

## **Crown Pastoral Land Tenure Review**

**Lease name : ISLAND HILLS**

**Lease number : PC 034**

### **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.

The report attached is released under the Official Information Act 1982.

**ISLAND HILLS  
PASTORAL LEASE**



**CONSERVATION RESOURCES  
REPORT**

**DEPARTMENT OF  
CONSERVATION**

**FEBRUARY 2013**

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## PART 1 INTRODUCTION

Island Hills Pastoral Lease (hereafter called “the lease”; Map 1)) is leased by Dan and Mandy Shand. The property covers approximately 5083 hectares on the Organ Range in North Canterbury, west of Culverden. Most parts of the lease are steep mountain slopes, dissected by numerous steep-sided valleys, and rising to 1704m altitude at Mt Skedaddle. Smaller parts of the lease are gentler ridge crests, toe slopes and terraces, notably those at lower altitude along the Mandamus valley. Northwest parts of the property are drained by Gorge Stream and its tributaries, southwest parts by Silver Brook and its tributaries, and eastern parts by Mandamus River and its tributaries including Organ Stream and Bush Creek. Gorge Stream drains to the Waiiau River; other streams drain to the Hurunui River.

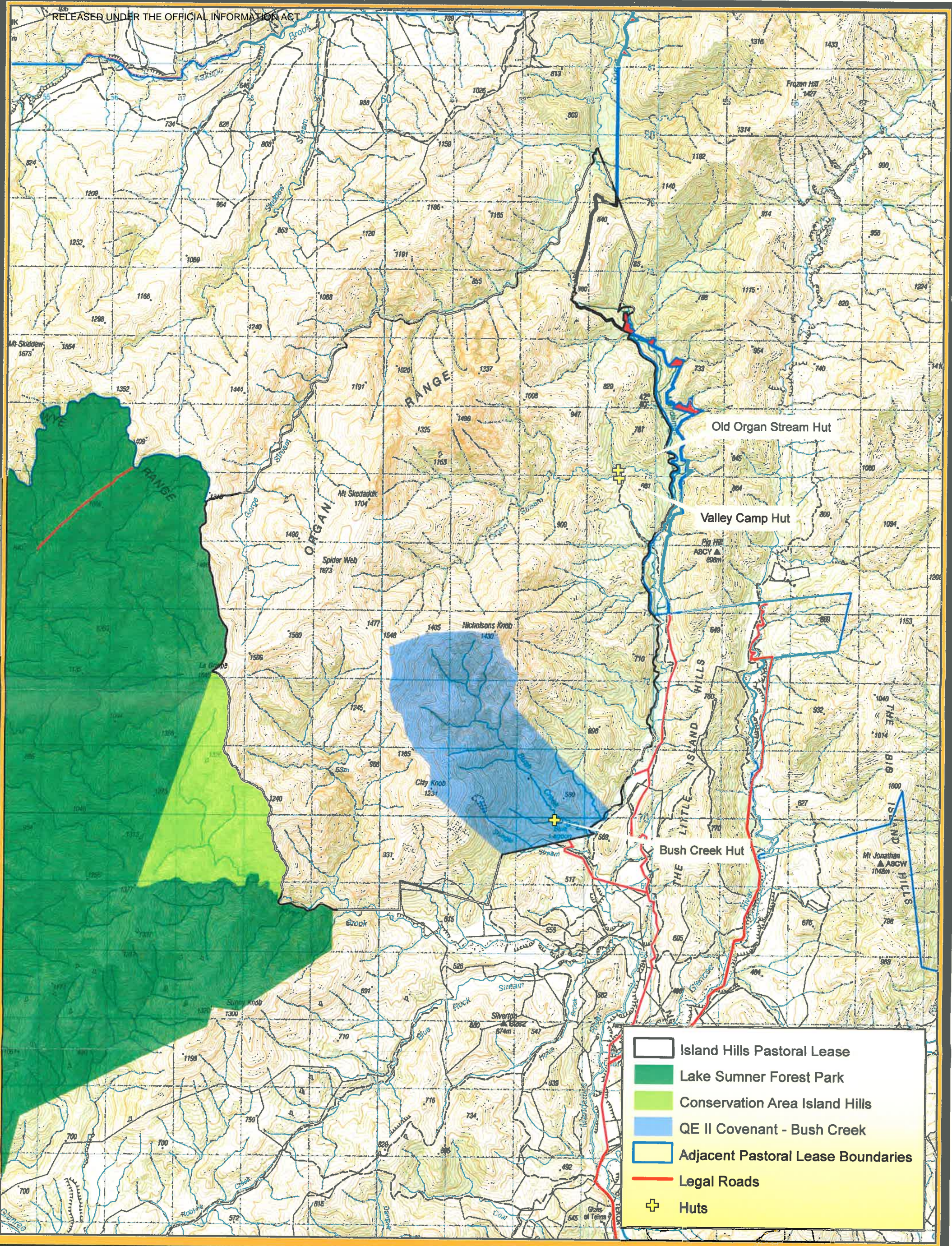
Island Hills Pastoral Lease lies in Sumner Ecological District (ED), within Puketeraki Ecological Region (McEwen, 1987). Sumner Ecological District has not been surveyed as part of the Protected Natural Areas Programme (PNAP). Part of the lease, located in the Bush Creek catchment, is protected by a QEII Open Space Covenant.

The property adjoins Lake Sumner Forest Park at its western boundary, Glynn Wye Pastoral Lease at its northern boundary, and freehold parts of Island Hills and the neighbouring ‘Glens of Tekoa’ at its southern boundary. The main access to the property is from State Highway 7 via Balmoral Station Road and Tekoa Road.

The tenure review inspection of the property was undertaken during February 2012 by a number of specialists. These specialists’ reports (listed below) form the basis of this Conservation Resources Report.

- Island Hills Pastoral Lease Landscape Assessment Report, Blakely Wallace Associates, July 2012, 8p + photographs and maps.
- Botanical Report for Island Hills Station for Tenure Review, Nicholas Head, DOC, July 2012, 18p.
- Bat, Bird and Lizard Survey of Island Hills Pastoral Lease, North Canterbury, Marieke Lettink, Fauna Finders, May 2012, 12p including photos + maps.
- Island Hills Pastoral Lease – A report on the aquatic fauna values, Scott Bowie, DOC, October 2012, 14p.
- Island Hills Pastoral Lease Tenure Review Invertebrate Survey, Warren Chinn, DOC, June 2012, 14p.





# Island Hills Pastoral Lease

## Map 1: Topographical, Cadastral, QE II Covenant and Hut Map

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

### **2.1 LANDSCAPE**

#### **2.1.1 Landscape Context**

Island Hills Pastoral Lease is located in North Canterbury inland from Culverden and approximately 80km north of Christchurch. The lease includes the Organ Range and rugged mountainous country east and southeast of the range. It ranges in altitude from approximately 500m in the south to 1704m at Mt Skedaddle on the crest of the Organ Range. Other named high points are Nicholsons Knob (1430m), Spider Web (1673m), La Grippe (1645m) and Clay Knob (1231m). To the north and west of Island Hills are high altitude mountain lands. A secondary and lower range, Little Island Hills, lies to the east outside the lease boundary.

The lease borders Lake Sumner Conservation Park to the west. To the south and east are developed farmland and forestry land. Vegetation within this developed land is a mix of pasture, pockets of bush and scrub, areas of broom and plantation forestry. Balmoral Forest is located to the east in the Culverden basin.

The Mandamus catchment has some of the most diverse and interesting geology in the region, predominantly greywacke and argillite with volcanics and limestone. The Organ Range is described as Land Type H13, steep to very steep, dissected subhumid to humid mountain range with narrow rounded ridges, bedrock outcrops and extensive scree especially at higher elevation. Snow tussock, alpine, subalpine and rockfield vegetation occur on the upper slopes with short tussock grassland, matagouri, kanuka and manuka shrubland with remnant beech forest on the lower slopes.

The Hurunui District Plan identifies large areas of Outstanding Natural Landscape (ONL) on the Gorge Stream side of the Organ Range on Island Hills Pastoral Lease, and in adjacent lands to the north, west and east.

#### **2.1.2 Landscape Description**

For the purposes of this landscape assessment, Island Hills Pastoral Lease is described as one landscape unit, reflecting its uniform landscape character. Landscape character is evaluated using the following criteria:

- **Naturalness:** the condition of the natural vegetation, patterns and processes and the degree of modification present.
- **Legibility:** expressiveness: how obviously the landscape demonstrates its formative processes.

- Aesthetic Factors: Distinctiveness is 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. Coherence is based on characteristics including intactness, unity, continuity, and compatibility (intrusions, alterations, disruptions tend to detract from coherence).
- Historic Factors: historically valued attributes in the context of a high country landscape.
- Visibility: the visibility of the landscape from public vantage points.

Within the Island Hills Landscape Unit, four areas are described (Map 2):

1. Mandamus Valley
2. Organ Range
3. Gorge Stream
4. Silver Brook

#### Mandamus Valley:

This area contains the low to mid elevation hill slopes on the true right (west side) of the Mandamus River, from the confluence of Silver Brook in the south (excluding freehold land adjacent to the southeast corner of the lease) to the lease boundary in the upper catchment in the north. The area supports extensive areas of mixed beech forest and second growth kanuka forest. Mixed indigenous shrublands are present in some areas. Small clearings are present on the valley floor adjacent to the river and at Valley Camp Hut. Areas of open pasture occur on previously cleared mid slopes, above the bushline (at approximately 800m) and on saddles and knobs. The area is inherently unstable with slips and sheet erosion visible.

Organ Stream is the largest of the Mandamus River tributaries on the lease. It has two main upper tributaries in basins below Mt Skedaddle, Spider Web and Nicholsons Knob. Lower Organ Stream is predominantly forested, except for a mosaic of shrubland and clearings on the valley floor. Native woody vegetation appears to be vigorously regenerating and will eventually cover open areas if left undisturbed. Extensive areas of exposed bedrock, rocky ribs and bluffs are a feature of the mid to upper slopes of the Organ Stream valley. The upper part of the catchment forms steep mountainous lands dominated by the imposing and impressive peaks of Nicholsons Knob and Mt Skedaddle. Beech forest forms a dominant cover and contrasts with surrounding sub-alpine vegetation, where snow tussock grades up-slope to rockland, fellfield and scree.

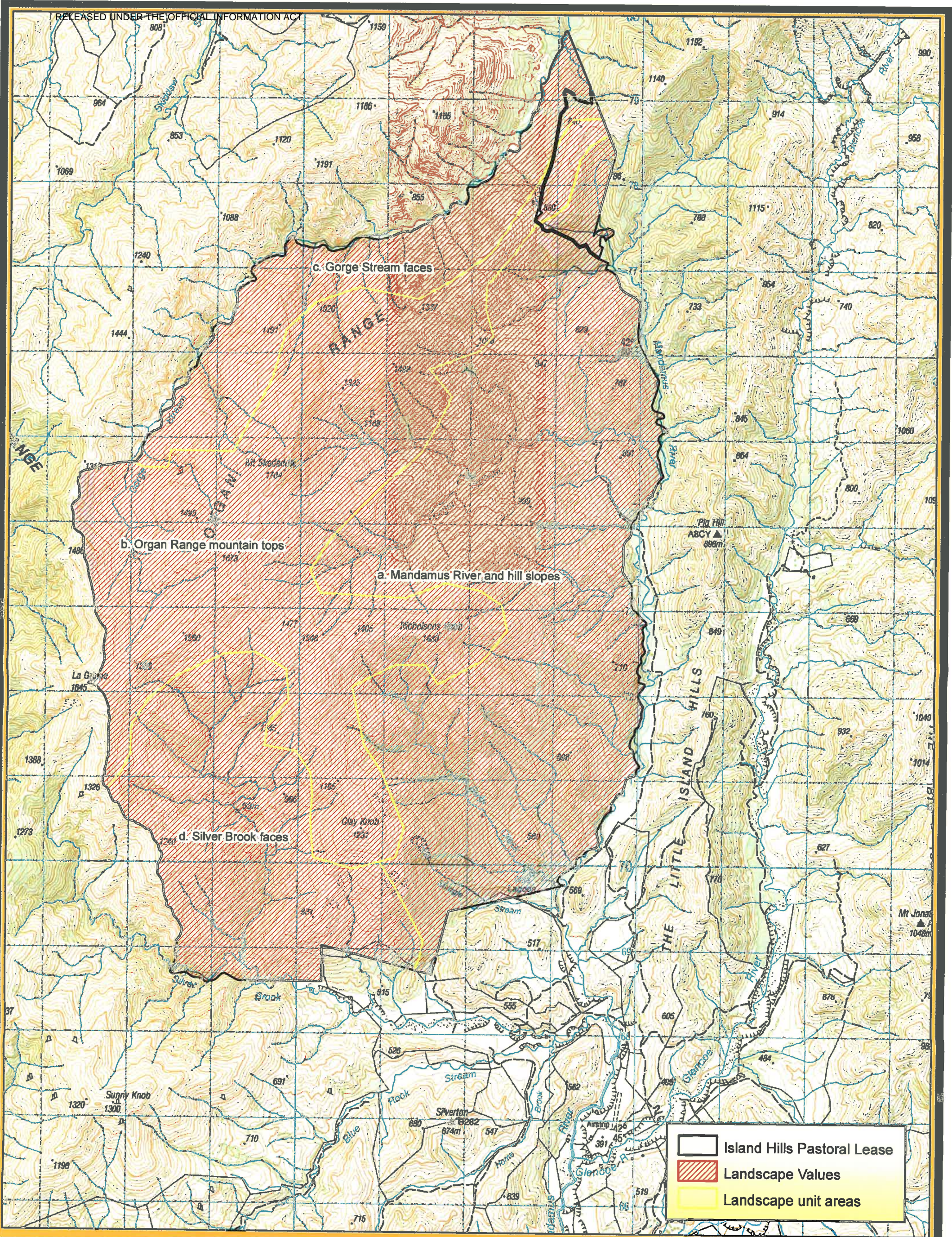
Narrow terraces occur between the Mandamus River and the flanks of the Organ Range. Small wetlands, lagoons and associated vegetation occur here, notably Blue Lagoon in Bush Creek.

#### Organ Range:

The Organ Range summits are a diverse area of rock outcrops, rockland, scree, fellfield, herbfield and tussockland, rising to Mt Skedaddle at 1704m. The bushline varies considerably from 800m on open spurs to 1200m within forested gullies.

Rock tors, bluffs and talus occur in steep incised gullies and on slopes. Snow tussock is dominant and forms an extensive cover to the ridge crest. Associated with these tussocklands is a diverse mix of sub-alpine herbs, grasses and shrubs, with taller woody vegetation nearer the bushline. The vegetation has many textures and shades of green but is dominated by the distinctive olive-green of snow tussock.





# Island Hills Pastoral Lease

## Map 2: Landscape Values

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Talus, fellfield and bare stony ground supporting mixed herbfield and grassland communities occur on summits and ridges. Rock bluffs regularly occur along and below the summit especially around Mt Skedaddle.

Gorge Stream:

This sub-unit comprises the west-, northwest- and north-facing mountain slopes above Gorge Stream. Vegetation patterns are similar to those described above and are dominated by snow tussockland. Subalpine shrubland is dominant in damp gullies at the base of the high basins and is often associated with talus. Mountain beech forest is confined mainly to lower gullies but extends up-slope in places. Secondary kanuka forest is also much less significant on these faces. Bluffs and exposed rock outcrops are also a feature on this side of the Organ Range.

Silver Brook:

These southern slopes of the Organ Range include the large side tributary east of La Grippe and the southern face of Clay Knob. This area has similar landform and vegetation characteristics as the remainder of the lease, except that the southern face of Clay Knob has a large broom infestation and areas of regenerating shrubland. This is the only part of the lease that does not have a high degree of natural character.

**Visual and scenic values**

The whole of Island Hill Pastoral Lease has significant visual and scenic values. The upper slopes of the Organ Range are visually impressive and distinctive. The fluted bedrock from which the range derives its name is a distinctive feature and a prominent landmark. The varied rockland, tors, bluffs, scree and associated plant communities are characteristic of the summit ridge and are visually impressive.

On the lower bush-covered slopes of the lease, the intactness of the forest and shrubland communities combined with the distinctive exposed upper slopes and summit ridge contribute to high overall visual and scenic values.

The summit ridge of the Organ Range is visible from the Lewis Pass Highway (SH7) west of the turn off to Hamner Springs and in distant views from public places between Waikari and Culverden. In these views, the Organ Range forms the foreground of the ranges of the Southern Alps. The lease is also visible from high ground within Lake Sumner Conservation Park.



## Significance of Landscape Values

With the exception of the broom infestation on the south face of Clay Knob and small fringe areas of the lease along the Mandamus River, the entire pastoral lease has high inherent landscape values due to the intactness and integrity of the landform and vegetation. The remnant beech forests are highly representative of the original vegetation and are complemented by regenerating kanuka forest and the intact and extensive sub-alpine vegetation on upper slopes of the Organ Range. The summit rocklands, tors, bluffs, scree and associated plant communities form an impressive and intact mountain landscape. The Organ Range is a distinctive local landmark of inland North Canterbury. The lease represents an important intact example of a Canterbury high country landscape at the transition between the plains and Southern Alps. The evaluation summary for the significance of the landscape values is found in Table 1.

Table 1: Evaluation Summary

Criteria	Value	Comment
Naturalness	high	High natural values over all parts of the lease, apart from the southern face of Clay Knob; all natural patterns and processes are intact.
Legibility	medium	The varied geology of Island Hills (tectonics, faulting, and volcanism) is moderately expressed, especially on the upper slopes; formative processes and landforms on lower slopes are masked by forest.
Aesthetic Factors	high	The entire lease has high aesthetic value; it is visually distinctive, especially the upper slopes and summit ridge; there are no obviously discordant features within the lease, other than the area of broom on Clay Knob.
Historic Factors	medium	The early pastoral history, including forest clearance in the early days and subsequent careful management over many years by the Shand family, is reflected in the landscape values of the lease today.
Visibility	medium	The Organ Range summit ridge is visible from the Lewis Pass highway, other public viewpoints and Lake Sumner Conservation Park.



## **2.2 GEOLOGY, LANDFORMS AND SOILS**

### **2.2.1 Geology**

The basement rocks of Island Hills Pastoral Lease, exposed on higher slopes, are Pahau terrane rocks comprising bedded sandstone and mudstone of Cretaceous age (Rattenbury *et al*, 2006). Within this formation are basalts of Cretaceous age (Suggate, 1978). These rocks are overlain on valley floors by river gravels and sand.

### **2.2.2 Landforms**

Island Hills Pastoral Lease is dominated by the Organ Range. Prominent landforms are: open rocky higher-altitude ridges; gentler basins and upper slopes; broad dissected mid-altitude slopes with extensive beech forest; incised forested gullies of the larger streams; and, low-altitude terraces. Spectacular rock-fluting is present at higher altitudes. The Organ Range landform is representative of the North Canterbury mountain lands.

### **2.2.3 Soils**

All parts of the lease have Kaikoura or Tekoa steepland soils, except for a very small area of Ashwick silt loam on the Mandamus River terraces at the southeast lease boundary.

### **2.2.4 Land Use Capability**

All parts of the lease, except for a very small area on the Mandamus River terraces at the southeast lease boundary, are lands with very severe limitations for land use (Class 8e), severe limitations for land use (Class 7e) or non-arable land with moderate limitations.

### **Significance of Geology, Landforms and Soils**

The geology, landforms and soils of Island Hills Pastoral Lease are representative of the North Canterbury mountain lands. They are contiguous with similar landforms on adjacent properties and within Lake Sumner Conservation Park. Significant landforms on the lease are the higher-altitude ridges and basins, including fluted rock formations, broad dissected mid-altitude slopes with extensive beech forest; incised forested gullies of the larger streams; and, low-altitude terraces.

## **2.3 CLIMATE**

Island Hills Pastoral Lease has a subhumid mountain climate with cold winters and warm dry summers. Predominant winds are from the northwest, with occasional gales. Snow can affect all parts of the lease and lie at higher altitudes for several weeks in winter. Average annual precipitation is between 800 and 1200mm (Tomlinson, 1976). The climate of the area is influenced by the sheltering effects of the Southern Alps, resulting in drier conditions than occur in mountain environments nearer the main divide.



## 2.4 LAND ENVIRONMENTS OF NEW ZEALAND (LENZ)

LENZ is a classification of New Zealand landscapes using a comprehensive set of climate, landform and soil variables chosen for their role in driving geographic variation in biological patterns (Leathwick *et al*, 2003). The units of LENZ (land environments) are areas of land having similar environmental conditions regardless of where they occur in New Zealand. Therefore LENZ provides a framework that allows prediction of a range of biological and environmental attributes including the character of natural ecosystems, the vulnerability of environments to human activity and the potential spread or productivity of new organisms (Leathwick *et al*, 2003). LENZ data are presented at four levels of detail, with Level I containing 20 environments, Level II containing 100 environments, Level III containing 200 environments and Level IV containing 500 environments.

In an analysis of the LENZ Level IV data, remaining indigenous vegetation cover and the extent of legal protection, Walker *et al*, (2005) proposed a threat classification for New Zealand's land environments based on two components of vulnerability (likelihood of loss): legal protection and risk of loss. This threat classification (Table 2) has become the recognised benchmark for the promotion of threatened LENZ conservation.

Table 2: LENZ threat categories and definitions (Walker *et al*, 2005)

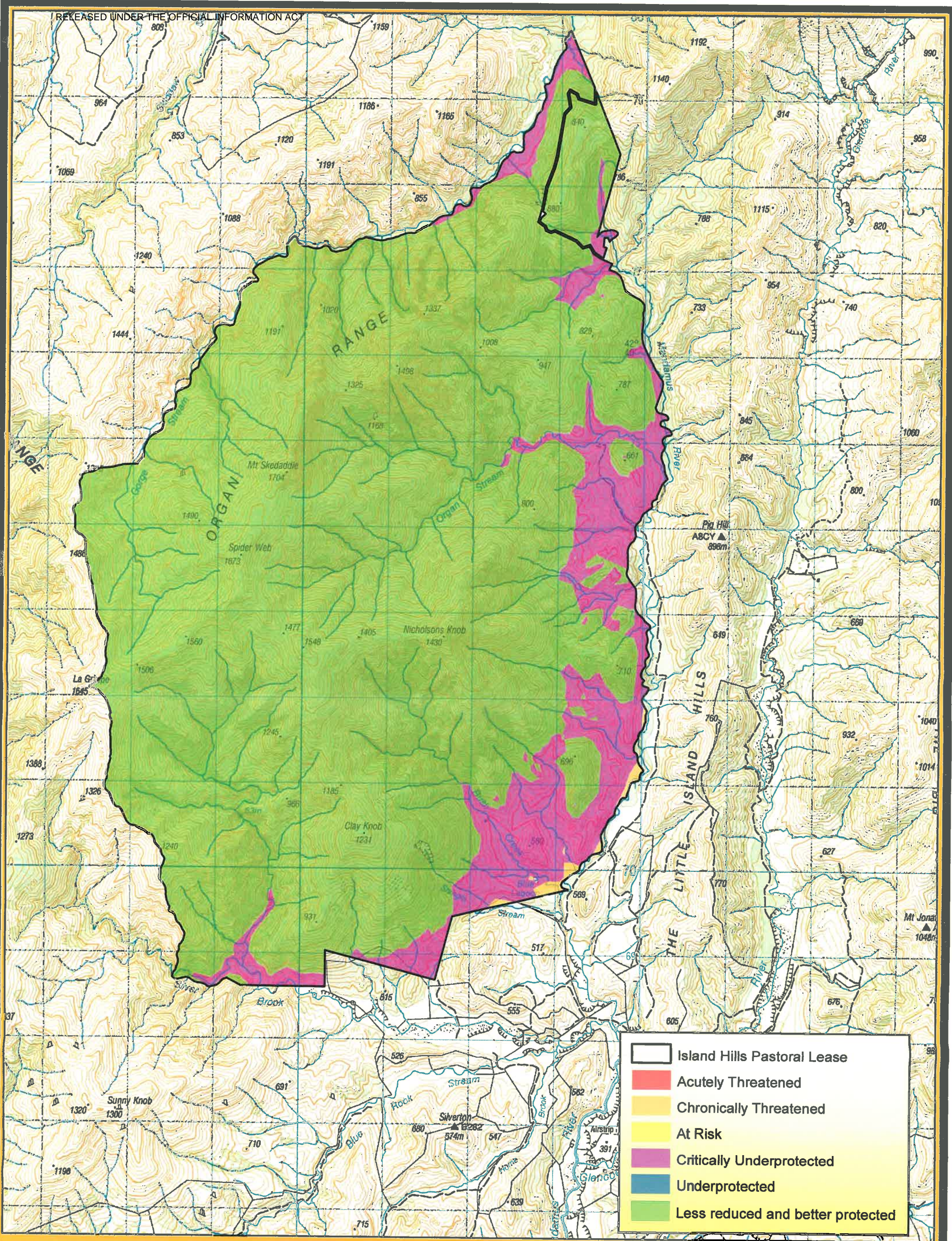
Category	Criterion
acutely threatened	<10% indigenous cover remaining
chronically threatened	10-20% indigenous cover remaining
at risk	20-30% indigenous cover remaining
critically under-protected	>30% indigenous cover remaining <10% legally protected
under-protected	>30% indigenous cover remaining 10-20% legally protected
less reduced and better protected	>30% indigenous cover remaining >20% legally protected

On Island Hills Pastoral Lease small low-altitude areas on the terraces of Mandamus River at the southeast lease boundary lie within a "chronically threatened" land environment (B3.2a). Lower hill slopes in the main valleys on the lease (below approximately 600m) lie within a "critically under-protected" land environment (E1.4d). All other higher-altitude parts of the property lie within "less reduced and better protected" land environments (mostly E1.4c, P1.2a and P1.2d).

### Significance of Land Environments

Approximately 15% of Island Hills Pastoral Lease lies within chronically threatened or critically under-protected land environments (Map 3). These land environments comprise most parts of the lease below approximately 600m altitude.





# Island Hills Pastoral Lease

## Map 3: LENZ Threat Categories

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## 2.5 VEGETATION

### 2.5.1 Ecological Context

The original vegetation of the property below c.1200m probably comprised mixed black beech, mountain beech and red beech forest with occasional podocarp trees: matai and mountain tötara. Above tree line, the original vegetation would have comprised tussocklands dominated by species of snow tussock, sub-alpine shrubland, herbfield and specialist scree/talus communities (Leathwick *et al*, 2003).

Large areas of the lease retain native plant cover that is representative of the original plant communities, such as the large remnants of old growth beech forest, and the notably intact sub-alpine tussockland and shrubland communities. Most of the remainder of the lease supports regenerating forest and scrub, forming extensive mosaics of mountain beech, kánuka and manuka. Small pockets of short tussock and exotic grassland occur on hill slopes and terraces that have yet to regenerate to native woody cover. With the exception of a large area of dense (introduced) broom on the southern flanks of Clay Knob, only relatively small areas of the property are dominated by exotic vegetation.

### 2.5.2 Vegetation and Flora

The lease is divided into two botanical survey units for this description of the vegetation.

- Unit 1: Eastern Slopes (Mandamus River catchment)
- Unit 2: Western Slopes (Gorge Stream catchment)

#### Unit 1: Mandamus

##### Beech forest:

Old growth beech forest occurs in many gullies and on steep slopes, the largest area being in Bush Creek catchment. Mountain beech is the predominant beech tree species and forms a typically open and 'naturally' weather battered canopy to c.25m. Red beech and silver beech are also common at some sites and form a significant component of the canopy at suitable locations, such as Bush Creek. Common sub-canopy species are putaputāwētā and broadleaf. Lancewood and mountain five-finger are less common. Mountain tötara is occasionally present. Matai has been recorded in Bush Creek, but was not observed on this survey. It is likely to be very rare as it is close to its natural limit in this area. Bush lawyer is common.

Sapling and shrub layers contain a high diversity of species, as expected for this forest type, and are generally in good condition. Common shrubs present, albeit varying in abundance and distribution, are *Coprosma rhamnoides*, *C. microphylla*, *C. taylorii*, *C. propinqua*, *C. linariifolia*, weeping mǎpou, prickly mingimingi and *Leucopogon fasciculatus*. Seedlings and saplings of mountain beech, broadleaf, putaputāwētā, lancewood and mountain five-finger are common throughout.

Forest floor vegetation is generally in good and highly natural condition, although heavy pig rooting and cattle damage was locally apparent. Various ferns are present, including prickly shield fern, *Hypolepis ambigua*, thousand-leaved fern, kiwakiwa, lance fern, small kiokio, kiokio, little hard fern and water fern. Hook grasses, such as *Uncinia uncinata*, form extensive patches in places. *Uncinia rupestris* and *U. fuscovaginata* are also common. Common herbs include *Lagenifera pinnatifida*, *L. pumila*, *L. strangulata*, *Ranunculus reflectus*, *Nertera villosa*, *Galium propinquum* and *Oxalis*



*lactea*. The grasses *Poa imbecilla* and *Rytidosperma gracile* are present throughout, with the rare and poorly-understood grass *Stenostachys gracilis* also present in localised patches.

Riparian forest margins support a mixed composition of tree species in addition to beech, including broadleaf, putaputawētā, lancewood, kowhai, tree fuchsia, shining karamu, wineberry, mountain wineberry, tree daisies (*Olearia paniculata* and *O. arborescens*), and the shrubs *Hebe salicifolia*, *H. brachysiphon*, *H. glaucophylla*, *Carmichaelia odorata* and weeping māpou. Mountain ribbonwood, including notably large specimens, is also present along forest edges in the western part of the lease.

#### Känuka Forest and Manuka Scrub:

Känuka forest forms extensive cover on hill slopes. This forest is difficult to describe as it occurs as an extensive mosaic of different types, with känuka ranging in size from old stunted trees at harsh sites, to huge trees taller than 15m in shady damp gullies. Some are mixed with manuka, others occur with regenerating mountain beech and other hardwood species, notably broadleaf, putaputawētā, tarata (*Pittosporum tenuifolium*) and lancewood. On harsh sites, such as dry spurs, känuka is often stunted (<4m tall) and occurs with sub-alpine species, including turpentine shrub, snowberry (*Gaultheria antipoda*), *Olearia cymbifolia*, *Celmisia haastii* and slim snow-tussock.

The understory composition of känuka forests is also highly varied depending on age of stand, density and height of canopy, slope and aspect. On dry steep sunny sites the understorey commonly comprises a dense shrub layer of prickly mingimingi, *Coprosma rhamnoides*, *Helichrysum lanceolatum* and a ground layer of species that often form dense patches, such as clubmosses (*Lycopodium volubile* and *L. scariosum*), hook grasses (*Uncinia rupestris* and *U. uncinata*), little hard fern, carpets of moss and numerous other herbs and grasses, as described elsewhere in the report. Seedlings of broadleaf and mountain beech are common throughout under the känuka forest canopy. *Traversia baccharoides* (declining; de Lange *et al*, 2009) is occasionally present.

Manuka scrub occupies extensive areas, primarily on mid/upper shady slopes. This plant community was not assessed in detail, but typically forms dense cover to around 4m tall. Sapling beech and other hardwood trees and shrubs are typically scattered throughout as it slowly regenerates back to beech forest. Toward the upper altitude limit of manuka, around 1200m, it often occurs with sub-alpine species such as inaka, snow tötara, *Olearia cymbifolia* and slim snow-tussock.

#### Shrubland, grassland and rocky habitats:

Small-leaved shrubland is occasionally present, such as in the Organ Stream catchment. It is dominated by a mixed canopy of *Coprosma propinqua*, *C. taylorii*, *C. rugosa*, porcupine shrub, matagouri, mountain tauhinu, *Hebe brachysiphon*, *H. salicifolia*, *Helichrysum lanceolatum*, mountain wineberry, *Corokia cotoneaster*, native broom, kanuka and manuka. The nationally threatened shrub *Olearia fimbriata* (nationally vulnerable; de Lange *et al*, 2009) is occasionally present here. Vines are common and include *Clematis forsterii*, *C. marata*, pöhuehue, bush lawyer and native jasmine. Prickly shield fern and bracken are also common in patches. Like all secondary woody communities on the lease, these shrublands are regenerating to forest and they regularly contain young plants of beech and various hardwood trees as described earlier.

Pockets of open grassland occur in places, especially mid slope in the Organ Stream catchment, but they comprise only a minor component of the overall vegetation on the lease. Browntop is



the dominant species and forms a dense sward in combination with other exotic grasses and herbs. Scattered fescue tussock and silver tussock are typically present and can be a major component (>30%) of the cover, especially on exposed spurs. Associated with these plant communities are a range of exotic and native herbaceous species, such as mouse-ear hawkweed, mouse-ear chick weed, sweet vernal, crested dogs tail, catsear, dwarf heath, *Helichrysum filicaule*, blue tussock and yarrow. Grassland areas are regenerating to scrub and forest and typically contain scattered k nuka, manuka and shrubs, and invariably grade to dense shrubland and regenerating k nuka and beech forest.

Rocky tors, bluffs and talus occur in incised gullies and on steep slopes. These habitats support distinctive plant communities associated with exposed, unstable, extreme, rocky habitats. The few that were assessed support the following species: *Heliobeba raoulii*, *Helichrysum intermedium*, *Coprosma acerosa* (declining; de Lange *et al*, 2009), white fuzzweed, blue wheat grass, *Geranium brevicaule*, *Senecio dunedinensis* (naturally uncommon; de Lange *et al*, 2009), *Colobanthus strictus*, *Pimelea traversii*, *Olearia cymbifolia*, *Anaphaloides bellidoides*, *Scleranthus uniflorus*, *Asplenium trichomanes*, *Asplenium appendiculatum* subsp *appendiculatum*, *Rytidosperma setifolium* and *Hebe traversii*. Other native species present are dwarf heath, *Celmisia gracilenta*, *Raoulia hookerii*, golden speargrass, *Viola cunninghamii*, silver tussock, *Raoulia glabra*, *Blechnum penna-marina*, *Asplenium flabellifolium*, *Brachyglottis bellidoides*, harebell, *Microtis uniflora* and *Thelymitra hatchii*. Stunted shrubs of manuka, mountain wineberry, porcupine shrub, *Coprosma propinqua* and tutu are also present. Weed species are not particularly prevalent, but include mouse-ear hawkweed, sheep's sorrel, Chewings fescue and catsear.

#### Valley floor terraces:

Narrow terraces and terrace-risers occur between the Mandamus River and the flanks of the Organ Range. These primarily support a mosaic of modified short tussock grassland, scattered shrubland, and second growth k nuka and beech forest. Many small wetlands also occur in old channels and back-terrace depressions.

Fescue tussock grassland forms the dominant plant community on terraces. Tussock cover is typically quite sparse (<20%) and although these grasslands are quite modified they support a high diversity of native herbaceous species associated with frost flats. Common native species include dwarf heath, *Leptinella squalida* subsp *mediana*, *L. pusilla*, grassland buttercup, blue tussock, *Rytidosperma pumilum*, *Helichrysum filicaule*, *Geranium brevicaule*, *Uncinia rubra*, *Celmisia gracilenta*, *Muehlenbeckia axillaris*, *Luzula rufa*, native mint, *Gonocarpus aggregatus*, woolly moss, wire moss, spineless bidibid, *Nertera villosa*, *Carex breviculmis* and *Euchiton audax*. Silver tussock and shrubs of mountain tauhinu, matagouri, porcupine shrub, *Coprosma propinqua*, k nuka and m nuka are common, albeit scattered, and form dense patches in places. Common exotic species include mouse-ear hawkweed, white clover, red clover, browntop, sweet vernal, purging flax, yarrow, mouse-ear chickweed, catsear and king devil hawkweed.

Small wetlands occur in old channels typically at the back of terraces. They tend to be dominated by *Carex secta*, bog rush, *Carex sinclairii*, *C. coriacea*, *Juncus edgariae*, with holy grass and toetoe occasionally present. Other species recorded include *Carex virgata*, *C. flagellifera*, spike sedge, *Blechnum novae-zealandiae*, *Hypolepis millefolium*, little hard fern and *Ranunculus glabrifolius*. Common exotic species are *Stellaria graminea*, water speedwell, monkey musk, Yorkshire fog and water forget-me-not. These wetlands are fairly modified and disturbed by cattle, but most retain their integrity and remain broadly representative of the original vegetation.



Pockets of mountain beech and tall k nuka forest occur on terrace risers. Kowhai, lancewood and broadleaf are common components of these forest communities, as are the other hardwood trees and shrubs described above for riparian forests. The understory contains many species also described earlier, including species which appear to favour terraces and gentle lower slopes, such as bush lily, *Pittosporum divaricatum*, *Raukawa anomalus*, shining karamu, *Coprosma linariifolia* (large specimens), weeping mapou, red matipo, bidibid, kiwakiwa and water fern. Steep, sunny and rocky terrace risers are characterised by tree daisies (*Olearia paniculata*, *O. arborescens*), kowhai, tutu, *Carmichaelia odorata*, *Hebe traversii*, *H. glaucophylla*, matagouri, *Corokia cotoneaster* and *Coprosma* species.

#### Sub-alpine vegetation above tree line:

Slim snow-tussockland is the dominant plant community above tree-line and forms notably uniform and extensive (>40%) cover to the ridge crest. These tussocklands are highly natural and contain a very large number of associated sub-alpine herbs, grasses and shrubs. Common species include *Celmisia semicordata*, *C. densiflora*, *C. discolor*, *C. spectabilis*, *C. viscosa*, false speargrass, carpet grass, bristle tussock, *Ourisia caespitosa*, *Phyllachne colensoi*, snowberry (*Gaultheria depressa*), *Anisotome imbricata* var. *prostrata*, *A. aromatica*, *Brachyglottis bidwillii*, woodrush, mountain fescue tussock, blue tussock, golden speargrass, *Gentianella montana*, *G. corymbifera*, *Geum parviflorum*, *Lobelia macrodon*, *Epilobium chlorifolium*, *E. gracilipes*, *E. glabellum*, *Euphrasia laingii*, *Ranunculus enysii*, *Forstera bidwillii*, *Deyeuxia avenoides*, *Wahlenbergia albomarginata*, *Anisotome flexuosus*, *Acaena glabra*, *A. fissistipula*, *Myosotis elderi* and *Microseris scapigera*. Pockets of turpentine scrub, snow t tara, *Hebe rakaiensis*, *Hebe odora*, *Gaultheria crassa* and *Olearia cymbifolia* occur throughout, but become especially prevalent toward tree line and more so on eastern aspects. Patches of whipcord hebes are present, in particular along gentle spurs and include *Hebe lycopodioides*, *Hebe hectorii* var. *demissa* and *Hebe cheesemaniae*.

Talus, fellfield, and bare-stony ground habitats, are common along summit spurs and support mosaics of mixed herbfield and grassland communities. Slim snow-tussock often forms strips across broad and gently sloping ridges. Flocks of vegetable sheep occur in places. *Phyllachne colensoi*, *Scleranthus uniflorus*, *Raoulia grandiflora*, *R. hookerii*, *Chionobebe pulvinaris* and *Celmisia* species are common cushion plants. Other common species include *Epilobium pycnostachyum*, *E. rubromarginatum*, *E. porphyrium*, *E. crassum*, *Raoulia grandiflora*, *Anisotome imbricata* var. *prostrata*, *A. flexuosus*, *Anaphaloides bellidoides*, *Colobanthus acicularis*, *C. buchananii*, feathery tutu, clubmoss (*Lycopodium fastigiatum*), *Parabebe decora*, *Myosotis australis*, *Geranium brevicaulis*, *Poa sublimis*, *Koeleria novo-zelandica* agg. and *Poa buchananii*, with *Leptinella atrata*, *Aciphylla monroi*, *Carex wakatipu*, and *Notothlaspi rosulatum* occasionally present. Shrubs regularly present are *Myrsine nummularia*, *Hebe pinguiifolia*, *Dracophyllum pronum*, *D. kirkii*, *Pentachondra pumila*, *D. uniflorum*, snow t tara, *Hebe rakaiensis*, *H. cheesemaniae*, *Pimelea traversii*, *Gaultheria crassa* and *Olearia nummulariifolia*. These shrublands often form dense patches, usually around talus slopes below ridges.

Rock bluffs occur regularly along and below the summit with especially massive bluffs around Mt Skedaddle. These areas were not surveyed in detail, although the following specialist bluff species were noted: *Pachycladon fastigiatum*, *Anisotome pilifera*, New Zealand edelweiss and *Helichrysum intermedium*. Talus is typically fringed by snow t tara, turpentine scrub and hebes.

Scree is present but was not inspected. It is likely to support representative native plant communities, including many of the species described above for talus communities.



## Unit 2: Gorge

This part of the lease was not inspected closely. Slim snow-tussockland is the dominant plant community across the majority of Unit 2. It forms notably uniform cover, often greater than 50%, and regularly descends to the valley floor of Gorge Stream. Vegetation on upper slopes is similar to that described for Unit 1, although sub-alpine shrubland communities appear less common on western aspects. These grasslands appear intact and undoubtedly contain a high diversity of native plant species.

Mountain beech forests are more limited in extent in Unit 2, and primarily confined to gullies on lower slopes. This area also lacks the extensive second growth k nuka hardwood forests which are feature of Unit 1, presumably reflecting the drier northerly aspects. This part of the property clearly supports extensive and intact sequences of highly representative native plant communities.

## Notable Flora

Several nationally threatened and regionally rare species were recorded on the lease. The most important is *Olearia fimbriata* (nationally vulnerable). Other notable species are *Traversia baccharoides* and *Coprosma acerosa* (declining), *Senecio dunedinensis* (naturally uncommon), *Pachycladon fastigiata*, *Stenostachys gracilis* (data deficient), *Hebe hectorii* subsp. *demissa* (only record in ED), *Helichrysum depressum* X *filicaule* (an unusual and uncommon hybrid), and *Rytidosperma merum* (ranked data deficient but most likely to be upgraded to threatened).

## Significant Inherent Botanical Values of Island Hills Pastoral Lease

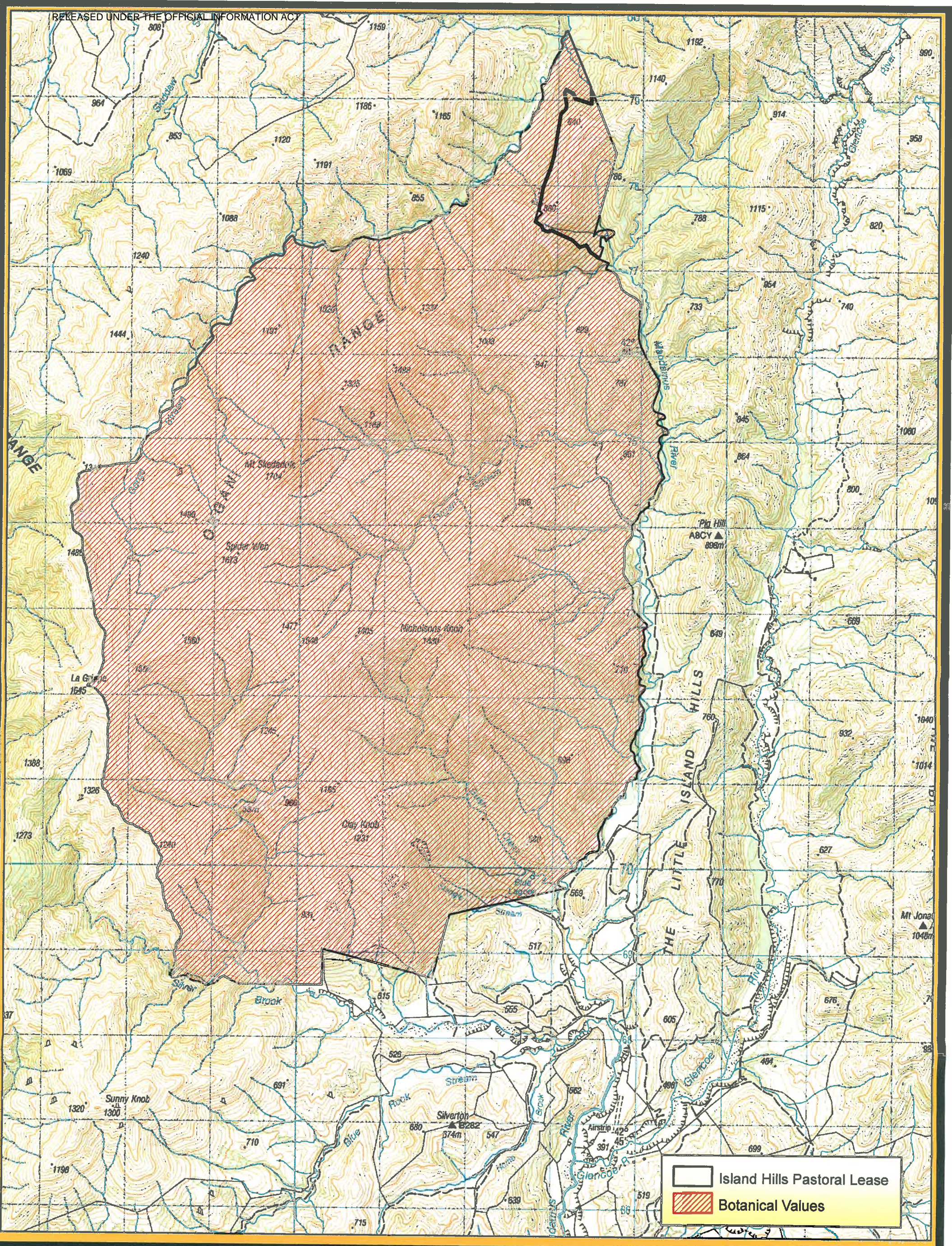
The majority of the lease contains significant inherent value (Map 4), notably representative native plant communities, intact ecological sequences and indigenous biodiversity on threatened and under-protected land environments. Accordingly, almost all of the property meets the criteria for protection.

Of highest significance are the remnant beech forests. These are highly representative of the original vegetation and are relatively intact in structure and composition. The values of these forests are complemented by the extensive mosaic of advanced second growth k nuka forest, itself highly representative of successional forest communities. Healthy ecological functioning is a notable feature of these forests, as indicated by vigorous regeneration and a high diversity of sapling and seedling tree species.

High-altitude ecosystems dominated by slim snow-tussockland and associated sub-alpine shrubland are also highly original and representative of the pre-human ecological character. These plant communities are healthy and intact, and contain a remarkable diversity of plant communities. Associated bluff, scree, fellfield, flush and seep habitats, which occur throughout the higher altitude parts of the lease, are also highly original. The extensive sequences of indigenous vegetation from valley floor to sub-alpine summits are an important feature.

Valley floor alluvial surfaces and toe-slope forest, shrubland and wetland communities occur on threatened and critically under-protected Land Environments. Protection of these areas is a national priority (MfE 2000; MfE 2007).





# Island Hills Pastoral Lease

## Map 4: Botanical Values

Department of Conservation  
Te Papa Atawhai

New Zealand Government

