provided habitat for a range of invertebrates including the moths *Aptonotoreas orphnaea* (Lepidoptera: Geometridae) and *Gelophaula trisulca* (Lepidoptera: Tortricidae).

B: Mill Creek Block

Albert Burn Saddle

This is primarily a scree habitat which is likely to have been important for the weta *Deinacrida connectens* (Orthoptera: Stenopelmatidae).

Minaret Burn Headwaters

The vegetation in this valley is in pristine condition. There was no evidence of grazing or damage by stock. Invertebrate fauna was diverse and included: large ground weta *Hemiandrus focalis* (Orthoptera: Stenopelmatidae), the ground beetle *Megadromus sandageri* Broun (Coleoptera: Carabidae), and the large weevil *Lyperobius* n. sp. (Coleoptera: Curculionidae).

Cattle Face – South End

The vegetation comprises excellent shrublands interspersed with areas of tussock which have been grazed. Cattle damage was noted in several of the seep areas (see Section 4.1.3 for photo). Invertebrate fauna was diverse and included: weevils *Lyperobius* n. sp., *Gromilus* sp.(Coleoptera: Curculionidae), click beetle *Prisahypnus frontalis* (Sharp) (Coleoptera: Elateridae), *Dasytes* sp. (Coleoptera: Melyridae) and predatory fly - possibly bat wing fly (Diptera: Muscidae). Moths included: Butlers ringlet butterfly *Erebiola butleri* (Lepidoptera: Satyridae) which is only found in pristine alpine grasslands of the South Island and the looper moth *Asaphodes cataphracta* (Lepidoptera: Geometridae) which is only locally found on mountain buttercups (Ranunculaceae).

Mt Eostre

The high alpine moths *Notoreas blax and Notoreas mechanitus* (Lepidoptera: Geometridae) which have a restricted distribution (west Otago) were present at this site. The southland

grasshopper *Alpinacris tumidicauda* (Orthoptera: Acrididae) was also collected and this has extended its northern distribution.

Lower Mill Creek

Habitats include native grasslands that are not significantly modified by cattle grazing. The tussock ringlet butterfly *Argyrophenga spp.* (Lepidoptera: Nymphalidae), common blue butterfly *Zizina spp.* (Lepidoptera: Lycaenidae), magpie moth *Nyctemera amica* (Lepidoptera: Arctiidae) were observed at this site. Also present were: exotic Coccinellidae species, brown soldier bug *Cermatulus nasalis* (Hemiptera: Pentatomidae) and soldier fly (Stratiomyidae).

C: Old Homestead Block & Cameron Flat

Beech forest at Homestead Creek

The beech forest forms important riparian vegetation beside Homestead Creek. This will benefit the aquatic invertebrates occupying the stream, and the general water quality including water temperature and turbidity. The following moths of conservation value were collected by light trapping at night under the beech forest canopy: the owlet moth *Physetica caerulea* (Lepidoptera: Noctuidae), *Orocrambus haplotomus,* and *Orocrambus callirrhous* (Lepidoptera: Crambidae). Moths *Asaphodes adonis, Paradetis porphyritis* (Lepidoptera: Geometridae), *Glaucocharis interrupt* and *Scoparia acharis* (Coleoptera: Crambidae) were also collected and these are only found locally.

***Olearia hectorii* Sites**

Moths representing the Crambidae and Nepticulidae families were collected from the trees on the Lease as well as the lichen darkling beetle *Artystona wakefieldi* Bates (Coleoptera: Tenebrionidae). A number of fly and spider species were also occupying the habitat provided by these trees. Invertebrates are likely to play an important role in the pollination of *Olearia hectorii.*

The moth fauna of *Olearia* has been well studied and *Olearia hectorii* is known to support at least 23 species, with 12 species thought to be specific to this tree species (Patrick, 2000). The following moth species have previously been collected on the property (Patrick *pers.comm.*), but were not recorded during this survey: *Stathmopoda campylocha* Meyrick, 1889 and *Stathmopoda albimaculata* Philpott, 1931 are known to be hosted by *Olearia* and *S. campylocha* has recently been collected in the Matukituki Valley. These moths are listed as being 'nationally critical' and 'nationally endangered' respectively. Other acutely threatened moths hosted by small leaved *Olearia* spp: *Declana* 'grey toreuta', *Maoritenes* n.sp., *Pasiphila* n.sp. and *Protosynaema* n.sp, *Graphania tetrachroa, Meterana grandiose, M. exquisita,* and *Pseudocoremia rudisata.* The most likely reason for not recording this suite of threatened moths during the tenure review inspection is time of year; most previous records have been in the Spring when new *Olearia* foliage emerges. In addition, some of the moth species only have one generation per year, making it less likely to record them. The tenure review inspection also had to cover a large area, so sampling intensity could be an issue.

Significance of Invertebrate Values

A majority of the invertebrates collected during this inspection were native with few introduced species. The huge diversity and abundance of invertebrates occupying this pastoral lease are indicative of intact natural landscape.

Twelve threatened invertebrate species have been recorded on the Lease (Table 7), the ground beetle *Megadromus sandageri* Broun (Coleoptera: Carabidae) [ranked Range Restricted], being the only one recorded in the current survey. Species listed as 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.

Table 7: Threatened invertebrate Species known from the Lease

Threat Division	**Threat Category**	**Species**	**Comments* denotes species was found during a previous survey**
Acutely Threatened	Nationally Critical	*Stathmodpoda campylocha* moth	***** Hosts on *Olearia hectorii* on toe slopes in West Branch. Only known locality.
	Nationally Endangered	*Declana "grey toreuta"* moth	***** All three host on *Olearia spp.* Located on toe slopes of Matukituki River West Branch.
		Maoritenes n. sp. moth	
		Protosynaema n. sp. moth	
		Stathmopoda albimaculata moth	***** Hosts on *Olearia hectorii* on toe slopes in Matukituki River West Branch.
		Asaphodes stinaria moth	***** Associated with "hairy" Ranunculus sp. at forest margins on the property.
		Graphania tetrachroa moth	***** Hosts on *Olearia spp.* Located on toe slopes of Matukituki River West Branch.
		Pasiphila n. sp. moth	***** Hosts on *Olearia spp.* Located on toe slopes of Matukituki River West Branch.
Chronically Threatened	Gradual Decline	*Meterana grandiosa* noctuid moth	***** Hosts on *Olearia spp.* Located on toe slopes of Matukituki River West Branch.
		Meterana exquisita noctuid moth	***** Hosts on *Olearia spp.* Located on toe slopes of Matukituki River West Branch.
	Range Restricted	*Megadromus sandageri* ground beetle	Minaret headwaters

Several other species, although not ranked as nationally threatened, are notable in a regional and local context. These are described in Table 8 below.

Potential Habitat

While native aniseed (*Gingidia montana)* is present on the Lease, the chronically threatened moth *Gingidiobora subobscurata* (Lepidoptera: Geometridae), which hosts on it and is thought to be restricted to higher-rainfall upland and montane sites, was not recorded during the survey.

Table 8: Notable invertebrate fauna species recorded on the Lease

Invertebrate Species	Location	Comments
Alpinis tumidicauda Southland grasshopper	Mt Eostre	At its northern distributional limit
Asaphodes cataphraeta looper moth	Matukituki River East Branch -north end of Cattle Faces	Only found in alpine grassland of western Otago.
Deinacrida connectens Large alpine weta	Shotover Saddle	A large iconic species, restricted to alpine habitats.
Erebiola butleri Butlers ringlet butterfly	Pristine alpine grassland of Matukituki River East Branch –south end of Cattle Faces	One of few New Zealand butterfly species, and is indicative of natural alpine grasslands.
Lyperobius n. sp. weevil	Minaret Burn headwaters; Matukituki River East Branch –south end of Cattle Faces	Only a few specimens of this new undescribed species have been collected, and other members of the genus are threatened with extinction (Hitchmough, 2002; McGuinness, 2001).
Notoreas blax moth	Mt Eostre	Restricted to high alpine zone of western Otago. Hosted by dwarf shrubs of *Kelleria* spp.
Notareas mechanitis moth	Shotover Saddle, Mt Eostre	Restricted to alpine zone of western Otago. Hosted by dwarf shrubs of *Kelleria* spp.
Ocrambus clarkei eximia moth	Shotover Saddle	Restricted to high alpine zone of western Otago; rarely collected.
Ooperipatellus viridimaculatus Ancient velvet worm	Shotover Saddle	Restricted to alpine environments and is threatened due to trade by international collectors.
Pharmacus spp. cave weta	Shotover Saddle	This is the first record of the cave weta genus *Pharmacus* collected in this area. As a consequence it is undescribed, and the conservation status is unknown. Of scientific interest as few other spp. in the genus i.e. one from Mt Cook (*P. montanus*) and another from Haast (*P. brewsterensis*).
Salticidae n. sp. Undescribed alpine spider (Araneae: Salticidae) (Forster and Forster, 1999)	Shotover Saddle	Part of a group of high alpine jumping spiders which appear to be specific to west Otago mountains.
Spider (Araneae: Theridiidae?)	Cameron Flat bluffs	Collected from plant *Gingidia montana.* Possibly a new species, therefore is of scientific interest.

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

Previous lizard surveys in the general vicinity of Mt Aspiring National Park have yielded mixed results and, in general, the lizard fauna is not considered diverse or abundant. The cryptic skink, *Oligosoma inconspicuum* is known from the Rees Valley, but its' distribution is apparently patchy (Whitaker *et al.* 2002, T. Jewell *pers. comm.* 2005). This species is currently ranked "Gradual Decline" along with *Hoplodactylus* aff. *maculatus* "Otago/Southland large", which is known from beech forest around Paradise, and the Jewelled gecko, *Naultinus gemmeus* which occurs on river flats in the Hunter Valley. *Hoplodactylus* aff. *granulatus* "Moke Valley" is also known from the Rees Valley; this species is currently ranked "Data Deficient". McCanns skink, *O. maccanni* is the fifth species known from the area; a single record is stored in HERPETOFAUNA database from the Albertburn Stream.

Methods

Over the inspection period, the weather was excellent and definitely suitable for locating the lizard species likely to occur there. An exception was *Hoplodactylus* aff. *granulatus* "Moke Valley". Night searches are considered necessary to locate this species and no such searches were carried out, mainly due to the difficulty in accessing high altitude sites by night. However, searches for this alpine specialist gecko were made by day in the vicinity of the Shotover Saddle.

Searches were made for both basking lizards and active lizards over the Lease. Searches were also made for sloughs, skeletal remains and for the distinctively large droppings (> 2cm) produced by large-bodied skinks and geckos. Searches included retreat sites for inactive geckos and skinks; rocks were turned and crevices were searched. Shrublands were searched in the early morning (where possible) for Jewelled geckos or their sloughs.

Species

No lizard species or their sign were found on the Lease despite perfect weather conditions. Lizard richness and abundance is believed to be naturally low on the Lease, and is not an induced state.

Some potential habitat for *Naultinus gemmeus* (Gradual Decline) and *Hoplodactylus* aff. *granulatus* "Moke Valley" (Data Deficient) was located.

Habitat Description

Potential habitat for Jewelled geckos was located on the Homestead Peak faces, and in particular vegetation growing on the steep rocky bluffs behind the shrublands on the flats.

Potential habitat for *Hoplodactylus* aff. *granulatus* "Moke Valley" was located on the Shotover Saddle and within 100m from the Saddle on all sides. This area had rock screes and tumbles with associated bluffs which are favoured habitat of high altitude geckos (T. Jewell *pers. comm.* 2005). This potential habitat provides deep, dry retreats for geckos (retreats not overly disturbed by snow melt and freeze/thaw action).

Threats

Although mechanisms are not clearly understood and are no doubt species-specific, loss of indigenous vegetation negatively impacts on lizard communities (Whitaker 1996). Fire, in particular, is known to seriously deplete lizard populations (Patterson 1984).

As is common on mainland New Zealand, it is likely that any lizard populations on the Lease are subject to predation by the full suite of introduced mammalian predators including cats, ferrets, stoats, weasels, rats, and hedgehogs. In addition, habitat disturbance through rock heaving during pig rooting, sheep and cattle fouling and trampling and herbivory of rock tor vegetation are great threats to any lizards on this Lease.

Significance of Herpetofauna

No lizards were found on the Lease. However, some suitable habitat of threatened lizard species was found.

Habitat for the "Jewelled" gecko (Gradual Decline) is well understood (Duggan & Cree 1992, Shaw 1994). Suitable habitat was located on the Homestead Peak. This area is naturally protected from livestock browsing as it occurs on steep, vertical bluffs. This species has been ranked in "moderate" need of conservation attention within Otago (Whitaker *et al.* 2002).

2.6.3 Avifauna

Birds seen or heard during the tenure review inspection of the Lease are listed in Table 9.

Table 9: Native birds recorded during survey of the Lease

Common Name	Scientific Name	Location
Australasian harrier	*Circus approximans*	Seen in Matukituki River West Branch, but likely present elsewhere.
Bellbird	*Anthornis melanura*	Forest margins e.g. along true right of Matukituki River West Branch below Rob Roy.
Falcon	*Falco novaeseelandiae*	Present throughout the property. Seen on true right of Matukituki River West Branch below Rob Roy; and at Cameron Flat.
Greywarbler	*Gerygone igata*	Forest margins e.g. along true right of Matukituki River West Branch below Rob Roy.
Kea	*Nestor notabilis*	Alpine areas of property including Mill Creek, Fog Peak.
Kereru	*Hemiphaga novaeseelandiae*	Matukituki River East Branch flats.
Paradise shelduck	*Tadorna variegata*	Matukituki River West and East Branches, valley flats.
Rock wren	*Xenicus gilviventris*	Shotover Saddle and Mt Eostre.
Rifleman	*Acanthisitta chloris*	Forest margins e.g. true right of Matukituki River West Branch below Rob Roy.
Silvereye	*Zosterops lateralis*	Cameron Flat shrublands
South Island robin	*Petroica australis*	Observed in beech forest on true left of Matukituki River West Branch.

Significance of Avifauna

Kea, falcon and rock wren are listed as being under threat (Table 10; Hitchmough 2002). Taxa listed as Nationally Endangered and Nationally Vulnerable are acutely threatened, and face a very high risk of extinction in the wild. Species listed in the category 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.

Table 10: Threatened bird species

Threat Division	Threat Category as described in Hitchmough (2002)	Avifauna Species	Comments
Acutely Threatened	Nationally Endangered	Kea	Alpine areas provide important habitat.
	Nationally Vulnerable	Rock Wren	Shotover Saddle, Mt Eostre
Chronically Threatened	Gradual Decline	New Zealand Falcon	Sighted on true right of Matukituki River West Branch below Rob Roy and at Cameron Flat, but will be present throughout the property.

2.6.4 Aquatic Fauna

Introduction

Twenty six freshwater fish records for the Lease were found on the New Zealand Freshwater Fish Database (NZFFD). Koaro (*Galaxias brevipinnis*) have been recorded in the Matukituki River West Branch and East Branch, and their tributaries (Table 11). Brown trout (*Salmo trutta*) have been recorded in the Matukituki River West Branch and several of its tributaries (i.e. Big Creek, Raspberry Creek, Niger Stream, Red Rock Stream and an unnamed creek at the northern property boundary. Within the East Branch, brown trout have been recorded in the Glacier Burn and an unnamed tributary of the Homestead Faces.

Table 11: Fish records in streams on the Lease (from New Zealand Freshwater Fish Database)

Species	Creek Name	Map	Grid Reference
Koaro (*Galaxias brevipinnis)*	Matukituki River West Branch (near Big Creek)	F39	716245
	Matukituki River W Branch tributary (nr Cascade hut)	E39	654268
	Brides Veil Stream	E39	672248
	Niger Stream	F39	794262
	Homestead Creek	F39	760296
	Unnamed tributary of Matukituki River East Branch (Homestead faces)	F39	758287
	Glacier Burn tributary	F39	763313
Brown trout (*Salmo trutta*)	Matukituki River West Branch tributary at northern property boundary	E39	653268
	Matukituki River West Branch tributary nr Cascade hut	E39	654268
		E39	657262
	Red Rock Stream	E39	661255
	Big Creek	F39	716244
	Raspberry Creek	F39	719244
	Matukituki River West Branch	F39	716245
	Niger Stream	F39	794267 794262
	Glacier Burn	F39	767314 763315
	Matukituki River East Branch tributary (Homestead faces)	F39	758287
Rainbow Trout (*Oncorhynchus mykiss)*	Matukituki River West Branch	F39	716245
	Big Creek	F39	716244
	Raspberry Creek	F39	719244
	Red Rock Stream	E39	662257
Galaxias sp.	Big Creek	F39	716244
	Wishbone Creek	F39	738249

Rainbow trout (*Oncorhynchus mykiss*) are less common, having only been recorded in the Matukituki River West Branch, Big Creek, Raspberry Creek and Rock Stream.

An unidentified galaxiid has been recorded in Big Creek and Wishbone Creek, both tributaries of the Matukituki River West Branch.

No records were available for the Mill Creek Block.

Methods

Much of the property has been comprehensively sampled for fish in the past. This survey therefore focused on alpine streams located within the Mill Block, which had not previously been surveyed. Mill Block includes the east and west branches of Mill Creek, the headwaters of Minaret Burn and Albert Burn, and tributaries of Matukituki River East Branch. Each site was sampled using a backpack electric fishing machine using defined criteria (Allibone 1999). The use of a helicopter to gain access to most of the sample sites restricted the placement and number of sites due to landing practicalities. However, the block was effectively covered.

A total of 6 sites were surveyed, all of which were above 1000 m asl. The sites selected contained both riffle/run and pool habitat. All sites were sampled at a minimum of 50 m in length or 100 m^2. Stream width, depth, substrate and riparian composition were visually estimated according to the Freshwater Fish Database Form format. Site locations were recorded using a Global Positioning System (GPS). A map of site locations is provided in Appendix 8.

In-stream invertebrates found during electric fishing surveys were noted.

Aquatic Fauna Description

No fish were recorded at any of the Mill Creek Block sites.

Overall the water quality was very good throughout the Lease. The streams sampled appeared to get numerous heavy flows from snow melt and flooding, frequently resulting in a volatile streambed. Abundance of aquatic invertebrate was low to moderate, with mayflies and caddis being the dominant species group.

Significance of Aquatic Fauna

No rare indigenous aquatic fauna were identified.

Koaro is not of conservation concern. It is found throughout New Zealand occupying clear, swift flowing, cobble-boulder streams. Koaro is migratory and will include Lake Wanaka as part of its early life cycle before returning to streams approximately 5 months later.

Sports Fish Species
The Matukituki River is known as a significant recreational fishery for brown trout (*Salmo trutta)* and rainbow trout (*Oncorhynchus mykiss*) (National Angler Survey, NIWA).

2.6.5 Problem Animals

Thar have been present in very low numbers within the upper Minaret Burn, while low numbers of chamois are present within the Upper Minaret Burn and Mill Creek. Chamois and goats are present in reasonable numbers in the mountains of the Matukituki River West Branch. The Mill Creek block is within the Southern Exclusion Zone for thar, as identified in the National Thar Control Plan (Department of Conservation, 1993). The Department of Conservation is working to eliminate thar to prevent their invasion into Mount Aspiring National Park. Goats found in the Matukituki West Branch mountains are within the Mount Aspiring National Park goat control area. Red deer are present at low levels along the Cattle Faces and within Mill Creek catchment, and reasonable numbers also occur in the mountains of Matukituki West Branch.

Hare, possum, rat, mice, hedgehog, ferret, stout, weasel, rabbit, and feral cat will also be present. Cats, ferrets, stouts, weasels, rats and hedgehog are likely to have an impact on bird and invertebrate fauna on the property. Possum, chamois, deer, goats, hares and rabbits will impact locally on biodiversity values.

2.7 HISTORIC

2.7.1 Maori Cultural Values

There are no recorded Maori sites on the Lease, although there are sites of both moa hunter and later periods known from the mouth of the Matukituki Valley, as well as the named site of Nehenehe (Anderson 1982). The lower forest margins were likely to have been good hunting grounds for moa and other birds.

2.7.2 European Heritage Values

History of pastoralism

In the 1860s to 1870s, pastoralism in the area was centred on the very large run of Wanaka Station owned by Henry Campbell. At its periphery, there were about eight smaller runs, including the Glenfinnan Run at the head of the Matukituki Valley, leased by Ewen Cameron.

In 1958, Mt Aspiring Station comprised Runs 458, 465 and 468 (Appendix 9). After the surrender of most of Run 468 to the Mount Aspiring National Park, the run numbers changed to 456, 715 and 773.

Cameron took up Run 468 in 1877 (Angus 1981:30), and probably 458 as well where his homestead was located. He had 2200 sheep on the property in 1880 and 3000 by the following year. When Cameron tried to increase his flock to 4,400 in 1895, but heavy snow from May to September killed 2000 sheep. Cameron then abandoned the run and moved his remaining sheep to Mt Burke.

The Cameron homestead was at the mouth of Glenfinnan Creek, on the east side of the Niger Bluff. Early photographs show that the farmstead comprised a small house of mud brick, a stable building, yards, and slot and rail fences (Angus 1981: 17ff). There was no

woolshed because Cameron preferred to make the sheep walk the wool for 36 miles to the woolshed at Wanaka Station, close to the present Wanaka township. This is one of the longer treks described for this form of management.

Hugh McPherson had settled further up the valley in 1879, placing his farmstead on the Old Homestead site in the fork of the two main Branches of the Matukituki River. There is no clear record of which run he took up. He may have been there by grace and favour, earning most of his money by working on the roads. Hugh, and his brother Duncan, had worked as shepherds and as small businessmen around the goldfields. Hugh built the homestead with timber from the local mill, including the weather boards and shingles. They carried out mixed farming - sheep and cattle - and Mrs McPherson was able to sell butter, eggs, milk and baking to the local sawmillers. They would have been alone in the valley after the Cameron's left in 1896, and the sawmillers in 1899. Hugh McPherson was drowned in 1902 when returning home from Pembroke (now Wanaka). His widow stayed on the farm for a few years with the help of her husband's nephew, Duncan McPherson (Angus 1981:81).

In 1899, Duncan McPherson is thought to have taken up the runs which constitute the present Mt Aspiring Pastoral Lease (Runs 458, 468 and presumably 465). He settled with his wife on the short-lived sawmill site in the West Branch on the south side of McPherson Creek, although the Glenfinnan site was available after the Cameron's left in 1896. Duncan built a small house and byre, ran a few sheep and cattle, and established a garden and a small patch of oats on the McPherson Creek delta. The rabbits were too prevalent, however, for much more intensive farming (Aspinall 1993:34). After his aunt left the Old Homestead site in the East Branch in 1908, Duncan's family moved there.

At election time in 1919, Mrs McPherson was drowned on her way home from Wanaka, (Aspinall 1993:36). The McPherson family is very shadowy in the official records. A partial perusal of the records of sheep owners in the Appendices to the Journal of the House of Representatives (AJHR) during the 1880s and 1890s gives clear records for Ewen Cameron, a few for Hugh McPherson (e.g. 300 sheep in 1881 and 200 in 1882, but no mention in 1893 and 1894). There were none for Duncan when he should have been recorded in 1905, 1909, 1912 and 1919 (AJHR, mostly H-23a).

Jack Aspinall and Theo Russel took over the run in 1920, when it was possibly abandoned, though they are thought to have bought sheep from the McPherson's; sheep that were not recorded in the official returns. J Aspinall (sic) appears in the official records of sheep returns in 1923 for 1034 sheep, 1925 for 810 sheep, 1926 for 994 sheep and presumably thereafter (AJHR, C-23A).

The original house at the Old Homestead was burnt down from a chimney fire in 1921. A shed was spared, and Jack Aspinall used the remains of the old McPherson house in the West Branch to build temporary shelter. A new house was built from beech timber originating from the saw mill at Makarora, and steadily added to during the twentieth century. In the 1920s, shearing was done in the open and the woolshed of the middle years of the twentieth century must have been built later than the 1920s. The woolshed collapsed once during shearing and was so hastily rebuilt that, when the homestead was moved to below Niger Bluff, the building was hastily demolished before it fell down again (John Aspinall: *pers. comm.*).

When the new homestead was built on Glenfinnan Terrace in 1969, the whole management of the run was shifted to the new site with a new woolshed, covered yards, men's quarters, dog kennels, hen-house and sheds. Yards, hay barns and a deer shed are located at strategic sites on the flats. The Old Homestead across the river was taken over for outdoor education. The new homestead is not on the site of the Cameron farmstead which was too close to the mouth of Glenfinnan Stream for safety. In 1995, a large mud slide covered the probable site of the old house and stable seen in photographs against the Niger Bluff (John Aspinall *pers.comm.*).

A major feature of the present landscape are the extensive plantings of willows, poplars and other trees for erosion control, shelter and amenity established by Jerry Aspinall in the 1970s. They are a good example of a campaign by the Otago Catchment Board to encourage farmers to establish massive shelterbelts, sometimes on a cooperative system involving several properties. Mt Aspiring Station established its own willow nursery to produce poles and stakes of suitable species, so that Jerry Aspinall could meet his target of planting 1000 trees each year.

Sawmilling and tourism

Unlike so many runs in Otago, the Matukituki run holders did not have to contend with the activities of gold miners in the head of the valley (the official boundary of the Wakatipu Gold Field ran along the top of the range on the south side of the Matukituki River West Branch). There were at least three early sawmill sites, the longest lived being at Mill Creek or Corner Burn (Angus 1981:33). The early sawmills around the lakes, starting in 1859, were stimulated by the gold rushes, but also cut timber for the runholders. They made good use of the lake and the Clutha River to raft timber to Cromwell, though the sawmillers in the Matukituki Valley had to cart their timber down valley first. They managed to raft timber down the Matukituki River to a certain extent, especially in summer, since Hassing (1996:92) describes a boatswain, Marshall, being drowned off a raft in the Matukituki in the 1870s. Hassing (1996:63) provides a graphic account of how rafting down the Clutha was carried out. As the roads improved in the late 1870s, the millers preferred to send the timber by wagon. The first work at Mill Creek was probably done with crosscut saws above a sawpit. The sawmills paid small royalties to work areas of beech forest leased from the Crown. The forested blocks were not included in the pastoral leases. In 1877, A R Mackay surveyed 160 acres at Mill Creek for a sawmilling application by Thomas Russell and Joseph B Ewing (Aspinall 1993 :25). In 1878, there were 12 men employed at the Corner Burn mill, some, such as Russell and Ewing, with their wives and families. Old photographs show small houses, built almost entirely of wood, with picket fences, gardens and fruit trees, even though the settlement was on the shady side of the valley. One house appears to have a corrugated iron roof, but the chimneys are large wooden structures (Angus 1981:48). Bullock tracks were created through the bush to haul timber to the mill and water races created, apparently to wash away sawdust. The mill itself was driven by a stationary steam engine (Aspinall 1993:25). Any tracks or remnants of a water race to clear sawdust would all be in the forested block along the true left of the valley, an area which is now part of West Wanaka Conservation Area.

Floods, fires and transport costs created difficulties for sawmillers. Lands and Survey records show that Russell and Ewing gave up their license in 1891 (Aspinall 1993:27). They did try to re-establish their mill in the West Matukituki near the site of the present

Otago Boys High School Lodge. At the turn of the century, however, a fire went through the bush from Rob Roy to Homestead Creek; this was probably the final reason why Ewing, who had bought into the Makarora sawmills as well, shifted all his operations from the Matukituki to Makarora (Angus 1981:38). The sawmill sites are now marked by gooseberry bushes. A bullock driver, Colin McLaren, chose to stay on in the valley and lived in a hut down the valley from the mill site nearer to Round Hill until 1934 (Aspinall 1993:27).

Another apparently unlicensed mill was operated by the Templeton family on the north bank of the Glacier Burn beyond the Old Homestead up the East Matukituki Valley. Templeton bought it from a Mr Stevenson who may have started it about 1880, but this mill did not continue much after the early 1890s (Aspinall 1993:28). Given the effect of the climate on timber and the rapid rates of erosion, it is not surprising that no traces of the two small sawmills remain other than the occasional cut stump in the forest (John Aspinall: *pers. comm.*).

Tourism

Mount Aspiring was first climbed in 1910, with help from Duncan McPherson. The valley would have been too remote for most casual visitors, including climbers, until the road reached the Niger Hut. In the early 1940s the Brides track around the Niger Bluff was widened to give road access to the Cameron Flat. Huts were built for both farm use and for trampers. The original corrugated iron Niger Hut (located just off the Lease boundary) was built by the old Tourist Department (Aspinall 1993:59) and allowed to fall into disrepair. In 1932 the station built the present concrete hut on the terrace above the road, using the iron of the old hut as a lean-to at one end. Although important to the lessees of Mt Aspiring Station until their new homestead was built, this hut is just over the southern boundary of the station.

In 1932, the present Cascade Hut was built up the Matukituki River West Branch, and the New Zealand Alpine Club built the Aspiring Hut in 1946. Both were on the Lease when built, and involved much cooperation from Jack Aspinall. Raspberry Hut was also built by Jack Aspinall in 1932 as a base for musterers and rabbiters, and is the only one of these small historic dwellings now present on the Lease.

Field evidence

Pastoral farming

There are at least three reasons why there is little or no trace of historic features on the Lease- the weather, the vigorous level of erosion and the relatively low level of farming and other activities until after about 1950. Added to this was the general use of poor durability beech timber, so that buildings and yards which were not constantly repaired and painted soon rotted. The archival history of the runs has also been difficult to research, since none of the standard historic references include them. Field visits to the farmstead sites did not reveal any nineteenth century structures.

Of the three farmstead sites, only the East Matukituki site established by Hugh McPherson is still identifiable, since the Old Homestead buildings on it are still maintained. The house, rebuilt in the 1920s and added to, was demolished recently for an

outdoor education centre. The oldest known woolshed was post 1930 and also demolished, and none of the small outbuildings are known to be earlier than 1930 (John Aspinall *pers. comm.*). The remaining buildings, such as a generator shed, a farmhand's hut and several concrete foundations, indicate something of the nature of the layout of the farmstead. The curious position of this farmstead, established in 1879, on the far side of the Matukituki from road access cannot be clarified by reference to the run boundaries.

The sunniest and most sheltered site for a homestead with best access to the road is clearly on Glenfinnan Terrace, though in hindsight the particular site of the Cameron's house at the mouth of Glenfinnan Stream, was at risk from erosion. It took the Aspinall family 47 years to shift back to the logical site for the homestead relative to the whole run. They even had to bring back into the Mount Aspiring Lease a small section of the old run which had been transferred to the neighbouring Cattle Flat station in order to establish the new homestead on their own leasehold (Aspinall 1993).

No trace of the Cameron house or stable has been seen by the Aspinalls, even before the mud slide covered the area. No trace of the McPherson's farmstead in the West Branch has ever been seen, except for some cut stumps in the beech forest which may have been the work of the previous sawmill. The terrain is suited to grazing and small cultivation with a good wood and water supply, but it is even more remote from the road access to Wanaka than the Old Homestead site. It is possible that Hugh McPherson sited the Old Homestead so as to have grazing land clearly separated from the Camerons across the river, although cattle freely wade the river. Duncan McPherson though seems to have been deliberately seeking a degree of isolation. Neither McPherson family could be considered to be in the same social tradition as the runholders generally. They seem to have been more subsistence farmers or crofters in a distinctly unusual setting.

Significance of Historic Values

The upper Matukituki Valley, Mt Aspiring and the leaseholders of the Station have a special place in the social history of Otago. The peak and surrounding mountains have been a strong focus of climbing, tramping and outdoor recreation. Duncan McPherson provided important support for the first ascent of Mt Aspiring in 1910 and appears in photographs of the party. The Aspinall family has a reputation for three generations of unfailing assistance and kindly hospitality to climbers, visitors and staff of government departments.

The lack of heritage structures does not mean that there is no sense of heritage in this landscape. In particular, the nineteenth century community of sawmillers, subsistence farmers and at least one runholder in this remote valley was highly distinctive and interesting. Considering the rugged climate and terrain, their lives capture our imagination.

The cultural landscape (i.e. the locations of homesteads relative to roads, sawmills, run boundaries, forests and rivers) has significant intrinsic value. Its significance is added to by the proximity of the National Park, and by the large numbers of visitors who pass through the working area of the Lease on their way to the Raspberry Flat carpark at the road end.

2.8 PUBLIC RECREATION

2.8.1 Physical Characteristics

Mount Aspiring Pastoral Lease comprises the river flats of the upper Matukituki River West Branch and lower Matukituki River East Branch, the hillslopes below Mt Tyndall, Shotover Saddle, Craigroyston Peak, Sharks Tooth and Fog Peak, Glenfinnan Peak, and an isolated mountainous block encompassing Dragonfly Peak, Mt Eostre and Mill Creek catchment above the West Wanaka Conservation Area.

Visitor numbers to the general area are high, ranging from the short stop traveler to the remoteness seeker. There are important and exciting opportunities for public recreation on Mount Aspiring Pastoral Lease. This is due to the:

- Large and mountainous nature of the property.
- Its location as the Wanaka gateway to Mount Aspiring National Park, with huge numbers of visitors already coming to the area seeking an outdoor experience (e.g. Matukituki River West Branch walk).
- The stunning setting with a variety of terrain provides opportunities for a wide range of activities including scenic driving, camping, picnicking, fishing, mountain biking, day walking, tramping, hunting, ski touring, climbing, rock climbing, kayaking and rafting.
- Magnificent natural scenery, with outstanding views into Mount Aspiring National Park
- Presence of beautiful rivers – Matukituki River East and West Branches, waterfalls and glaciers in the immediate surrounds.

In 1992, DOC compiled a Recreation Opportunity Spectrum (Harper 1992) for the entire Conservancy whereby all areas regardless of land tenure, were classified and mapped according to setting, activity and recreational experience characteristics.

The upper slopes between Mt Tyndall and Red Rock, with its relatively high alpine basins, screes, bluffs and patches of permanent ice, are zoned "Remote Experience". This recreation opportunity is characterised by a sense of complete isolation from human interaction and activity. The naturalness of the setting is an important part of the experience. Outdoor survival skills and experience are essential.

The majority of the property, including the entire Mill Creek block, the Matukituki River West Branch hillslopes and peaks from Shotover Saddle to Glenfinnan Peak, and the upper valley flats (i.e. above approximately Brides Veil Stream), are zoned "Backcountry Walk-in". Although relatively close to visitor facility developments, access to these areas is only possible on foot and is often associated with tramping tracks or routes (Harper 1992).

The Matukituki valley river flats upstream of Cameron Flats are zoned "Backcountry 4x4 drive-in" which is "characterised by a feeling of relative remoteness from populated areas" (Harper 1992). The highly natural setting is a valued part of the experience and may be associated with motivations of "escape from town" and nature appreciation.

Downstream of Cameron Flats, the Matukituki river flats are zoned "Rural" which is "characterised by a feeling of being away from Urban areas, but in a strongly human-

modified setting" (Harper 1992). This class encompasses the more developed and accessible farmland where pleasure driving, horse trekking, walking and picnicking might take place.

In 1989, Federated Mountain Clubs compiled an outdoor recreation plan for Silver Peaks and Otago Alps (Mason 1989) which included the Matukituki catchment. The majority of the property , encompassing the slopes of Mt Tyndall, Shotover Saddle and Craigroyston Peak on the true right of Matukituki River, are zoned '*Open Space'*, while the Mill Creek-Dragonfly Peak area is zoned '*Natural (Experience) Environment'*.

2.8.2 Legal Access

Map 4.2.1 shows where Section 24 Conservation Act 1987 marginal strips and legal roads exist on the Lease.

a) Roads

The property is serviced by the formed gravel Wanaka Mount Aspiring Road, which slightly deviates from its legal alignment in places e.g. Cameron Flat. The road provides two wheel drive vehicle access from Wanaka, as far as the Raspberry Flat roadend carpark. The legal road alignment continues up-valley as far as the boundary with Mount Aspiring National Park near Aspiring Hut. This legal road was specifically put in to provide public access to the Mount Aspiring National Park when the park was created. A farm track which is used for foot and mountain bike access to the park, deviates from this legal alignment.

b) Marginal Strips

Fixed Section 58 Land Act strips, which are deemed to be marginal strips under Part IVA of the Conservation Act 1987, are present along the following rivers (Conservation Management Strategy Land Inventory Numbers in brackets):

- Matukituki River – East Branch (F39 060)
- Matukituki River – West Branch (F39 061)
- Glacier Burn (F39 094)
- Rob Roy Stream (E39 056).

None of these marginal strips necessarily follow the existing alignment of the riverbeds. Any parts of the river that now contact the Lease will attract movable strips as a result of tenure review.

The following waterways have marginal strips under the Conservation Act 1987, and are deemed movable under Section 24G:

- Niger Stream (F39 071)
- Glenfinnan Stream (F39 084),
- Sheepyard Creek (F39 085)
- Unnamed Creek- West Matukituki (F39 086)
- Raspberry Creek (F39 087)
- Big Creek (F39 088)
- Downs Creek (F39 089)
- MacPherson Creek (F39 090)

- Homestead Creek (F39 091)
- Unnamed Creek – East Matukituki (F39 092)
- Corner Burn or Mill Creek (F39 093)
- Brides Veil (E39 052)
- Red Rock Stream (E39 053) and
- Unnamed Streams – West Matukituki (E39 054, E39 055).

2.8.3 Activities

Significant recreational routes and areas are shown on Map 4.2.3.

The Matukituki Valley is an important gateway for visitors to Mount Aspiring National Park via Wanaka. The Aspinall family has been particularly good at providing public access across the property. The popularity of the National Park is likely to grow as international visitor numbers increase. The Lease provides an outstanding setting for a range of activities which include scenic driving, mountain biking, picnicking, day walking, tramping, climbing, rock climbing, ski touring, kayaking, rafting, fishing and hunting.

Visitor Carparking
The Wanaka Mount Aspiring Road road-end carpark at Raspberry Flat provides day shelter, toilet and interpretation facilities. This facility is an important recreational site in its own right. An estimated 5 – 10,000 people per year travel just to the carpark, read the displays then travel back down the road to Wanaka. Public access is provided by a gentleman's agreement.

Scenic Driving
The Wanaka Mount Aspiring Road, between Wanaka and Raspberry Flat carpark, is popular with visitors who wish to enjoy the grandeur of the Southern Alps from their car.

Picnicking and Camping
Cameron Flat is a popular camping and picnicking area currently managed by the Department. Informal camping also takes place near to Raspberry Flat carpark, along the Matukituki River West Branch marginal strip.

Day Walks
Several popular day walks in the area, cross the Lease. Descriptions based on Moir's Guide (Spearpoint [Ed] 1998) are provided below.

Matukituki River West Branch
(i) Raspberry Flat to Aspiring Hut
The West Matukituki is approached on foot from the carpark at Raspberry Flat, by Big Creek. The track marked with orange poles leads up valley, before rejoining the 4WD farm track, as it winds across bouldery gullies of gravel fan, heading upstream. The track is obvious, and is marked with orange poles wherever it deviates from the farm track. It stays near or on the flats to Wilsons Bluff, then zig-zags up 60 m, before descending gently to the flats upstream again. Approximately 10 minutes down valley of Aspiring Hut, the boundary between the Lease and National Park is crossed. This valley walk is

very popular, with over 20,000 visitors in 2003-4 walking at least part of the way. Some of these visitors will be visiting the Rob Roy Glacier Walk (see below), or be passing through on tramping or climbing trips further afield (see Tramping and Climbing sections below).

(ii) Rob Roy Glacier Walk
This is a pleasant day walk through beech forest, with spectacular views to the southern ice faces of Rob Roy Peak. It is reached by walking across grassy flats through the Lease from Raspberry Flat Carpark for about 15 minutes up valley, until a swing bridge across the Matukituki River West Branch is reached. From here, the track is in the adjoining National Park.

In the year 2003-4, over 10,000 people used this walk.

(iii) Glenfinnan Peak
Glenfinnan Peak is a local vantage-point, providing excellent views into the surrounding valleys and mountains. While unmarked, the most commonly used route leaves the Wanaka Mount Aspiring Road on the western side of Niger Stream, and follows the property boundary upslope, until a leading ridge, located between Niger and Glenfinnan Streams, is reached. This provides easy access for people of reasonable fitness and experience up onto Glenfinnan Peak and along to Fog Peak.

Matukituki River East Branch
The East Matukituki is relatively less developed and populated than the West Branch, and provides opportunities for some longer day walks.

(iii) Otago Boys High School Bridge to Glacier Burn
The Matukituki River West Branch is crossed via the Otago Boys High School Bridge (OBHS), located ~2.5km up the road from Cameron Flat. The riverbank is followed on the other side to the flats in the Matukituki River East Branch. The route leads up grassy flats to the Glacier Burn, from where a well-marked track enters the beech forest 100 m south of the Burn. This track crosses the Lease within the beech forest, before entering the National Park. The track provides access to bush edge, then up to the head of the valley.

(iv) Cameron Flat to Junction Burn (Matukituki River East Branch)
The East Matukituki is approached from Cameron Flat. The West Matukituki is crossed here (or via the OBHS Bridge described above, when the river is high), and the grassy flats within the Lease traversed. Beyond the Lease-National Park boundary at Glacier Burn is reached, a marked route continues up valley through the beech forest and more flats, until Junction Flat is reached.

Tramping
Given the Lease's location adjacent to Mount Aspiring National Park and other conservation land, there are numerous opportunities for tramping, which require access across the property to reach the tops or alpine saddles between valleys. For full route descriptions, see Moir's Guide (Spearpoint [Ed] 1998).

Matukituki River West Branch
Trampers cross the Lease's valley flats between Raspberry Flat car park and the Mount Aspiring National Park boundary near Aspiring Hut to complete routes to French Ridge, Bevan Col, Liverpool Biv, or Cascade Saddle through to the Rees-Dart track. A less frequented unmarked route takes experienced trampers from the Matukituki River West Branch flats over Shotover Saddle (to the Lease boundary), down to Lochnagar in the Shotover catchment.

Matukituki River East Branch
The East Matukituki is relatively less visited and developed than the West Branch. A tramping route for experienced and capable parties links the Matukituki valley with the Wilkin Valley via Rabbit Pass. The Matukituki River is crossed at Cameron Flat. The route then crosses the Matukituki River East Branch flats located on the Lease, until the boundary of Mount Aspiring National Park is reached in the vicinity of Glacier Burn. From there, parties continue up the Matukituki River East Branch, following a marked track to Ruth Flat. Rabbit Pass is at the head of the valley, over which a marked route descends steeply down ledges to a waterfall, and onwards to the Wilkin River valley and out to Makarora township on SH6.

The Matukituki River East Branch also provides access to a tramping route over Albert Burn Saddle to the Albert Burn and Lake Wanaka.

Mill Creek
The alpine parts of Mill Creek are located entirely within the Lease, and provide opportunities for tramping. Parties cross the Matukituki River at the Mount Aspiring homestead and follow a cattle track through the West Wanaka Conservation Area beech forest into the lower Mill Creek catchment. At the head of the west branch, Dragonfly Peak is an easy climb. From there it is possible to return to the starting point via Hester Pinney Creek and Matukituki River East Branch, or down the Albert Burn to Lake Wanaka and out to State Highway 8 at Makarora (as above).

Climbing
Mt Tyndall (2465 m), Dragonfly Peak (2165 m) and Mt Eostre (1995 m) are the only ~2000+ m peaks with access routes largely on the property. Mt Tyndall can be accessed from Shotover Saddle, while the other two peaks are an easy climb from Mill Creek, Albert Burn Saddle or Matukituki River confluence. The property, however, provides access to numerous other peaks which are partially located on the Lease i.e. Shark's Tooth (2096 m), Craigroyston Peak (2211 m) and Fog Peak (2240 m).

Climbers wishing to ascend Mount Aspiring, Rob Roy or any of the other peaks within the National Park, have to cross river flats within the Matukituki Valley, which are part of the Lease.

Rock Climbing
A number of bolted rock climbing routes are sited on bluffs located on the true left of the Matukituki River West Branch, c. 1.5km downstream of the Otago Boys High School Bridge.

Hunting
Recreational hunters, with landholder permission, help keep red deer and chamois numbers low within the Mill Creek and main Matukituki River West Branch block.

Ski Touring
There are opportunities for ski touring in the mountains located on the Lease, for example, near Albert Burn Saddle and Shotover Saddle.

Mountain Biking
Mountain biking is popular as far as Aspiring Hut on the National Park boundary.

Angling
The Matukituki River is popular for angling. Sport fish include brown trout and rainbow trout.

Kayaking and Rafting
The Matukituki River West Branch is a pleasant river, with an exciting section of water located below Rob Roy Stream, suited to kayaking and recreational rafting.

Commercial Recreation
A number of commercial recreation ventures operate on the Lease:

- Four wheel drive cross-country from Cameron Flat to Old Homestead in East Matukituki Valley.
- Walking and trekking activities from Raspberry Flat car park to Rob Roy Bridge and Aspiring Hut; and up East Matukituki valley to Glacier Burn.
- Commercial heliskiing and heliboarding within the boundaries of the Lease.
- Albertburn Hut is a commercial hut used to accommodate guests of Whare Kea Lodge (Wanaka), who access the hut by air.
- Providers of outdoor education from Tititea Lodge, East Matukituki Valley.

A condition of the recreation permit for the Albert Burn Hut is that the hut is to be removed on expiry of the concession. In relation to operating on Mount Aspiring Pastoral Lease, these recreation permits will expire on the date the tenure review is completed for the Lease.

Tititea Lodge
The Old Homestead, or Tititea Lodge as it is now known, is located on the flats of Matukituki River East Branch. The buildings are owned and administered by Tititea Trust, who operates it as an outdoor education centre for Dunstan High School (Alexandra) students and other groups. Students visit the Lodge for much of the year, gaining access through the Lease, either via the Otago Boys High School (O.B.H.S) Bridge, or by crossing the Matukituki River at Cameron Flats. A ropes course has been developed in the trees behind the Lodge.

Significance of Recreation

Mount Aspiring Pastoral Lease is strategically placed at the Matukituki Valley gateway to the Mount Aspiring National Park from Wanaka. This area is known internationally as a destination for tramping and climbing. The Lease provides an outstanding mountainous setting for a range of activities which include scenic driving, mountain biking, picnicking, day walking (including the West Matukituki internationally renowned walk), tramping,

climbing, backcountry ski touring, hunting, fishing, kayaking and rafting. People participate in these activities both on the property, and via the Lease en route to the adjacent conservation land.

Commonly used and strategic access routes to the National Park cross the Lease i.e. from Raspberry Flat car park to Rob Roy Bridge and Aspiring Hut in the Matukituki West Branch; from Cameron Flat or O.B.H.S Bridge to Glacier Burn in the East Branch; and part of the Glacier Burn track.

The Raspberry Flat carpark at the Wanaka Mount Aspiring Road road-end is a strategic recreational facility located on the Lease.

PART 3: OTHER RELEVANT MATTERS & PLANS

3.1 CONSULTATION

The property was discussed at an NGO early warning meeting held in Alexandra on 23rd September 2004.The main points raised during the meeting were:

- Whole of Mill Creek block should become conservation land.
- Possible landscape covenant that precludes subdivision on valley floors.
- Fence north side of Shotover face.
- Need to secure legal foot access through East Matukituki.
- Mill Creek block to east – mainly used for grazing cattle after summer – is it surplus pastoral land?

In written submissions, the following recreation groups raised a number of issues:

Central Otago Deerstalkers Club

- Need for good (legal) public four wheel drive access
- Permission to carry guns be met by DOC permit only
- That dogs be allowed to any proposed conservation lands.

Federated Mountain Clubs (FMC):

Land to become Conservation Areas/Recreation Reserves

- The entire Mill Creek Block (a possible addition to Mount Aspiring National Park)
- North facing steep slopes between Mt Tyndall and Fog Peak from valley floor (from Raspberry Flat westwards) to alpine zone. Bush and waterfalls in Big Creek, and areas providing access to Shotover Saddle and Mt Tyndall to be eventually added to Mount Aspiring National park.
- Raspberry Flat and an access corridor northwards to Mount Aspiring Hut (Recreation Reserve)
- Camerons Flat for camping and car parking (Recreation Reserve)
- North of Glacier Burn on flats in Matukituki River east Branch.

Access Requirements:

In the event that the above areas FMC recommends as conservation land become freehold, the following public foot access routes will be required:

- From near Brides Veil Waterfall on Matukituki Flats to Shotover Saddle. This would provide climbing access to Mt Tyndall, Sharks Tooth and Craigroyston Peaks
- Climbing routes to Fog Peak and Glenfinnan Peak
- Access across Cameron Flat to Matukituki ford and up East Matukituki Flats to Glacier Burn footbridge and track to Glacier Burn catchment.

- Access for bone fide parties with permission to use Old Homestead (Tititea Lodge) across flats to the Lodge
- High river flow access for the public and bone fide parties with permission to use the Old Homestead (Tititea Lodge), by crossing the Otago Boys High School Bridge then across the flats.
- If Dragonfly Peak/Mt Eostre/Mill Creek Block do not become Conservation Area, public access to these peaks will be required
- Public foot and mountain bike access from Raspberry Creek carpark to Cascade and Aspiring Huts, including high-water route on true right above Rob Roy Stream confluence, and the section over Wilsons Bluff.

Public Bike and vehicle access to be guaranteed as follows:

- Road access over Wanaka Mount Aspiring road to carpark at Raspberry Flat should be confirmed as legal to ensure that public vehicle and bike use of the road is secure as an outcome of tenure review.
- Mountain bike use of Matukituki Valley as far as boundary of national Park is also needed.

Dunedin Branch Management Committee of Forest and Bird Protection Society:

Land to be Returned to the Crown:

- The entire Mill Creek Block (high ecological and landscape values)
- East Matukituki Flats (high landscape values but highly modified vegetation). If this area does not return to the Crown, then cattle grazing into West Wanaka Conservation Area at its base, and into bush margins along the Matukituki River as well as up valley of Glacier Burn, must be prevented.
- Land >1000 m in Matukituki River West Branch (high ecological and landscape values)
- Any *Olearia hectorii* patches need formal protection

Access:

- From West Matukituki to Shotover Saddle and beyond.

Other Points:

- Flats from Niger Face, up the West Matukituki have been highly modified.
- Cattle grazing into the National Park near Aspiring Hut needs to be prevented.

Upper Clutha Branch of Forest & Bird Protection Society

Land to be Returned to the Crown:

- Mill Creek block including upper faces above the bush on the true left of Matukituki River East Branch. This area has considerable conservation values. Cattle grazing cannot be ecologically sustainable in the Mill Creek valley or on the upper slopes above bush in the East Branch of Matukituki Valley if no fertiliser is ever put on. If fertilises is applied, it would spell the end of what is left of the biodiversity present.
- Homestead Peak faces in the East and West Matukituki Branches cannot be considered ecologically sustainable for farming. These should be returned to full crown ownership and control, as far as the bush edge on the valley floor.

- Land between Mt Tyndall and Niger Stream i.e. land above and through the bluffs to the south side of the face running from Shotover Saddle around to the homestead.

Access:

- The legal road up the valley from the homestead to Aspiring Hut be made secure in every way for the 'public to enjoy'.
- That suitable access be arranged through the freehold land for climbers and others to the Shotover Saddle and other peaks on the south boundary.

Other Matters:

- Albert Burn Saddle hut should be removed on completion of the tenure review
- The edges of bush where they are boundary with the National Park should be fenced.

The full written submissions of FMC and Forest & Bird Dunedin and Upper Clutha branches are attached (Appendix 10, 11 and 12 respectively).

3.2 REGIONAL POLICY STATEMENTS & PLANS

(a) 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, and inventory of outstanding features and landscapes that are regionally significant."

(b) Otago Regional Plan: Water

The whole property (with the exception of portions on the southern boundary) is subject to the rule which requires resource consent for suction dredge mining.

3.3 DISTRICT PLANS

(a) Queenstown Lakes District Plan

The property is located within the General Rural zone of the Queenstown Lakes District Plan.

The partially operative Queenstown Lakes District Plan requires resource consent for the clearance of areas of indigenous vegetation greater than 0.5 hectares, or above 1070 m, or where threatened plants (as listed in an appendix) are present.

Resource consent is required for subdivision and subsequent development, buildings, forestry and also ski area activities. No forestry shall be undertaken in an alpine area with an altitude greater than 1070 m. There are no registered historic sites, protected features or areas of significant indigenous vegetation as set out in the schedules of the plan. The protected landscape provisions of the Plan are in the process of going through the Environment Court. However, it is likely that the property will be in an Area of Outstanding Landscape. Protection is limited to the controls set out above.

3.4 CONSERVATION MANAGEMENT STRATEGIES & PLANS

The Otago Conservancy of DOC has prepared a Conservation Management Strategy (CMS) which was approved by the Minister of Conservation in August 1998.

The CMS identifies 41 special places of conservation interest in Otago Conservancy. The Lease lies mainly within the Matukituki Special Place, although a small portion at its southern boundary lies within the Upper Shotover Special Place.

Matukituki Special Place
The Matukituki Valley is important as the highly scenic corridor leading from Wanaka to Mount Aspiring, and the surrounding mountain lands have high nature conservation values in their own right.

Objectives for Matukituki
To protect the high landscape and ecological values of this major access corridor and buffer to Mount Aspiring National Park and provide for an appropriate range of recreational uses compatible with the character of the valley and surrounding mountains and with the maintenance of high quality visitor experiences.

Key implementation statements to meet this objective that are relevant to this tenure review include the following:

- Formal protection will be negotiated for areas of *Olearia hectorii.*
- Improve legal foot access from Raspberry Hut to the Aspiring Hut Conservation Area.
- Building controls and sensitive use of the valley will be advocated to protect the high landscape values.
- Freshwater fish surveys of the areas will be undertaken.

- Recreation and tourism concession activity will be permitted on the lands administered by the department if consistent with the objective. Helicopter concessions in the valley are considered inappropriate.
- Goats will be controlled to prevent their migration into the Mount Aspiring National Park using the Judas goat programme in accordance with the goat control plan.
- Opportunities that may arise through pastoral lease tenure reviews will be used to negotiate for the protection of areas of high landscape and biological importance, to secure recreational access to valued areas, and to lead to more efficient conservation management.
- Thar will be eradicated from the area in accordance with the national thar control strategy, and incidental control of chamois will be undertaken.
- Investigation of cross-country skiing opportunities off the ski field and elsewhere in the area will be undertaken, and negotiations with landholders initiated where appropriate.
- Promote Kai Tahu place names, and promote Kai Tahu traditions in interpretation.

Priorities for Matukituki
Improving the security of and opportunities for enhanced public enjoyment of this Special Place will be a priority.

Upper Shotover Special Place:

A small sliver of the Lease (i.e. in the vicinity of Shotover Saddle and Mt Tyndall) is located within the northern extremity of the Upper Shotover Special Place.

Kimi Akau is the traditional Kai Tahu name of the upper Shotover, which approximates to "looking for the coast". Waitaha explorers found the valley a dead end in their search for route to Te Tai Poutini (West Coast).

Objective for Upper Shotover
To protect the natural and historic resources of the upper Shotover area, particularly their biodiversity, relative remoteness and landscape values and to provide for or allow an appropriate range of commercial and non-commercial recreational activities consistent with the protection of the resources and a high quality visitor experience.

Key implementation statements to meet this objective that are relevant to this tenure review include the following:

- Plant pests and animal pests will as far as possible be controlled, with attempts to eradicate goats from the area using advanced techniques, to be pursued in terms of the approved goat control plan.
- Pastoral lease tenure review on properties in the area may provide opportunities to negotiate for outcomes furthering the objective.
- Make appropriate references to Kai Tahu traditional values in interpretation.

Priorities for Upper Shotover
Wilding tree control, historic site stabilization and measures to enhance public enjoyment will be priorities 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.

PART 4: ATTACHMENTS

4.1.1 References

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4.1.2 Appendices

APPENDIX 1: Landscape Unit Photos

APPENDIX 2: Characteristics of Land Environments of New Zealand Units on Mount Aspiring Pastoral Lease

APPENDIX 3: Map of Land Environments of New Zealand Units – Mount Aspiring Pastoral Lease

APPENDIX 4: Plant Species List

APPENDIX 5: Map of Distribution of Threatened Plant Species on the Lease

APPENDIX 6: Map of Invertebrate Sampling Sites

APPENDIX 7: Invertebrate Species Recorded at Mount Aspiring Pastoral Lease

APPENDIX 8: Map of Freshwater Fisheries Sampling Sites during Tenure Review Inspection.

APPENDIX 9: Letter from the Commissioner of Crown Lands to Jerry Aspinall 1958.

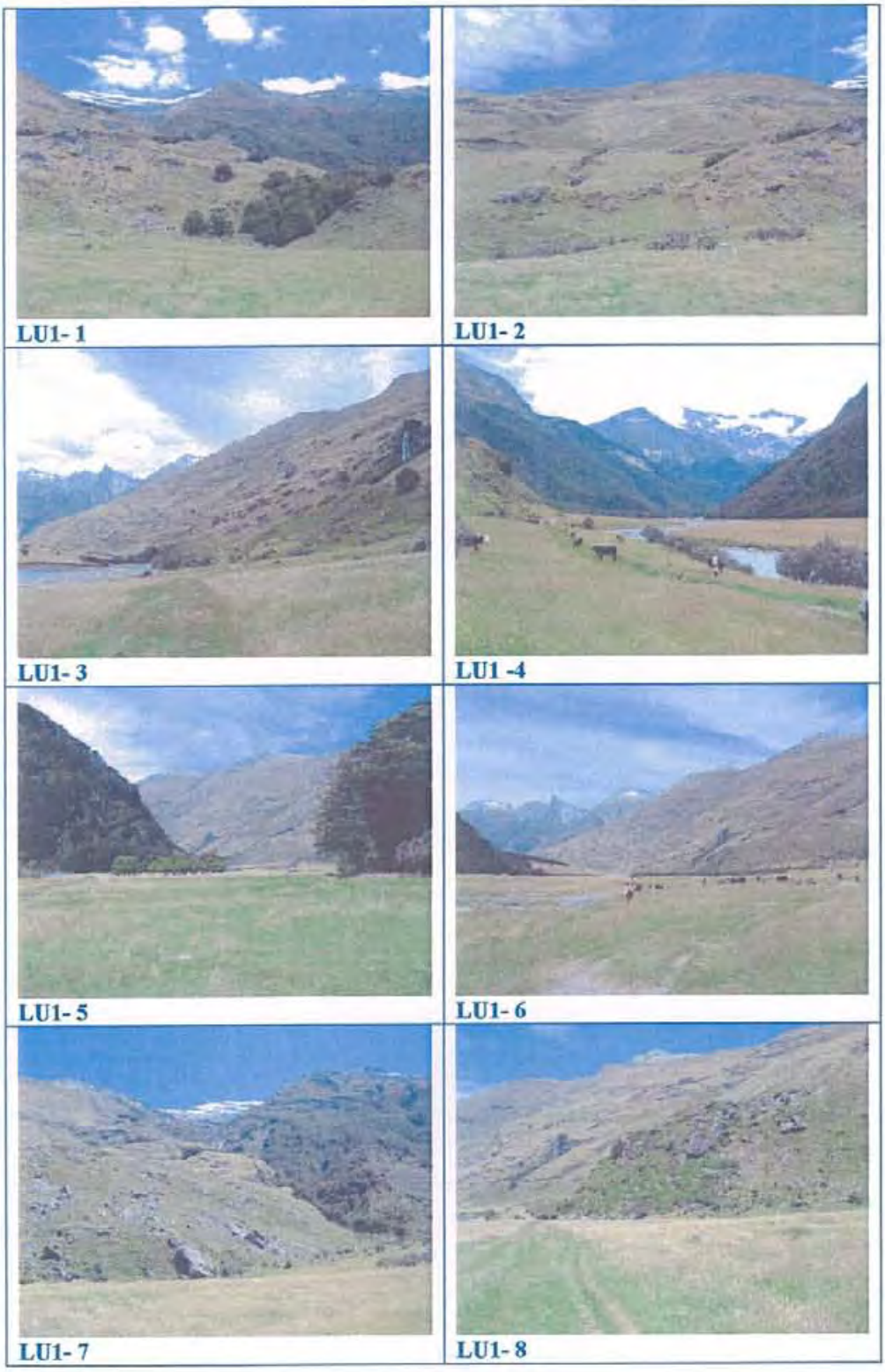
APPENDIX 10: FMC Report on Recreational Values

APPENDIX 11: Forest & Bird Dunedin Management Committee Report

APPENDIX 12: Upper Clutha Branch, Forest & Bird Protection Society Submission

APPENDIX 1: Landscape Unit Photos

APPENDIX 1: Landscape Unit Photos



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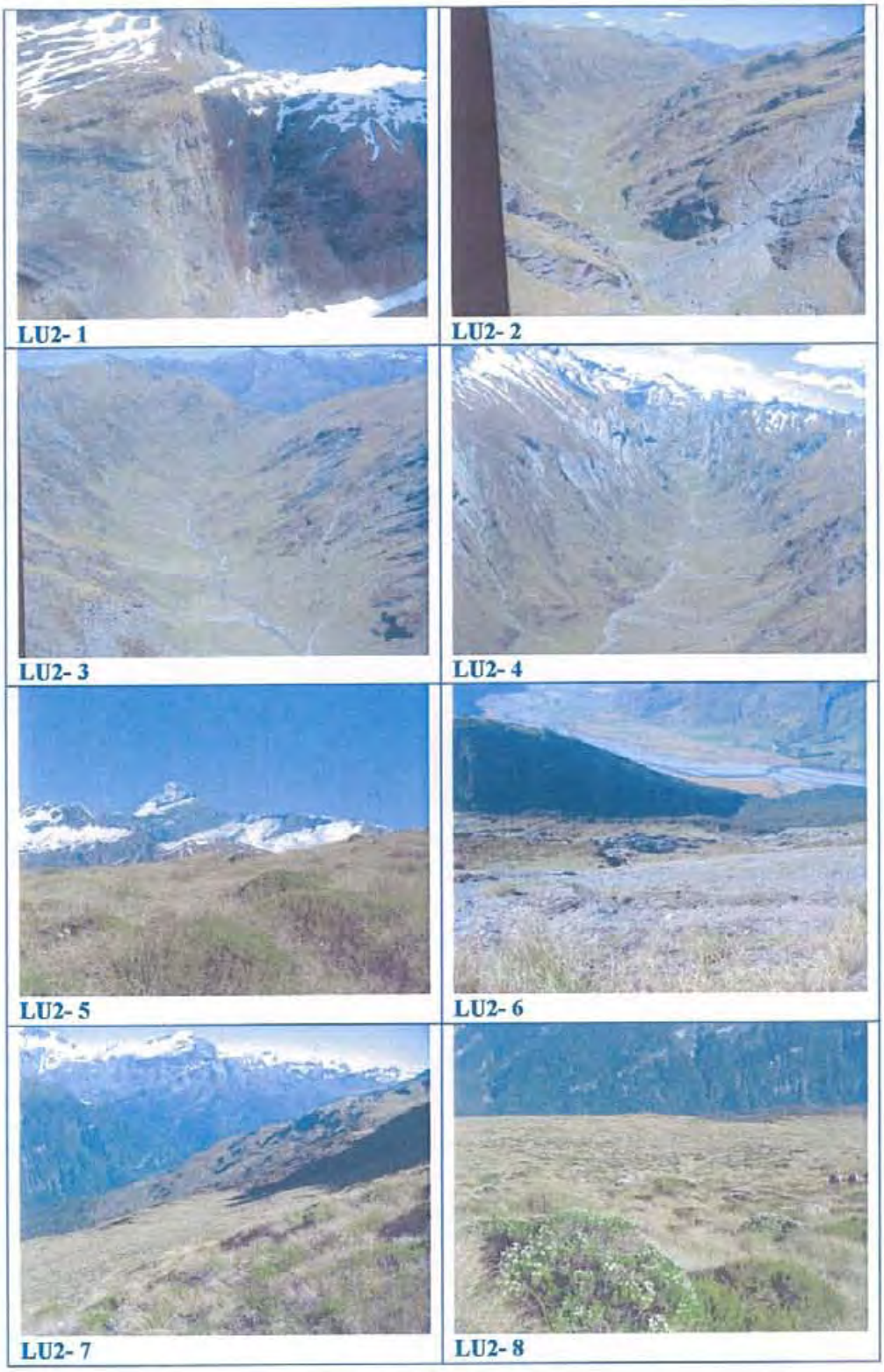

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Mt Aspiring Tenure Review
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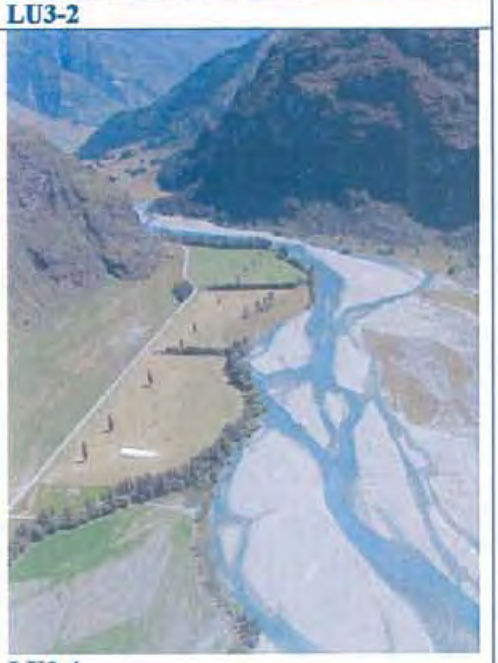

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LU3-6 Homestead faces

Mt Aspiring Tenure Review
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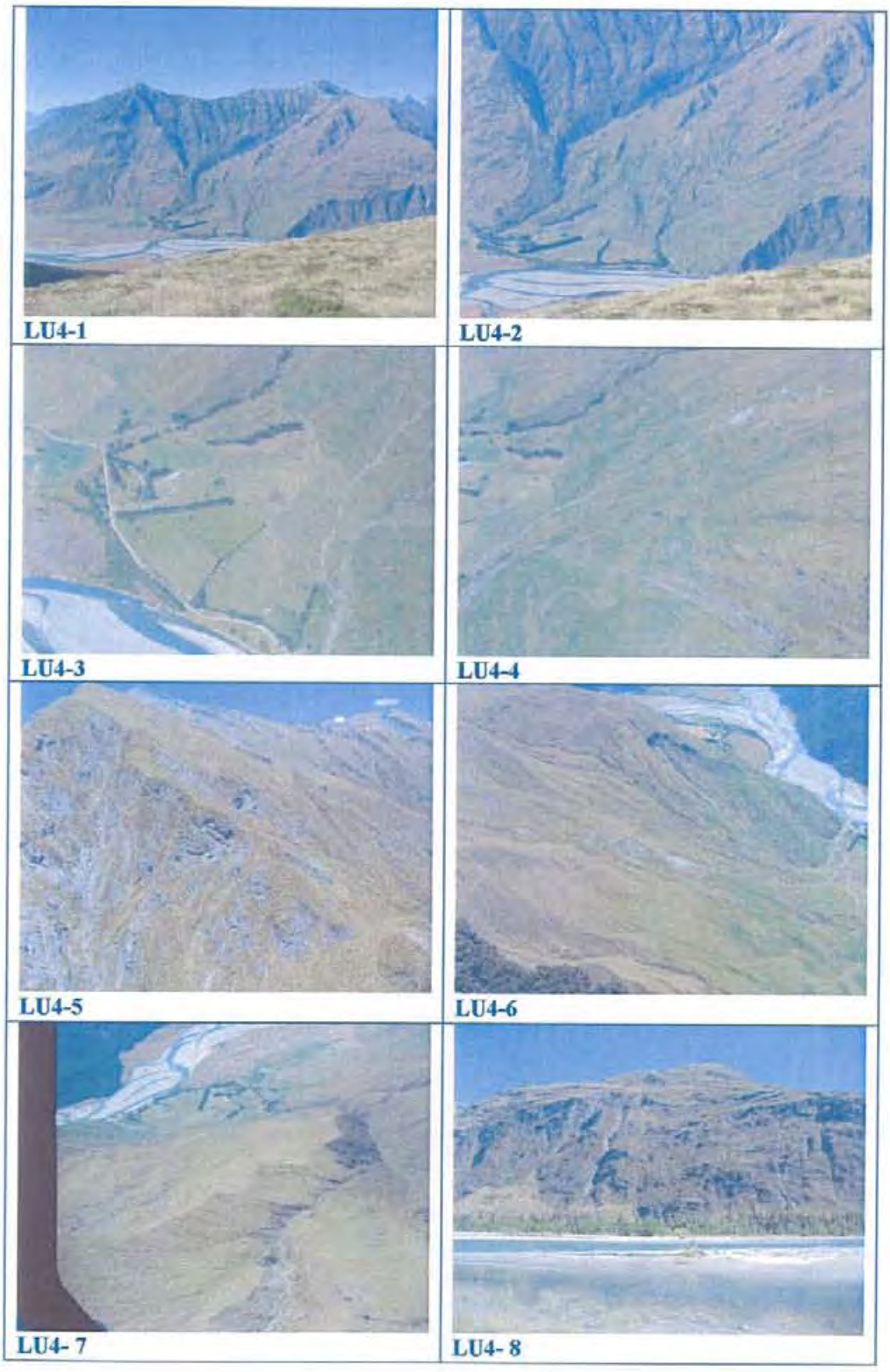
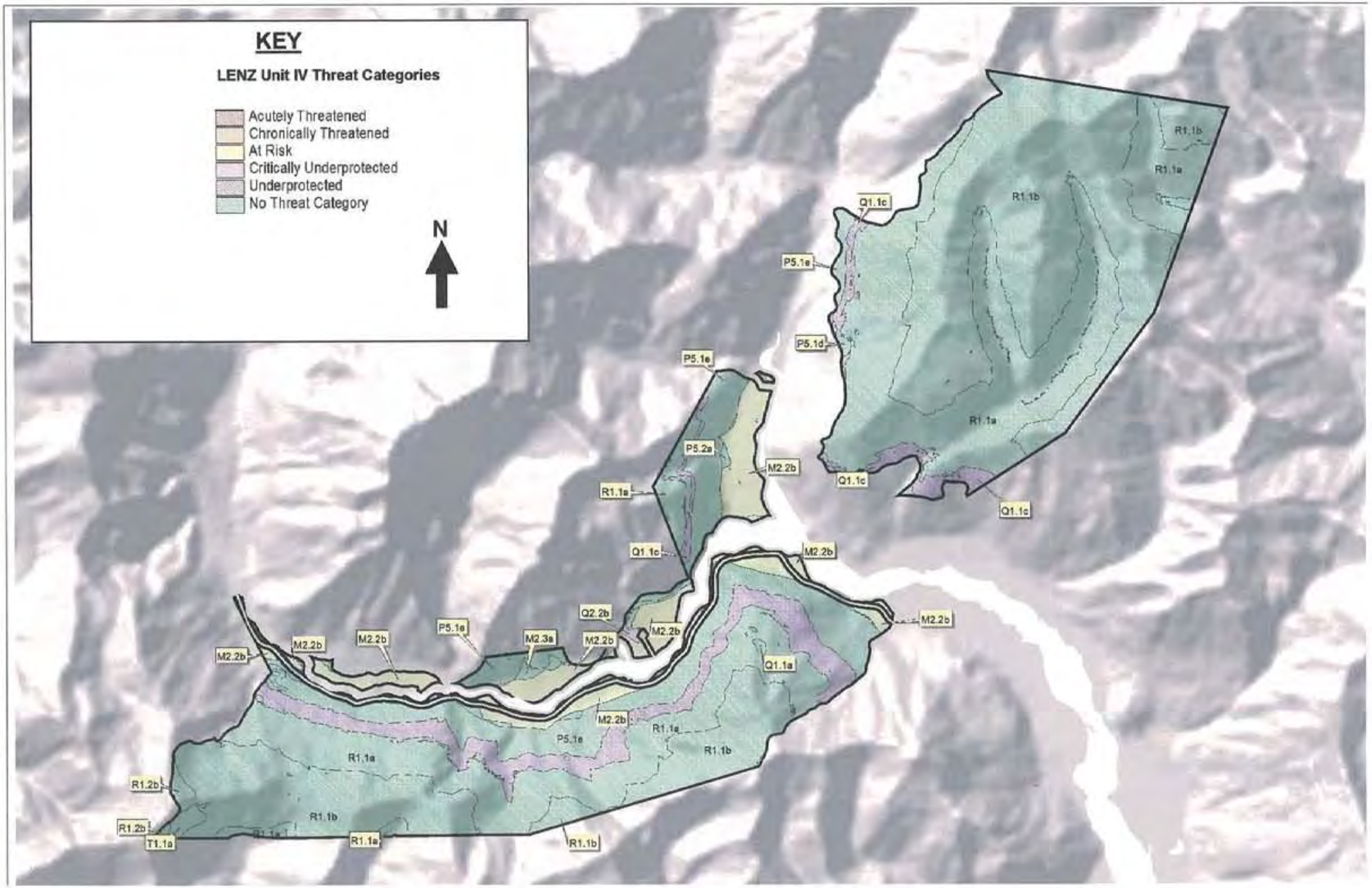


APPENDIX 2: Characteristics of Land Environments of New Zealand (LENZ) Units on Mount Aspiring Lease. From: Leathwick, J., F. Morgan, G. Wilson, D. Rutledge, M. McLeod and K. Johnston. 2002: Land Environments of New Zealand. Technical Guide. Ministry for the Environment.

LENZ Level IV Environments	Characteristics
M2.2b	Western South Island Recent Soils; of gently undulating flood plains. Moderately fertile soils with imperfect drainage, derived from greywacke gravels with some loess, schist alluvium. 360 m asl.
M2.3a	Western South Island Recent Soils; of easy rolling flood plains. Moderately fertile imperfectly-drained soils derived from greywacke gravels with some loess, schist alluvium. 545 m asl.
O1.4a	Western South Island Foothills and Stewart Island; of steep hills. Well-drained soils of low fertility from Tertiary sandstones, gravels and granite; 540 m asl.
O2.3b	Western South Island Foothills and Stewart Island; of very steep mountainous terrain. Imperfectly-drained soils of moderate fertility from schist with greywacke west of the Alpine Fault; 575 m asl.
P5.1b P5.1d P5.1e	Central Mountains including western Otago; of steep mountains. Well drained soils of moderately natural fertility from granite and greywacke alluvium, schist and mixed alluvium, Tertiary mudstones and andesite. 610 m asl.
P5.2a	Central Mountains including western Otago; of strongly rolling mountains. Well drained soils of low natural fertility from Moutere gravels, Tertiary mudstones, sandstones and greywacke alluvium. 525 m asl.
Q1.1a	South-eastern Hill Country and Mountains including Harris Mountains; of strongly rolling mountainous terrain. Well drained soils of moderate fertility from greywacke, schist; 1095 m asl.
Q1.1c	As for Q1.1a, but of very steep mountainous terrain.
Q1.2a	South-eastern Hill Country and Mountains including Harris Mountains; of very steep mountains. Well drained soils of moderate fertility from greywacke rock, colluvium and basalt. 1305 m asl.
Q2.1a	As for Q2.1a, but at lower elevations where climate is cool rather than cold; steep mountains, well-drained soils of moderate fertility from greywacke. 640 m asl.
Q2.2b	South-eastern Hill Country and Mountains; of strongly rolling mountainous terrain, moderately indurated. Imperfectly drained soils of moderate fertility from schist. 730 m asl.
R1.1a	Southern Alps; of steep mountains. Cold climate. Well drained soils of moderate fertility from schist and greywacke. 1320 m asl.
R1.1b	As for R.11a but much cooler temperatures and higher monthly water balance ratios.
R1.2b	As for R.1.1a but warmer annual temperatures.
T1.1a	Permanent ice and snow.

APPENDIX 3: Map of Land Environments of New Zealand Units on Mount Aspiring Pastoral Lease

APPENDIX 3: Land Environments of New Zealand (LENZ) Units – Mount Aspiring Pastoral Lease



APPENDIX 4: Plant Species List – Mount Aspiring Pastoral Lease

Species	Abundance at site	Notes	Threat ranking
Gymnosperms			
Phyllocladus alpinus	Occasional	Forest	Not threatened
Podocarpus hallii	Occasional	Lowland	Not threatened
Podocarpus nivalis	Occasional	Higher altitudes	Not threatened
Dicotyledonous trees, shrubs and vines			
Aristotelia fruticosa	Rare	Beech forest	Not threatened
Aristotelia serrata	Occasional	Forest edges and streamsides	Not threatened
Aristotelia serrata X *fruticosa*	Rare	Forest margins	Not threatened
Berberis wilsonae	Rare	Spreading from Old Homestead garden to hillslopes behind	Exotic
Brachyglottis cassinioides	Local	East branch of Mill Creek	Not threatened
Brachyglottis rotundifolia	Rare	Shrubland on Cattle faces	Not Threatened
Buddleja davidii	Rare	Matukituki confluence	Exotic
Carmichaelia petriei	Local	Shrublands	Not threatened
Carpodetus serratus	Rare	Forest	Not threatened
Castanea sativa	Rare	Planted behind old homestead	Exotic
Clematis foetida	Rare	Lowland rock slopes	Not threatened
Clematis marata	Rare	West Matukituki shrublands	Not threatened
Clematis paniculata	Rare	Beech forest	Not threatened
Coprosma "taylorae" (*C. parviflora* var. *dumosa, C.* sp. (t), *C.* sp. 27)	Rare	Glenfinnan slopes	Not threatened
Coprosma cheesemanii	Occasional	Subalpine	Not threatened
Coprosma ciliata	Occasional	Beech forest margin West Matukituki	Not threatened
Coprosma elatirioides (*C.* sp. (f), *C.* aff. *intertexta*)	Local	Subalpine damp sites	Not threatened
Coprosma foetidissima	Rare	Beech forest	Not threatened
Coprosma fowerakeri	Occasional	Shrublands on Cattle faces	Not threatened
Coprosma lucida	Rare	Beech forest	Not threatened
Coprosma niphobila	Rare	Subalpine rocks	Not threatened
Coprosma perpusilla subsp. *perpusilla*	Occasional	Higher altitudes	Not threatened
Coprosma propinqua subsp. "propinqua"	Local	Shrublands	Not threatened
Coprosma rhamnoides agg.	Rare	Beech forest	Not threatened
Coprosma rugosa	Local	West Matukituki shrublands; Cattle Faces	Not threatened
Coprosma serrulata	Local	Higher altitude rock outcrops	Not threatened
Coriaria plumosa	Local	Damp rocky sites	Not threatened
Coriaria sarmentosa	Local	Slope bases	Not threatened
Corokia cotoneaster agg.	Local	West Matukituki shrublands	Not threatened
Cotoneaster microphyllus	Local	Behind Old Homestead	Exotic
Cotoneaster simonsii	Local	Behind Old Homestead	Exotic
Cytisus scoparius	Rare	Flats	Exotic
Discaria toumatou	Local	Flats	Not threatened
Dracophyllum kirkii	Local	Subalpine shrubland below Shotover Saddle	Not Threatened

Species	Abundance at site	Notes	Threat ranking
Dracophyllum longifolium subsp. "longifolium"	Common	Shrublands	Not threatened
Dracophyllum muscoides	Occasional	Alpine cushionfield	Not threatened
Dracophyllum rosmarinifolium	Local	Mill Creek shrubland	Not threatened
Dracophyllum uniflorum	Local	Subalpine shrubland	Not threatened
Fuchsia excorticata	Occasional	Forest margins	Not threatened
Gaultheria antipoda	Local	Rocky sites	Not threatened
Gaultheria crassa	Local	Rock outcrops	Not threatened
Gaultheria depressa var. *novae-zelandiae*	Local	Higher altitude rock outcrops	Not threatened
Gaultheria nubicola	Occasional	Wet turfs Mill creek	Not threatened
Griselinia littoralis	Occasional	Montane rocky sites	Not threatened
Hebe hectorii subsp. *hectorii*	Occasional	Subalpine shrubland	Not threatened
Hebe odora	Local	Subalpine shrubland	Not threatened
Hebe pauciramosa	Local	Subalpine damp sites. Fell Creek	Not threatened
Hebe rakaiensis	Rare	Montane streamsides	Not threatened
Hebe salicifolia	Local	Lowland streamsides	Not threatened
Hebe subalpina	Local	Subalpine shrubland	Not threatened
Hoheria lyallii	Occasional	Montane forest margins	Not threatened
Kunzea ericoides	Occasional	Montane shrublands	Locally Notable
Leptospermum scoparium agg.	Rare	Glenfinnan slopes	Not threatened
Leucopogon fraseri complex (mountain ecotype)	Local	Open sites	Not threatened
Malus Xdomestica	Local	Hillslope behind old homestead	Exotic
Melicytus aff. *alpinus* (erect)	Rare	Lowland rock slopes	Not threatened
Muehlenbeckia australis	Local	Shrublands	Not threatened
Muehlenbeckia axillaris	Occasional	Throughout	Not threatened
Muehlenbeckia complexa agg.	Rare	Open hill slopes	Not threatened
Neomyrtus pedunculata	Rare	Beech forest	Not Threatened
Nothofagus fusca	Local	Lower slope beech forest	Not threatened
Nothofagus menziesii	Abundant	Lower to mid slopes forest	Not threatened
Nothofagus solandri var. *cliffortioides*	Rare	West Matukituki riparian	Not threatened
Olearia arborescens	Local	Rock forest	Not threatened
Olearia avicenniifolia	Common	Shrublands	Not threatened
Olearia bullata	Local	Subalpine shrublands	Not threatened
Olearia hectori	Local	Colluvial slope bases	Vulnerable
Olearia ilicifolia	Local	Shrublands on Cattle faces	Not Threatened
Olearia moschata	Rare	Glenfinnan rock fan & gullies in Cattle faces	Not threatened
Olearia nummularifolia	Local	Shrublands on Cattle faces	Not threatened
Ozothamnnus vauvilliersii	Local	Shrublands	Not threatened
Parahebe brevistylis (=*P. linifolia* subsp. *brevistylus*)	Occasional	Subalpine rocks	Not threatened
Parahebe decora	Occasional	Rock bluffs	Not threatened

Species	Abundance at site	Notes	Threat ranking
Parahebe lyallii	Rare	Bluffs on Cattle Faces	Not Threatened
Parahebe planopetiolata	Occasional	Rocky slopes above Shotover Saddle	Not Threatened
Parsonsia heterophylla	Local	West Matukituki shrublands	Not threatened
Pentachondra pumila	Local	Higher altitude	Not threatened
Pimelea oreophila agg.	Rare	Higher altitudes	Not threatened
Pimelea sp. cf. *prostrata*	Local	Matukituki shingle beds. An unusual *Pimelea* with round glabrous leaves, and sub-floral leaves 2x larger, fruit large, white.	Unknown
Pittosporum eugenioides s.s.	Rare	Forest	Not threatened
Pittosporum tenuifolium	Local	West Matukituki shrublands	Not threatened
Plagianthus regius	Local	Matukituki confluence	Not threatened
Populus nigra	Local	Planted	Exotic
Pseudopanax colensoi var. *ternatus*	Rare	Beech forest	Not threatened
Pseudopanax crassifolium	Rare	Beech forest	Not threatened
Pseudotsuga menziesii	Rare	Planted behind old homestead	Exotic
Pseudowintera colorata	Rare	Beech forest	Not threatened
Quercus robur	Rare	Planted behind old homestead	Exotic
Raukaua simplex var. *simplex* (ex. *Pseudopanax simplex*)	Rare	Beech forest	Not threatened
Ribes sanguineum?	Rare	Lowland rock slopes, not flowering	Exotic
Ribes uva-crispa	Local	Hillslope behind old homestead	Exotic
Rosa rubiginosa	Rare	Flats	Exotic
Rubus cissoides	Occasional	Forest margins	Not threatened
Rubus schmidelioides var. *schmidelioides*	Occasional	Shrublands	Not threatened
Salix fragilis	Local	Beside Matukituki River	Exotic
Salix viminalis	Rare	T.R.H.S. w. branch Matukituki River	Exotic
Sambucus nigra	Local	Flats and behind Homestead	Exotic
Schefflera digitata	Rare	Beech forest	Not threatened
Sequoiadendron giganticum	Rare	Planted behind old homestead	Exotic
Sophora microphylla	Local	Montane rock slopes	Not threatened
Sorbus aucuparia	Local	Flats	Exotic
Ulmus glabra	Rare	Planted behind old homestead	Exotic
Dicotyledonous herbs (including composits)			
Abrotanella caespitosa	Local	Fellfield	Not threatened
Abrotanella inconspicua	Local	Fellfield	Not threatened
Acaena agnapila var. *aequispina*	Rare	Lowland	Exotic
Acaena anserinifolia	Occasional	Lower altitudes	Not threatened
Acaena caesiiglauca var.	Occasional	Throughout	Not threatened
Acaena inermis	Occasional	Throughout	Not threatened
Acaena juvenca	Local	Beech forest	Not threatened
Acaena saccaticupula	Occasional	Throughout at higher altitudes	Not threatened
Achillea millefolium	Local	Exotic grassland	Exotic
Aciphylla aurea	Rare	Glenfinnan slopes	Not threatened
Aciphylla crenulata	Occasional	Tussock grasslands	Not Threatened
Aciphylla divisa	Local	Higher altitude rock outcrops	Not threatened

Species	Abundance at site	Notes	Threat ranking
Aciphylla hectorii	Rare	Albert Burn Saddle	Not threatened
Aciphylla kirkii	Occasional	Higher altitude grasslands	Not threatened
Aciphylla aff. *horrida (A. "lomond")*	Local	Upper Minaret Burn; Cattle Faces	Not threatened
Aciphylla montana var. *montana*	Rare	Mill Creek	Not threatened
Aciphylla scott-thomsonii	Occasional	Common by higher altitude streams	Not threatened
Anaphalioides bellidioides (ex. *Helichrysum bellidioides* in part)	Occasional	Throughout	Not threatened
Anemone tenuicaulis	Rare	Base of rock in Mill Creek and upper Minaret Burn	Sparse
Anisotome aromatica var. *aromatica*	Occasional	Higher altitude	Not threatened
Anisotome aromatica var. *dissecta*	Occasional	Higher altitude	Not threatened
Anisotome capillifolia	Occasional	Higher altitudes	Not threatened
Anisotome imbricata var. *imbricata*	Occasional	Cushionfield at Shotover Saddle	Not threatened
Anisotome pilifera	Occasional	Alpine rocky sites	Not threatened
Anthriscus caucalis	Local	Low altitude	Exotic
Arctium minus	Local	Bluff bases	Exotic
Argyrotegium mackayi	Rare	Higher altitude wetlands	Not threatened
Brachyglottis bellidioides	Occasional	Higher altitude	Not threatened
Brachyglottis southlandica var. *southlandica*	Rare	W. Matukituki Valley, south slopes	Not threatened
Brachyscome humilis	Rare	Shotover Saddle; Fog Peak	Range Restricted
Callitriche stagnalis	Local	Wet sites	Exotic
Capsella bursa-pastoris	Rare	Low altitude	Exotic
Cardamine hirsuta	Occasional	Low altitude	Exotic
Celmisia "rhizomatous bog"	Local	Higher altitude wetlands	Not threatened
Celmisia angustifolia	Rare	Mill Creek	Not threatened
Celmisia glandulosa var. *glandulosa*	Rare	Glenfinnan wetland	Not threatened
Celmisia gracilenta agg. (wide-leaved, scapes = lf)	Rare	Mill Creek	Unknown
Celmisia haastii var. *haastii*	Occasional	Fellfield	Not threatened
Celmisia hectorii	Occasional	Cushionfield at Shotover Saddle	Not threatened
Celmisia lyallii	Occasional	Tussock grasslands	Not threatened
Celmisia semicordata subsp. *semicordata*	Occasional	Tussock grasslands	Not threatened
Celmisia sessiliflorum	Local	Mill Creek; Shotover Saddle	Not threatened
Celmisia verbascifolia subsp. verbascifolia	Local	Tussock grasslands below Shotover Saddle	Not Threatened
Centaurium erythraea	Local	Grasslands in West Matukituki	Exotic
Cerastium fontanum subsp. *vulgare*	Occasional	Lowland	Exotic
Chionohebe thomsonii	Local	Shotover Saddle	Not threatened
Cirsium arvense	Occasional	Grasslands	Exotic

Species	Abundance at site	Notes	Threat ranking
Cirsium vulgare	Occasional	Lowland	Exotic
Colobanthus buchananii	Occasional	Alpine rocky sites	Not threatened
Colobanthus canaliculatus	Rare	Subalpine rocks	Not threatened
Colobanthus strictus	Occasional	Open sites	Not threatened
Craspedia "Otago"	Local	Alpine herbfields	Not threatened
Craspedia robusta	Local	Subalpine grasslands	Not threatened
Crassula colligata comp. (ex *C. tetramera*)	Rare	Under bluff at low altitude in W. Matukituki	Not threatened
Crassula sinclairii	Rare	Noted in some higher altitude ephemeral wetlands	Locally Notable
Crepis capillaris	Occasional	Lowland	Exotic
Digitalis purpurea	Rare	Low altitude flats	Exotic
Dolichoglottis lyallii	Local	Damp sites, higher altitude	Not threatened
Dolichoglottis scorzoneroides	Local	Higher altitude streamsides and head basins	Not threatened
Drosera arcturi	Rare	Glenfinnan wetland	Not threatened
Echium vulgare	Local	Low altitude dry sites	Exotic
Elatine gratioloides	Rare	T.R.H.S. w. branch Matukituki River, drainage ditch	Regionally Significant
Epilobium brunnescens subsp. *brunnescens*	Rare	Mossy bog cattle faces	Not threatened
Epilobium glabellum (*E. rubromarginatum*)	Occasional	Subalpine rocks	Not threatened
Epilobium glabellum s.s.	Rare	Mill Creek head basins	Not threatened
Epilobium komarovianum	Rare	Higher altitude wetlands	Not Threatened
Epilobium melanocaulon	Local	Matukituki shingle beds	Not threatened
Epilobium microphyllum	Occasional	Shingle slopes at lower altitudes	Not threatened
Epilobium nerteroides	Local	Stream beds	Not threatened
Epilobium porphyrium	Local	Creek beds	Not threatened
Epilobium pubens	Local	Rock bluffs	Not threatened
Epilobium purpuratum	Local	Mill Creek head basins; Upper Minaret Burn; above Shotover Saddle	Sparse
Epilobium rotundifolium	Local	Lowland stream sides	Not threatened
Epilobium sp.	Local	Common species of wetlands in area	Unknown
Epilobium tasmanicum	Occasional	Subalpine rocks	Not threatened
Euchiton lateralis	Local	Higher altitude wetlands	Not threatened
Euchiton ruahinacus (ex. *Gnaphalium ruahinacum*)	Rare	Glenfinnan slopes	Not threatened
Euchiton traversii	Local	Damp grassland West Matukituki	Not threatened
Euphrasia petriei agg. (W. Otago - Fiordland form with small flowers and glabrous leaves)	Rare	Albert Burn Saddle	Not threatened
Euphrasia zelandica agg.	Rare	Subalpine rocks	Not threatened
Forstera sedifolia	Rare	Streamside bank in Upper Minaret Burn	Not Threatened
Galium aparine	Local	Grasslands	Exotic
Galium divaricatum	Local	Low altitude flats	Exotic
Galium perpusillum	Local	Grasslands	Not threatened
Galium sp. aff. *perpusillum*	Local	Higher altitude wetlands	Unknown
Gentianella bellidifolia	Occasional	Higher altitudes	Not threatened

Species	Abundance at site	Notes	Threat ranking
Gentianella grisebachii	Local	Glenfinnan wetland	Not threatened
Geranium sessiliflorum subsp. *novaezelandiae* var. *novaezelandiae*	Occasional	Throughout	Not threatened
Geranium microphyllum	Local	Grasslands in West Matukituki	Not threatened
Geranium solanderi "Large Petals"	Rare	Grasslands	Not threatened
Geum parviflorum	Occasional	Damp hill slopes	Not threatened
Gingidia decipiens	Occasional	Rock outcrops above Shotover Saddle	Not threatened
Gingidia montana	Local	Shady rock bluffs	Not threatened
Gonocarpus micranthus	Rare	Cushionfield	Not threatened
Gunnera monoica	Local	Stream sides	Not threatened
Haastia sinclairii var. sinclairii	Local	Fellfield above Shotover Saddle	Not Threatened
Hectorella caespitosa	Local	Fellfield	Not threatened
Helichrysum filicaule	Occasional	Throughout	Not threatened
Hieracium lepidulum	Common	To c. 1200m	Exotic
Hieracium pilosella subsp.	Local	Dry sites	Exotic
Hieracium praealtum	Rare	Mossy bog cattle faces	Exotic
Hydrocotyle moschata	Local	Dry site W. Matukituki	Not threatened
Hydrocotyle novae-zeelandiae	Occasional	Mainly lowland	Not threatened
Hydrocotyle sulcata	Local	Damp grassland West Matukituki	Not threatened
Hypericum gramineum	Rare	Flats	Not threatened
Hypericum perforatum	Local	Dry bluffs	Exotic
Hypochoeris radicata	Occasional	Throughout	Exotic
Kelleria croizatii	Occasional	Cushionfield	Not threatened
Kelleria dieffenbachii	Occasional	Dry spur crest on Cattle faces	Not threatened
Lagenifera barkeri	Rare	Higher altitude wetlands	Not threatened
Lagenifera strangulata	Local	Common in beech forest	Not threatened
Leptinella pectinata subsp. *willcoxii*	Occasional	Subalpine rocks	Not threatened
Leptinella squalida subsp. *mediana*	Local	Flats and higher altitude wetlands	Not threatened
Leucogenes grandiceps	Local	Fellfield	Not threatened
Linum catharticum	Occasional	Dry rocky sites	Exotic
Lobelia linnaeoides	Local	Rocky slope in Minaret Burn; Cattle Faces	Not Threatened
Lotus pedunculatus	Occasional	Exotic grassland	Exotic
Microseris scapigera "var. linearis"	Rare	Mill Creek wetlands	Not threatened
Mimulus moschatus	Local	Low altitude wet sites	Exotic
Montia fontana subsp. *fontana*	Local	Wet sites	Exotic
Mycelis muralis	Occasional	Forest	Exotic
Myosotis "drucei" (*M. pygmaea* var. *drucei*)	Rare	Recorded at two sites. Higher altitude shingle slopes	Regionally Significant
Myosotis arvensis	Rare	Low altitude	Exotic
Myosotis elderi	Rare	Rocky slopes above Shotover Saddle	Locally Notable
Myosotis forsteri agg.	Rare	W. Matukituki Valley flats	Not threatened
Myosotis laxa	Local	Wet sites	Exotic
Myosotis macrantha	Local	Rock bluffs	Not threatened

Species	Abundance at site	Notes	Threat ranking
Myosotis pulvinaris s.s.	Local	Rocky ridge Mill Creek	Regionally Significant
Myriophyllum propinquum	Rare	T.R.H.S. w. branch Matukituki River, pond	Not threatened
Neopaxia sessiliflora s.s.	Local	Matukituki seepages, fellfield	Not threatened
Nertera balfouriana	Local	Mossy bog cattle faces	Not threatened
Nertera setulosa	Rare	Beech forest	Not threatened
Oreomyrrhis ramosa s.l.	Local	Rock bases	Not threatened
Ourisia caespitosa	Local	Damp sites	Not threatened
Ourisia glandulosa	Local	Higher altitude rock bases	Not threatened
Ourisia sessilifolia subsp. sessilifolia	Rare	Shady rock outcrop in alpine zone	Not Threatened
Oxalis magellanica	Rare	Shady rock bluffs	Not threatened
Pachycladon cheesemanii	Rare	34 plants under overhang at E2174900 N5627100 and single large plant at E2175354 N5628027	Gradual Decline
Pachycladon novae-zelandiae	Local	Fellfield	Not Threatened
Parentucellia viscosa	Rare	Low altitude flats	Exotic
Phyllachne rubra	Occasional	Cushionfield	Not threatened
Plantago lanigera	Local	Fellfield	Not threatened
Plantago novae-zelandiae	Local	Higher altitude wetlands	Not threatened
Plantago triandra	Local	Higher altitude wetlands	Not threatened
Polygonum aviculare	Rare	Low altitude flats	Exotic
Polygonum persicaria	Rare	Lowland wet sites	Exotic
Pratia angulata	Local	Low altitude flats	Not threatened
Pratia macrodon s.s.	Rare	Higher altitude wetlands	Not threatened
Prunella vulgaris	Local	Low altitude flats	Exotic
Pseudognaphalium "inland" (ex. *P. luteo-album* in part)	Rare	Higher altitude rock bluffs	Not threatened
Psychrophila obtusa	Local	Higher altitude wetlands	Not Threatened
Ranunculus amphitrichus	Rare	East branch of Mill Creek, wetland	Not threatened
Ranunculus buchananii	Local	Higher altitude rock faces and head basins	Not Threatened
Ranunculus foliosus	Local	Higher altitude wetlands	Not threatened
Ranunculus gracilipes	Local	Higher altitude wetlands	Not threatened
Ranunculus lyalliii	Local	higher altitude shady sites	Not threatened
Ranunculus maculatus	Local	In wetlands of both branches of Mill Creek	Sparse
Ranunculus pachyrrhizus	Local	Fellfield	Not threatened
Ranunculus reflexus	Local	Low altitude stream sides	Not threatened
Ranunculus repens	Local	Wet sites	Exotic
Ranunculus royi	Local	Wet rocky site in Upper Minaret Burn	Not threatened
Ranunculus sericophyllus	Rare	Mill Creak head basins	Not threatened
Ranunculus trichophyllus	Local	Low altitude ponds	Exotic
Raoulia glabra	Rare	Matukituki shingle beds	Not threatened
Raoulia grandiflora	Local	Fellfield	Not threatened
Raoulia hectorii var. hectorii	Local	Fellfield	Not threatened
Raoulia hookeri agg.	Local	Matukituki shingle beds	Not threatened
Raoulia tenericaulis	Occasional	Stream terraces W. Matukituki	Not threatened
Raoulia youngii	Local	Fellfield	Not threatened
Rumex acetosella	Common	Throughout, apart from alpine	Exotic
Rumex conglomeratus	Rare	Wet sites	Exotic

Species	Abundance at site	Notes	Threat ranking
Rumex crispus	Local	Wet sites	Exotic
Rumex flexuosus	Local	Wetland near Old Homestead; valley floor grassland in W. Matukituki	Not threatened
Sagina procumbens	Occasional	Throughout	Exotic
Schizeilema exiguum	Local	Fellfield	Not threatened
Schizeilema haastii var. *haastii*	Occasional	Subalpine rock bases	Not threatened
Schizeilema trifoliatum	Rare	Beech forest	Not threatened
Scleranthus brockiei	Rare	Riverbed in upper Minaret Burn	Not threatened
Senecio jacobea	Occasional	Lowland	Exotic
Senecio quadridentatus	Rare	Under bluff at low altitude in W. Matukituki	Not threatened
Senecio wairauensis	Rare	Under bluff at low altitude in W. Matukituki	Not threatened
Sherardia arvensis	Rare	Grasslands	Exotic
Silene conica	Rare	Low altitude rock faces	Exotic
Sisymbrium officinale	Rare	Low altitude	Exotic
Sonchus oleraceus	Rare	Low altitude rock faces	Exotic
Stellaria gracilenta	Occasional	Higher altitude rock outcrops	Not threatened
Stellaria media	Occasional	Low altitude	Exotic
Stellaria parviflora	Rare	Under bluff at low altitude in W. Matukituki	Not threatened
Taraxacum magellanicum?	Rare	Higher altitude, post flowering	Not threatened
Taraxacum officinale	Occasional	Grasslands	Exotic
Trifolium dubium	Occasional	Dry grassland	Exotic
Trifolium pratense	Local	Low altitude	Exotic
Trifolium repens	Occasional	Low altitude	Exotic
Urtica incisa	Rare	W. Matukituki Valley flats	Not threatened
Verbascum thapsus	Local	Dry sites	Exotic
Verbascum virgatum	Rare	Flats	Exotic
Viola cunninghamii	Rare	Higher altitude	Not threatened
Viola filicaulis	Rare	Beech forest margin W. Matukituki	Not threatened
Viola lyallii	Rare	Grasslands	Not threatened
Wahlenbergia albomarginata subsp. *albomarginata*	Occasional	Throughout	Not threatened
Grasses			
Agrostis capillaris	Common	Exotic grasslands	Exotic
Agrostis muelleriana	Rare	Glenfinnan rock fan; Minaret Burn fan	Not threatened
Aira caryophyllea subsp. *caryophyllea*	Local	Dry sites	Exotic
Alopecurus geniculatus	Local	Higher altitude wetlands	Exotic
Anthoxanthum odoratum	Occasional	Exotic grasslands	Exotic
Arrhenatherum elatius subsp. *bulbosum*	Rare	Base of cliff by W. Matukituki	Exotic
Brachypodium sylvaticum?	Rare	By waterfall in W. Matukituki. First record for Otago?	Exotic
Bromus hordeaceus	Occasional	Dry sites	Exotic
Chionochloa conspicua subsp. *conspicua*	Occasional	Riparian zones	Not threatened
Chionochloa crassiuscula subsp. *torta*	Occasional	Margins of alpine herbfield	Not Threatened
Chionochloa macra	Local	Tussock grasslands in Minaret Burn	Not threatened
Chionochloa oreophila	Local	Fellfield	Not threatened

Species	Abundance at site	Notes	Threat ranking
Chionochloa pallens subsp. *cadens*	Common	Tussock grasslands	Not threatened
Chionochloa rigida subsp. *rigida*	Common	Tussock grasslands	Not threatened
Cynosurus cristatus	Occasional	Exotic grasslands	Exotic
Dactylis glomerata	Occasional	Exotic grasslands	Exotic
Dichelachne crinita	Rare	Bluffs	Not threatened
Elymus solandri	Occasional	Rock faces and grasslands	Not threatened
Festuca matthewsii subsp. *matthewsii*	Occasional	Subalpine grassland and rock	Not threatened
Festuca rubra subsp. *rubra*	Common	Exotic grasslands	Exotic
Glyceria fluitans	Local	Low altitude wet sites	Exotic
Holcus lanatus	Occasional	Exotic grasslands	Exotic
Koeleria cheesemanii	Occasional	Subalpine	Not threatened
Koeleria novozelandica	Occasional	Subalpine grassland and rock	Not threatened
Lachnagrostis striata	Local	Wetlands. Some plants have glabrous lemma	Not threatened
Lachnagrostis uda	Local	Mill Creek wetlands	Data Deficient
Lolium perenne	Occasional	Exotic grasslands	Exotic
Phleum pratense	Local	Cultivated grassland; cattle Faces	Exotic
Poa annua	Local	Low altitude wet sites	Exotic
Poa breviglumis	Occasional	Open sites	Not threatened
Poa cita agg.	Local	Damp sites	Not threatened
Poa colensoi s.l.	Common	Grassland	Not threatened
Poa imbecilla	Local	Rock overhangs	Not threatened
Poa novae-zelandiae	Local	Fellfield	Not threatened
Poa pratense	Occasional	Exotic grasslands	Not threatened
Poa trivialis	Local	Forest margin	Exotic
Rytidosperma australe	Rare	Mill Creek, rock faces	Not threatened
Rytidosperma buchananii	Occasional	Rocky sites	Not threatened
Rytidosperma gracile	Rare	Footslope	Not threatened
Rytidosperma setifolium	Local	Mill Creek	Not threatened
Rytidosperma unarede	Occasional	Rock faces	Not threatened
Trisetum lepidum	Local	Mill Creek boulder field	Not threatened
Rushes and Sedges			
Carex coriacea	Local	Damp sites	Not threatened
Carex echinata	Local	Glenfinnan wetlands	Not threatened
Carex guadichaudiana	Local	Higher altitude wetlands	Not threatened
Carex ovalis	Local	Damp sites at higher altitudes	Exotic
Carex petriei	Local	Glenfinnan rock fan	Not threatened
Carex sinclairii	Local	Wet sites	Not threatened
Carex wakatipu	Occasional	Higher altitude	Not threatened
Carpha alpina	Rare	Mt Eostre wetland	Not threatened
Eleocharis acuta	Rare	T.R.H.S. W. branch Matukituki River, pond	Not threatened
Isolepis aucklandicus	Occasional	Wet sites	Not threatened
Isolepis caligenis	Local	Mt Eostre wetlands	Not threatened
Juncus antarcticus	Rare	Wetlands	Not threatened
Juncus articulatus	Local	Wet sites	Exotic
Juncus bufonius var. *bufonius*	Local	low altitude flats	Exotic
Juncus effusus	Local	Damp sites	Exotic
Juncus novae-zelandiae	Local	Damp sites	Not threatened

Species	Abundance at site	Notes	Threat ranking
Juncus tenuis var. *tenuis*	Local	Track sides	Exotic
Luzula banksiana var. *rhadina*	Rare	Mill Creek	Not threatened
Luzula picta var.	Rare	Low altitude banks	Not threatened
Luzula pumila	Local	Fellfield	Not threatened
Luzula rufa var. *rufa*	Occasional	Rock outcrops at higher altitudes	Not threatened
Oreobolus impar	Local	Glenfinnan wetlands	Not threatened
Oreobolus pectinatus	Local	Higher altitude wetlands	Not threatened
Schoenus pauciflorus "short"	Local	Higher altitude wetlands	Not threatened
Schoenus pauciflorus "tall"	Local	Higher altitude	Not threatened
Uncinia divaricata	Local	Damp fan Minaret Burn	Not threatened
Uncinia drucei	Local	Mill Creek	Not threatened
Uncinia rubra	Rare	W. Matukituki Flats	Not Threatened
Uncinia silvestris	Local	Beech forest	Not threatened

Monocotyledons (other)

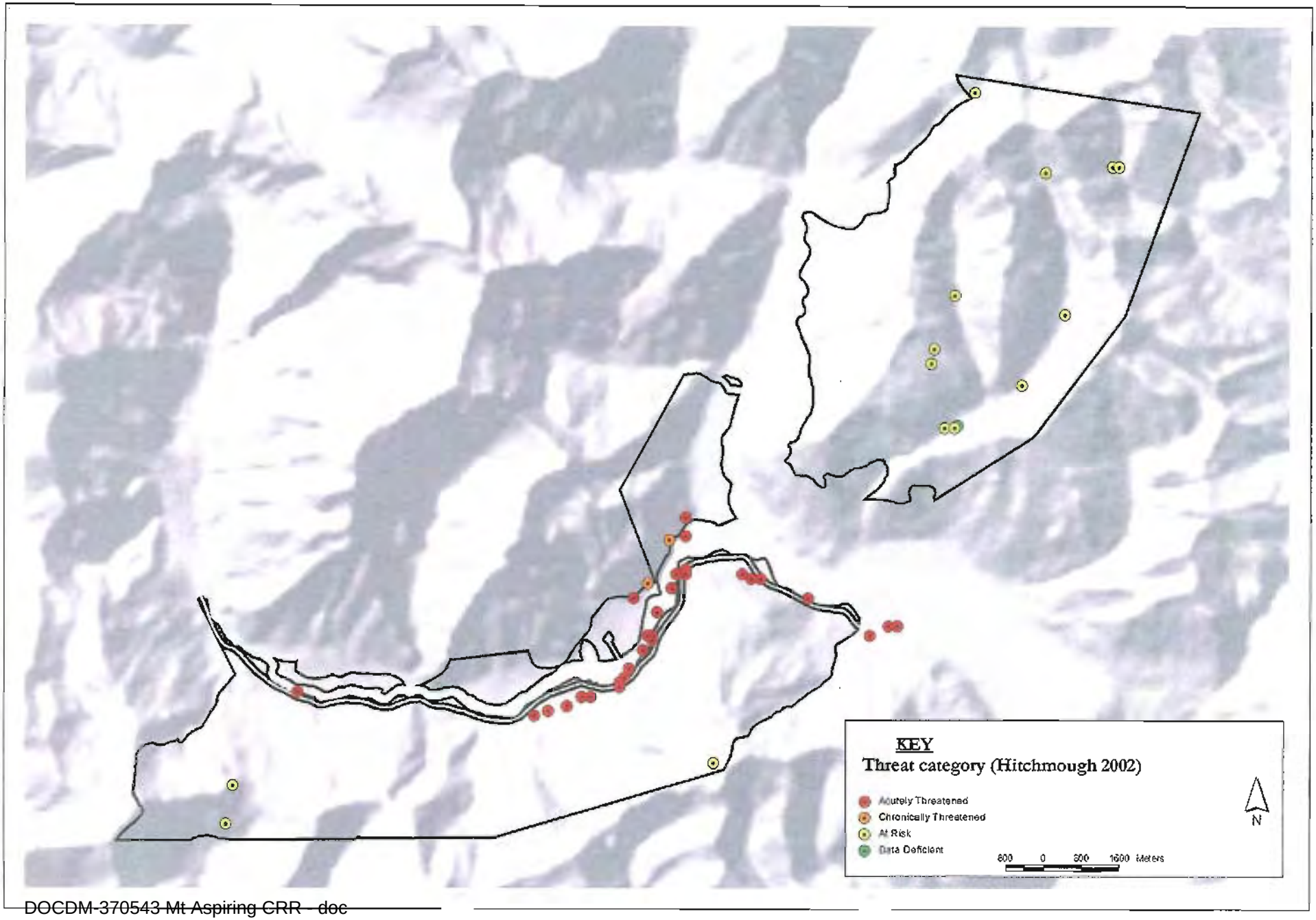
Aporostylis bifolia	Rare	Beech forest	Not Threatened
Arthropodium candidum	Rare	Shady rock faces	Not threatened
Astelia nervosa agg.?	Rare	Fog Peak	Not threatened
Astelia nivicola var. *nivicola*	Local	Tussock grasslands	Not threatened
Astelia petriei	Occasional	Tussock grasslands	Not Threatened
Chiloglottis (*Simpliglottis*) *cornuta*	Rare	Beech forest	Not threatened
Cordyline australis	Local	Lowland rocky faces	Not threatened
Corybas trilobus agg.	Rare	Beech forest	Not threatened
Microtis oligantha	Rare	West Matukituki grasslands	Not threatened
Microtis unifolia agg.	Occasional	Grasslands	Not threatened
Phormium cookianum	Occasional	Rock outcrops	Not threatened
Potamogeton cheesemanii	Local	Pond in West Matukituki	Not threatened
Prasophyllum colensoi s.s.	Occasional	Grasslands	Not threatened
Pterostylis areolata?	Rare	Forest margin, post-flowering	Not threatened
Rostkovia magellanica	Common	Subalpine grassland	Not threatened
Thelymitra sp.	Local	Dry sites in grassland	Not threatened

Ferns and Allies

Adiantum cunninghamii	Rare	Low altitude rock faces	Not threatened
Asplenium flabellifolium agg.	Local	Rocky sites	Not threatened
Asplenium flaccidum subsp. *flaccidum*	Local	West Matukituki shrublands	Not threatened
Asplenium richardii	Occasional	Beech forest and rocky sites	Not threatened
Asplenium trichomanes	Local	Rocky sites	Not threatened
Belchnum fluviatile agg.	Rare	Forest	Not threatened
Blechnum chambersii	Local	Streamsides	Not threatened
Blechnum montanum	Local	Low altitude forest	Not threatened
Blechnum penna-marina	Occasional	Rocky sites	Not threatened

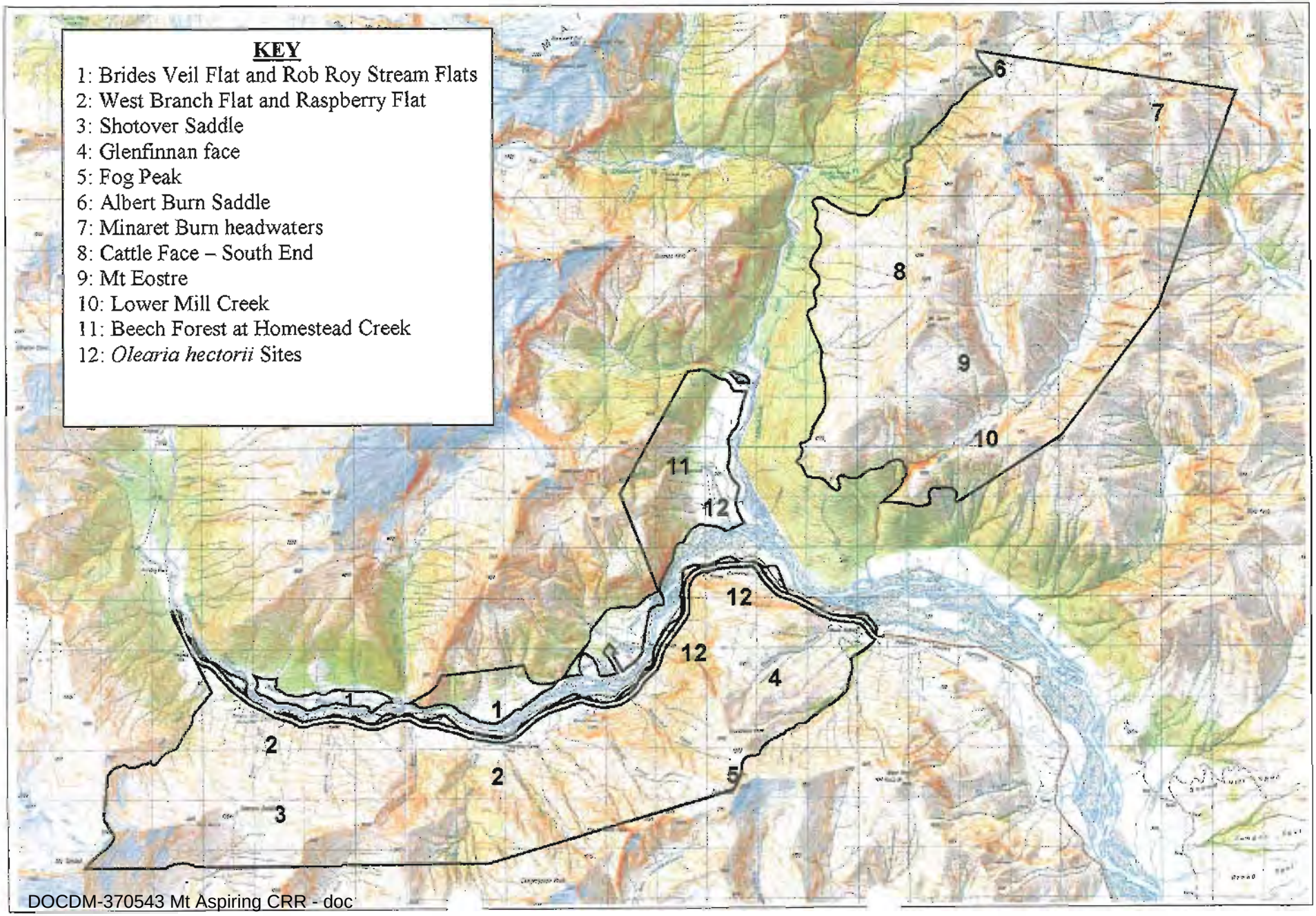
Species	Abundance at site	Notes	Threat ranking
Blechnum procerum	Local	Damp rock faces	Not threatened
Blechnum vulcanicum	Rare	Rocky sites	Not threatened
Ctenopteris heterophylla	Occasional	Forest	Not Threatened
Cystopteris tasmanica	Local	Rocky sites	Not threatened
Grammitis patagonica	Occasional	Rocky sites	Not threatened
Grammitis poepiggiana	Occasional	Rocky sites	Not threatened
Histiopteris incisa	Occasional	Forest	Not threatened
Huperzia australiana	Occasional	Subalpine	Not Threatened
Huperzia varia (ex. *Lycopodium varium*)	Rare	Low altitude forest	Not threatened
Hypolepis millefolium	Occasional	Rocky sites	Not threatened
Lycopodium fastigiatum	Rare	Lowland	Not threatened
Microsorum pustulatum	Rare	Forest	Not threatened
Pellaea rotundifolia	Local	Forest	Not Threatened
Polystichum cytostegia	Local	Alpine rock fall	Not threatened
Polystichum neozelandicum subsp. *zerophyllum* (ex *P. richardii* in part)	Rare	Forest	Not threatened
Polystichum vestitum	Occasional	Forest edges	Not threatened
Pteridium esculentum	Occasional	Lowland	Not threatened

APPENDIX 5: Distribution of Threatened and Data Deficient Plant Species on the Lease



APPENDIX 6: Map of Invertebrate Sampling Sites

APPENDIX 6: Invertebrate Sampling Sites



APPENDIX 7 : Invertebrate Species Recorded on Mount Aspiring Pastoral Lease

Order	Family	Genus species	Conservation Status
Orthoptera	Acrididae	*Alpinacris tumidicauda*	restricted to alpine habitat
		Sigaus australis	restricted to alpine habitat
		Phaulacridium marginale	widespread & common
	Stenopelmatidae	*Hemiandrus focalis*	restricted to alpine habitat
		Deinacrida connectens	restricted to alpine habitat
	Rhaphidophoridae	*Pharmacus sp.*	restricted to alpine habitat
Lepidoptera	Satyridae	*Erebiola butleri*	restricted to alpine habitat
		Argyrophenga antipodum	widespread & common
	Lycaenidae	*Zizina oxleyi*	widespread & common
	Hepialidae	*Wiseana copularis*	widespread & common
	Noctuidae	*Agrotis ipsilon*	widespread & common
		Physetica caerulea	locally common
		Tmetolophota atristriga	widespread & common
		T. semivittata	widespread & common
		Aletia virescens	widespread & common
		Meterana dotata	widespread & common
		Graphania mollis	widespread & common
		G. rubescens	widespread & common
		G. agorastis	widespread & common
		G. mutans	widespread & common
		G. plena	widespread & common
		G. ustistriga	restricted to *Olearia hectorii*
	Geometridae	*Asaphodes clarata*	restricted to alpine habitat
		A. cataphracta	locally common
		A. aegrota	widespread & common
		A. adonis	locally common
		Aponotoreas insignis	restricted to alpine habitat
		A. orphnaea	locally common
		Austrocidaria gobiata	restricted to alpine habitat
		Declana leptomera	widespread & common
		D. floccose	widespread & common
		Paranotoreas zopyra	restricted to alpine habitat
		Helastia corcularia	widespread & common
		H. cinerearia	widespread & common
		Homodotis megaspilata	widespread & common
		Epiphyrne undosata	widespread & common
		E. charidema	widespread & common
		Paradetis porphyritis	rare and restricted in distribution
		Pseudocoremia productata	widespread & common
		P. rudisata	restricted to alpine habitat
		P. leucelaea	widespread & common
		Pasiphila melochora	widespread & common
		Notoreas mechanitis	restricted to alpine habitat
		Notoreas blax	locally common

Order	Family	Genus species	Conservation Status
		N. ortholeuca	locally common
		Dasyuris callicrena	locally common
		D. anceps	locally common
		Gellonia pannularia	locally common
	Tortricidae	*Gelophaula trisulca*	restricted to alpine habitat
		Planotortrix excessana	widespread & common
		Harmologa amplexana	widespread & common
	Oecophoridae	*Izatha picarella*	widespread & common
		I. peroneanella	widespread & common
		Tingena apertella	widespread & common
		Trachypepla anastrella	widespread & common
	Crambidae	*O. clarkei eximia*	rare and restricted in distribution
		O. flexuosellus	widespread & common
		O. vittellus	widespread & common
		O. ramosellus	widespread & common
		O. dicrenellus	locally common
		O. haplotomus	restricted distribution
		O. callirrhous	widespread & common
		O. philpotti	restricted to alpine habitat
		O. corruptus	widespread & common
		O. aethonellus	widespread & common
		O. crenaeus	restricted to alpine habitat
		O. catacaustus	locally common
		Tawhitia glaucophanes	restricted to alpine habitat
		Eudonia feredayi	widespread & common
		E. submarginalis	widespread & common
		E.leptalea	widespread & common
		Glaucocharis interrupta	restricted to alpine habitat
		Scoparia acharis	restricted to alpine habitat
		Scoparia cyameuta	restricted to alpine habitat
		S. asaleuta	locally common
		S. minusculalis	widespread & common
	Nepticulidae	*Stigmella ilsea*	restricted distribution
	Arctiidae	*Nyctemera annulata*	widespread & common
	Nymphalidae	*Argyrophenga spp.*	widespread
Coleoptera	Curculionidae	*Lyperobius n.sp*	restricted to alpine habitats (other members of genus are threatened)
		Lyperobius spedenii Broun	restricted to alpine habitats (other members of genus are threatened)
		Zenographus metallescens Broun	widespread & common
		Gromilus sp.	widespread & common
		Anagotus latirostris (Broun)	restricted to alpine habitats (other members of genus are threatened)

Order	Family	Genus species	Conservation Status
		Otiorhynchus sulcatus (Fabricius)	widespread & common introduced species
		Hoplocneme sp	widespread & common
	Coccinellidae	*Illies galbula*	widespread & common
	Tenebrionidae	*Artystona wakefieldi* Bates	widespread & common
	Carabidae	*Cicindela parryi* White	widespread & common
		Megadromus sandageri Broun	range restricted (Hitchmough, 2002)
	Elateridae	*Prisahypnus frontalis*	widespread & common
	Scarabidae	*Scythrodes squalidus*	restricted to alpine habitat
	Cerambycidae	*Hybolasius* sp.	widespread & common
	Melyridae	*Dasytes* sp.	widespread & common
	Byrrhidae	*Epichorius* sp.	widespread & common
	Chrysomelidae	*Adoxia* sp.	widespread & common
	Dytiscidae	*Liodessus plicatus* (Sharp)	widespread & common
Hemiptera	Cicadidae	*Kikihia angusta* (Walker)	restricted to SI foothills
		K. rosea?	locally common
		Maoricicada sp.	locally common
		M. cambelli?	restricted to alpine habitats
	Miridae	*Mirid (indet.)*	unknown
	Pentatomidae	*Cermatulus nasalis*	widespread & common
Dermaptera	Forficula	*Forficula auricularia* Linnaeus	widespread & common introduced species
Blattodea	Blattidae	*Celatoblatta quinquemaculata*	restricted to alpine habitats
Pscoptera	Psocidae	*Indet. Sp.*	widespread & common
Araneae	Araneidae	*Eriophora pustulosa*	widespread & common
		Colaranea verutum	widespread & common
	Theridiidae	*Achaearanea* n.sp.?	unknown
	Salticidae	*Undescribed SpA.*	restricted to alpine habitats
	Zoropsidae	*Uliodon spp.*	widespread & common
	Amaurobioidea	*Indet. Sp.*	unknown
	Stiphidiidae	*Cambridgea?*	widespread & common
Opiliones	Palpatores	*Pantopsalis* Sp. A	widespread

Order	Family	Genus species	Conservation Status
Onychophora	Peripatopsidae	*Ooperipatellus viridimaculatus*	restricted to alpine habitat
Diptera	Muscidae	*Indet. Spp.*	widespread & common
	Calliphoridae	*Indet. Spp.*	widespread & common
	Syrphidae	*Melangyna novaezelandia*	widespread & common
	Tipulidae	*Indet. Spp.*	widespread & common
	Stratiomyidae	*Indet. Spp.*	widespread & common
	Tachinidae	*Indet. Spp.*	widespread & common
	Asilidae	*Indet. Spp.*	widespread & common
	Mycetophilidae	*Indet. Spp.*	widespread & common
	Anisopidae	*Indet. Spp.*	widespread & common
	Simulidae	*Austrosimulium sp.*	widespread & common
Hymenoptera	Ichneumonidae	*Indet. Spp.*	widespread & common
	Formicidae	*Monomorium antarcticum*	widespread & common
	Apidae	*Bombus terrestris*	widespread & common introduced species
	Colletidae	*Leioproctus sp.*	widespread & common
Diplopoda	Julidae	*Cylindroiulus britannicus*	widespread & common introduced species
Isopoda	Styloniscidae	*Trichoniscus sp.*	widespread & common
Platyhelminth	Geoplanidae	*Indet. Sp.*	widespread & common
Odonata	Petaluridae	*Uropetala chiltoni*	widespread & common

APPENDIX 8: Map of Freshwater Fisheries Sampling Sites during Tenure Review Inspection.

APPENDIX 8: Freshwater fisheries sampling sites during Tenure Review Inspection - Mount Aspiring Pastoral Lease