

# **Crown Pastoral Land Tenure Review**

**Lease name : HUNTER HILLS**

**Lease number : PT 082**

## **Conservation Resources Report**

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.

**July**

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# HUNTER HILLS PASTORAL LEASE



## CONSERVATION RESOURCES REPORT

Department of Conservation

July 2006

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## PART 1 INTRODUCTION

Hunter Hills Pastoral Lease is leased by Mark and Nicola Giles. The 2687 ha property is located in the Hakataramea Valley in South Canterbury. It covers gentle to moderately-steep southwest-facing slopes on the west flank of The Hunters Hills. The property ranges in altitude from 580 m at the confluence of Longden Stream and the Hakataramea River to approximately 1200 m on The Hunters Hills in the vicinity of Two Mile Stream. It is drained by Longden, Nessing, Cabbage Tree Gully, Two Legged, Scour, Anderson, Two Mile, Wyatt and Peter streams, all tributaries of the Hakataramea River (itself a tributary of the Waitaki River).

Access to the property is via Hakataramea Downs Road, from Hakataramea Valley Road. Unformed legal roads link Hakataramea Downs Road with the northwest boundary of the property in the vicinity of Two Legged Stream.

Hunter Hills Pastoral Lease lies mostly in the Hunters Ecological District with a small area at the northern end of the property in the Hakataramea Ecological District. Both ecological districts are within Pareora Ecological Region (McEwen, 1987). These ecological districts have not been surveyed as part of the Protected Natural Areas Programme.

Hunter Hills Pastoral Lease adjoins Asheridge Pastoral Lease to the south, Hunters Hills Conservation Area (Conservation Land Unit J39134) to the east and freehold land to the north and west. No parts of the lease are currently subject to protection for conservation purposes.

The tenure review inspection of the property was undertaken during November 2005 and January 2006 by a range of specialists. These specialists reports (listed below) form the basis of this Conservation Resources Report.

- Hunter Hills Pastoral Lease Landscape Assessment, Alan Petrie, January 2006, 6p + photos + map.
- Plant Communities of Hunter Hills Pastoral Lease and Recommendations for Protection, Mike Harding, February 2006, 13p + photos + maps.
- Assessment of the Fauna Values of Hunter Hills Pastoral Lease, Simon Elkington, *undated* 2006, 9p + maps.
- Hunter Hills Pastoral Lease, A Report on the Aquatic Fauna Surveys, Scott Bowie, March 2006, 22p (including photos + maps).
- Hunter Hills Pastoral Lease Tenure Review Invertebrate Survey, Peter Johns, *undated* 2006.



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

### **2.1 LANDSCAPE**

#### **2.1.1 Landscape Context**

Hunter Hills Pastoral Lease is situated on the west-facing flank of The Hunters Hills, South Canterbury. The Hunters Hills, the lower Campbell Hills to the south and the Kirkliston Range to the west enclose the Hakataramea Valley, creating an impression of seclusion and isolation. The property is elongated, stretching along the mid and lower slopes of The Hunters Hills. The even-topped summit, smooth rounded spurs, deep gullies and apron of rolling downs characterises the range. The dry climate of the Hakataramea Valley is evident in the contrast between semi extensive dryland farming on the hill country and more intensive farming with irrigation on the lower country.

The Canterbury Regional Landscape Study (Boffa Miskell Limited and Lucas Associates, 1993) identified Hakataramea Pass and its approaches as a regionally-significant landscape due to the presence of remnant tussocklands, shrublands and its open landscape character. Hunter Hills Pastoral Lease lies just outside this regionally-significant landscape.

#### **2.1.2 Landscape Description**

For the purposes of this landscape assessment Hunter Hills Pastoral Lease is divided into three landscape units, principally based on catchment boundaries (refer attached map). The criteria used to assess and evaluate the landscape values of each unit are based on the following attributes:

- Naturalness: an expression of the indigenous content of the vegetative cover and the extent of human intervention.
- Legibility: an expression of the clarity of the formative processes and how striking these processes are.
- Aesthetic value: the memorability and naturalness of the area, including factors which can make a landscape vivid, such as simplicity in landform, muted colours and fine-textured ground cover.
- Visual values: a sub-set of landscape values which relate to the visibility of a particular landscape or natural feature as seen from public vantage points.

#### **Unit 1, Southern Slopes**

This landscape unit covers the southern end of the property and incorporates the mid reaches of Two Mile Stream and Wyatt Stream and the northern tributary of Peter Stream. The upper and lower limits of the unit are the property boundaries at altitudes of c.1000 m and c.700 m respectively. The slopes below the steeper, more dissected high country are commonly rounded and smooth, consisting of low spurs separated by shallow gullies. Significant natural features within the unit are the deeply incised valleys of the tributaries of Two Mile Stream. The mid and lower sections of each tributary has cut down through the mantle of colluvium and into the bedrock to form deep winding gorges that feature rock bluffs and over-steepened rubble slopes. The most impressive gorge encloses the southern tributary. The channels of both Wyatt and Peter streams are contained within shallowly incised valleys.

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The vegetative cover follows a sequence that is strongly dictated by altitude, aspect and grazing pressure. The upper basin of Wyatt Stream supports snow tussock with golden speargrass and matagouri-*Coprosma* shrubland. Below c.750 m the vegetation changes to more modified short tussockland with fescue tussock and silver tussock, pasture and areas of open ground and mouse-ear hawkweed. Shrubland and scrub are present along the streams and on the gorge sides, interspersed with areas of rockland and stonefield. A large crack willow is present in lower Two Mile Stream and wilding pines have been felled in the tall tussocklands.

### Landscape Values

The incised tributaries of Two Mile Stream possess high inherent landscape values due to the clear expression of the natural processes that have formed the winding rocky gorges. The special characteristics of these gorges are their naturalness within a more modified landscape and the wild and scenic character created by their enclosed form and the presence of white-water streams. The balance of the unit has moderate inherent landscape values. The tall tussocklands in upper Wyatt Stream convey a high degree of naturalness, but their landscape values have been compromised by the abrupt change to more depleted grasslands at lower altitudes.

### Potential Vulnerability to Change

Land uses that have the potential to adversely affect this unit are:

- Further loss of tall tussockland and its replacement with modified short tussockland.
- Trampling of stream margins by cattle.
- Earth disturbances that will allow invasion of weed species.
- Establishment of wilding pines.

## **Unit 2, Central Slopes**

This unit incorporates the central part of the property, between Two Legged Spur in the north and the southern edge of the Anderson Stream catchment in the south. The upper and lower limits of the unit are the property boundaries at altitudes of c.1000 m and c.700 m respectively. The unit contains a series of rounded spurs separated by V-shaped gullies featuring small bluffs. The main streams twist around short interlocking side spurs whereas the stream channels are boulder-bound and contain stretches of white water. The apron of rolling hill country at the lower limits of the unit forms the transition between the slopes of The Hunters Hills and the wide floor of the Hakataramea Valley.

A large proportion of the vegetative cover is modified. A good cover of snow tussock is present above c.900 m altitude, particularly on the darker slopes, but drier slopes and spurs are commonly covered in a mixture of short tussockland, patches of matagouri scrub and mats of mouse-ear hawkweed. At lower altitudes, even-aged matagouri is widespread, especially along the streams.

### Landscape Values

This unit has moderate inherent landscape values and is typical or representative of the west-facing slopes of The Hunters Hills. The unit does not contain any striking natural features. The vegetation is a disjointed mosaic of tussockland, grassland and shrubland.

### Potential Vulnerability to Change

Land uses that have the potential to adversely affect this unit are:

- Further replacement of grassland with shrubland.
- Establishment of wilding pines and other woody weeds.

### **Unit 3, Northern Slopes and Flats**

This unit covers the northern end of the property, north of Two Legged Spur. The upper and lower limits of the unit are the property boundaries at altitudes of c.1000 m on the slopes of The Hunters Hills and c.600 m on the valley floor adjacent to the Hakataramea River. This unit is characteristic of the mid and lower flanks of The Hunters Hills and the floor of the Hakataramea Valley. A notable feature is the incised nature of the south branch of Cabbage Tree Gully. The upper section of this stream is contained within a deep gorge that features near-vertical rock faces and a deep winding valley lined with substantial rock bluffs.

Tall tussockland is dominant above c.800 m altitude on darker faces and above c.950 m on sunny faces. Mid slopes are dominated by a wide belt of modified short tussockland and grassland. Mixed shrubland and scrub are present along the south branch of Cabbage Tree Gully.

#### Landscape Values

The gorge of the south branch of Cabbage Tree Gully has moderately high inherent landscape values due to the rock bluffs, woody vegetation (shrubland and scrub) and overall sense of enclosure. The balance of the unit conveys only moderate inherent landscape values and is transitional between areas of high inherent value on the upper slopes of The Hunters Hills and farmland on the floor of the Hakataramea Valley.

#### Potential Vulnerability to Change

Land uses that have the potential to adversely affect this unit are:

- Invasion of tussockland by shrubland.
- Establishment of wilding pines.

### **2.1.3 Visual Values**

Hunter Hills Pastoral Lease has only moderate visual resource values due to the fact that the property covers only the mid and lower slopes of The Hunters Hills. The upper slopes and summit of the range (outside the property) are visually significant as an integral part of the landforms that enclose the Hakataramea Valley. Parts of the property are visible though not prominent from Hakataramea Valley Road. The most scenic viewpoints on the property are the enclosed views within the rocky gorges, especially at the junction of the tributaries of Two Mile Stream.

#### **Significance of Landscape Values**

The incised middle reaches of the tributaries of Two Mile Stream on the property have significant inherent landscape values. These values are attributable to the clear expression of the natural processes that have formed the winding rocky gorges. The special characteristics of these gorges are their naturalness within a more modified landscape and the wild and scenic character created by their enclosed form and the presence of white-water streams. Otherwise, the property has moderate inherent landscape values as part of the natural landscape of The Hunters Hills and Hakataramea Valley.



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

### **2.2.1 Geology**

The basement rocks of the main part of Hunter Hills Pastoral Lease, on The Hunters Hills Range, are weakly foliated schistose to non-schistose quartzofeldspathic sandstone (greywacke) interbedded with mudstone (argillite) of Permian age. Hill slopes are mantled with deposits of loess (wind-deposited sediments). Gentler lower slopes on the property comprise moderately to highly weathered brown gravel in a highly weathered sandy matrix and overlain by up to three layers of loess. The low terraces between Langdon Stream and the Hakataramea River in the northern part of the property comprise recently-deposited boulders, gravel, sand and clay. A small exposure of cretaceous greensand and cemented bioclastic limestone is present just north of Nessing Stream. A number of more-or-less parallel faults traverse the slopes of The Hunters Hills through the property (Forsyth, 2001).

### **2.2.2 Landforms**

Hunter Hills Pastoral Lease is dominated by the moderately-steep slopes of The Hunters Hills and the gentler toe slopes and terraces at the base of the range. The slopes of The Hunters Hills are relatively even, with small spurs separated by incised gullies. Several of the main streams, notably Two Mile Stream and the south branch of Cabbage Tree Gully, have cut down to form relatively deep steep-sided gorges. The lower slopes are gentle and even, sloping southwest to the Hakataramea River and indented by the incised valleys of the streams flowing from The Hunters Hills. Areas of flat or gently-sloping alluvial outwash plain and terrace are present where the streams at the northern end of the property meet the Hakataramea River. No geopreservation sites are listed for the property.

### **2.2.3 Soils**

Higher altitude parts of the property on The Hunters Hills have Benmore stony silt loams, gentler mid slopes have Tengawai hill soils, lower-altitude terraces have Dalgety shallow soils and Hakataramea silt loams, and low-altitude river flats and terraces have Hororata loams and Eyre shallow silt loams.

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

The Hunters Hills, upon which the property is located, is characteristic of the front country ranges of South Canterbury. It is broad, even-topped and rounded in shape. It lacks the steeper bare slopes of the mountain ranges further north in Canterbury and is in some respects transitional in form between the mountain ranges of Canterbury and Otago. There are no geopreservation sites listed for the property.

## 2.3 CLIMATE

Hunter Hills Pastoral Lease has a cool hill country climate with cool to cold winters and mild dry summers. Predominant winds are from the northwest, with occasional gales. Cool southerlies are common in winter. Snow can affect all parts of the property and lie at higher altitudes for several weeks in winter. Average annual precipitation is approximately 700 mm (Tomlinson, 1976), though precipitation may vary with altitude. The climate of the area is strongly influenced by the sheltering effects of the Southern Alps, resulting in drier conditions than occur in most of New Zealand's other mountain environments (Leathwick *et al.*, 2003). The climate of the property is also influenced by its position on the inland side of The Hunters Hills, where it is sheltered from the effects of southerly winds.

## 2.4 LAND ENVIRONMENTS OF NEW ZEALAND (LENZ)

LENZ is, as described by Leathwick *et al.* (2003): "a classification of New Zealand's landscapes using a comprehensive set of climate, landform and soil variables chosen for their role in driving geographic variation in biological patterns." The classification units of LENZ, termed environments by Leathwick *et al.* (2003), aim to: "identify areas of land having similar environmental conditions regardless of where they occur in New Zealand." The consequences of this are that "LENZ provides a framework that allows prediction of a range of biological and environmental attributes. These include 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)." Leathwick *et al.* (2003) present the LENZ information 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. These LENZ classes are presented nationally to assist use at a range of scales; however, this data should be interpreted with caution, as the predicted extent and suggested vegetation types for each Land Environment (Leathwick *et al.*, 2003) have been extrapolated from limited field data.

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

Table One 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 Underprotected	>30% indigenous cover remaining <10% legally protected
Underprotected	>30% indigenous cover remaining 10-20% legally protected
No Threat Category	>30% indigenous cover remaining >20% legally protected

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Recent river flats and terraces at the northern end of the property are categorised as a much reduced land environments ('acutely threatened' and 'chronically threatened'). Gently-sloping country at the northern end of the property is categorised as an 'at risk' land environment while all mid-altitude slopes are 'critically under-protected'. An area of lower altitude land at the southern end of the property is categorised as 'chronically threatened'. High altitude parts of the property have a 'No Threat' category (see attached map).

### **Significance of Land Environments**

Recent river flats and terraces at the northern end of the property are categorised as a much reduced land environments ('acutely threatened' and 'chronically threatened'). Gently-sloping country at the northern end of the property is categorised as an 'at risk' land environment while all mid-altitude slopes are 'critically under-protected'. An area of lower altitude land at the southern end of the property is categorised as 'chronically threatened'. High altitude parts of the property have a 'No Threat' category.



## 2.5 VEGETATION

### 2.5.1 Ecological Context

Hunter Hills Pastoral Lease lies mostly in the Hunters Ecological District with a small area at the northern end of the property in the Hakataramea Ecological District. Both ecological districts are within Pareora Ecological Region (McEwen, 1987). These ecological districts have not been surveyed as part of the Protected Natural Areas Programme. The original (pre-human) vegetation of the Hunters Ecological District was probably podocarp forest, podocarp-hardwood forest and scrub at lower altitudes and scrub and tall tussock at higher altitudes (McEwen, 1987; Andersen, 1916). The original vegetation of Hakataramea Ecological District was probably short tussockland, shrubland and scrub, with areas of low-stature mountain totara-hardwood forest (McGlone, 2001). The extent to which the area has been affected by natural fires is unclear but it is likely that such fires had an influence, particularly on drier slopes.

### 2.5.2 Vegetation and Flora

The original indigenous plant communities of Hunter Hills Pastoral Lease are substantially depleted. Most low-altitude parts of the property are modified and now support plant communities dominated by pasture species or low-stature matagouri shrubland. Areas of tussockland, shrubland and scrub are present in the steep-sided low altitude valleys, notably the south branch of Cabbage Tree Gully, Anderson Stream and Two Mile Stream. Areas of depleted short tussockland are present on the flats of the Hakataramea Valley at Longden Stream. Depleted tall tussockland is present at higher altitudes on the west-facing slopes of The Hunters Hills. The condition and naturalness of the tussockland generally increases with altitude. These indigenous plant communities are described below for three distinct parts of Hunter Hills Pastoral Lease.

#### Mid-altitude hill slopes

This area covers the mid-altitude slopes along the lower western flank of The Hunters Hills, comprising all of the property except the larger steep-sided valleys that bisect this area and the low-altitude flats at the north end of the property. Topography is gentle at lower altitudes and gradually steepens with increasing altitude. Vegetation is predominantly grassland, depleted short tussockland and shrubland at lower altitudes, grading to depleted tall tussockland and small areas of rockland and stonefield (talus) at higher altitudes.

Gentle low-altitude sites (below c.800 m) support grassland or depleted short tussockland with areas of low-stature matagouri shrubland or scrub. Dominant grassland species are pasture grasses, notably sweet vernal, browntop and mouse-ear hawkweed. Other species commonly present are fescue tussock, blue tussock, patotara, dainty daisy, *Raoulia subsericea*, sheep's sorrel, white clover, St John's wort, *Coprosma petriei*, harebell, *Helichrysum filicaule*, *Carmichaelia vexillata* and lichens. Shrubs and climbers occasionally present at low altitudes are tauhinu, coral broom, *Coprosma propinqua* and scrub pohuehue. Additional species occasionally present on dry stony areas are scabweed, porcupine shrub and wire moss.

These plant communities grade upslope to depleted tall tussockland. Pasture grasses and mouse-ear hawkweed are still dominant. Other species commonly present are fescue tussock, blue tussock, scattered low-stature narrow-leaved snow-tussock, snowberry, sheep's sorrel, catsear, white clover, *Raoulia subsericea*, dainty daisy, *Coprosma petriei*, *Kelleria dieffenbachii*, red woodrush, *Pimelea oreophila*, *Anisotome aromatica*, patotara, *Carmichaelia vexillata*, *Brachyglottis lagopus*, *Geranium sessiliflorum*, *Lycopodium fastigiatum* and woolly moss.

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At higher altitudes (above approximately 900 m) on the steeper slopes, narrow-leaved snow-tussock becomes more dominant especially on south-facing slopes. Tall tussock cover ranges from 20% to 75%. Matagouri, golden speargrass and occasionally porcupine shrub, *Pimelea pseudolyallii*, mountain flax, native broom and coral broom are also present. Inaka becomes common on some upper slopes. Tall tussock is frequently denser along stream margins, along with matagouri, golden speargrass, *Aciphylla scott-thomsonii*, *Coprosma propinqua*, native broom, *Olearia odorata* and occasionally *Olearia bullata* and *Coprosma intertexta*.

Dominant ground-cover species within tall tussockland are mouse-ear hawkweed, *Raoulia subsericea*, patotara, fescue tussock and sweet vernal. Other species commonly present are blue tussock, browntop, red woodrush, *Lagenifera cuneata*, *Brachyglottis haastii*, *B. lagopus*, snowberry, *Anisotome aromatica*, *A. flexuosa*, dainty daisy, *Carex breviculmis*, *Coprosma petriei*, *Leucopogon suaveolens*, *Pentachondra pumila*, *Ranunculus multiscapus*, *Lycopodium fastigiatum*, sheep's sorrel, wire moss, woolly moss and other mosses. Occasionally present are *Helichrysum filicaule*, cotton daisy, Maori onion, *Dracophyllum pronum*, *Pimelea oreophila*, *Carmichaelia vexillata*, *Lobelia linnaeoides* and *Microtis unifolia*.

Present at rocky sites are narrow-leaved snow-tussock, cotton daisy, *Celmisia lyallii*, mouse-ear hawkweed, snowberry, *Gaultheria crassa*, blue tussock, bristle tussock, inaka, mountain flax, porcupine shrub, *Pimelea traversii*, *Myrsine nummularia*, *Hebe cheesemanii*, *Pentachondra pumila*, *Acaena inermis*, *Raoulia hookeri*, *Grammitis* sp., *Blechnum penna-marina*, *Asplenium appendiculatum*, harebell, *Raoulia subsericea*, woolly moss, mosses and lichens.

Small areas of stable boulderfield/stonefield (talus) are present on steeper slopes. Vegetation on or at the margins of these areas is dominated by porcupine shrub, *Coprosma propinqua*, *C. sp. 't'* (unnamed *Coprosma* species), *C. cheesemanii*, *Myrsine nummularia*, scrub pohuehue, *Blechnum penna-marina* and woolly moss. Also common are matagouri, *Hebe rakaiensis*, korokio, mountain wineberry, native broom, coral broom, golden speargrass, blue tussock, *Anisotome filifolia*, snowberry, *Pimelea oreophila*, *Acaena caesiiglauca*, *Clematis marata*, harebell, sheep's sorrel, mouse-ear hawkweed, prickly shield fern and thousand-leaved fern.

### Steep-sided valleys

This area covers the three larger deeply-incised valleys which bisect main hill slopes on the property: the south branch of Cabbage Tree Gully, Anderson Stream and Two Mile Stream. These valleys are steep-sided, rocky and sheltered from the effects of activities (such as burning) on the surrounding slopes. Vegetation within these valleys is predominantly scrub, shrubland, tall tussockland and sparsely-vegetated rockland.

Scrub and shrubland are dominated by matagouri, *Coprosma propinqua*, mountain wineberry and lawyer. Other important species are *Olearia odorata*, porcupine shrub, native broom, *Coprosma intertexta*, *C. sp. 't'*, tauhinu, *Clematis marata*, *Parsonsia capsularis*, scrub pohuehue, golden speargrass, silver tussock, fescue tussock, blue tussock, *Pimelea oreophila*, woolly mullein, prickly shield fern, *Asplenium appendiculatum*, *Blechnum penna-marina* and bracken. Species occasionally present are mountain flax, *Coprosma crassifolia*, *Myrsine nummularia*, *Asplenium richardii*, elderberry, St John's wort and sweet brier. Additional species present mostly on stream sides are *Hebe rakaiensis*, koromiko, *Gaultheria crassa*, *Pimelea pseudolyallii*, *Parahebe lyallii*, tutu, monkey musk, thousand-leaved fern, *Blechnum montanum*, *Cystopteris tasmanica* and male fern.

Rockland is common in the lower valleys. Species commonly present on these sparsely vegetated sites are *Helichrysum lanceolatum*, *Coprosma crassifolia*, *C. petriei*, patotara, mountain flax, white fuzzweed, *Raoulia hookeri*, *Brachyglottis lagopus*, harebell, mouse-ear hawkweed, haresfoot trefoil, Deptford pink, necklace fern, *Asplenium trichomanes* and *Cheilanthes humilis*.

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Prostrate kowhai is present on rocky sites in Two Mile Stream valley. Kowhai trees are present in the middle reaches of Two Mile Stream valley and a single large kowhai tree is present in the south branch of Cabbage Tree Gully. One weeping mapou shrub was observed in lower Two Mile Stream. Large healthy populations of *Coprosma intertexta* are present in the mid reaches of Anderson Stream and on south-facing slopes of the south branch of Cabbage Tree Gully.

Upstream sections of these valleys tend to be less incised, with scrub and shrubland confined to a narrower corridor along the streams and tall tussockland more extensive. More dominant here are narrow-leaved snow-tussock, golden speargrass, *Aciphylla scott-thomsonii*, *Olearia odorata*, *Coprosma intertexta*, native broom, mountain flax, inaka, tutu and prickly shield fern. Also occasionally present are *Olearia bullata*, *Brachyglottis cassinioides*, coral broom and, in Anderson Stream, *Aciphylla subflabellata*.

### Low-altitude flats

This area covers the alluvial flats and terraces associated with lower Cabbage Tree Gully, Nessing Stream, Longden Stream and the Hakataramea River, comprising the northern part of the property. Two main plant communities are present: depleted short tussockland and sedgeland (swamp wetland).

Depleted short tussockland and associated herbfield are present on the low terraces and river flats between the Hakataramea River and Longden Stream. Short tussockland is dominated by pasture grasses, notably sweet vernal and browntop, with scattered fescue tussock. Other important species present are mouse-ear hawkweed, white clover, sheep's sorrel, *Coprosma petriei*, *Raoulia hookeri*, moss and lichen.

Areas of herbfield are dominated by bare ground, gravel, mouse-ear hawkweed and *Coprosma petriei*. Other important species are patotara, low-stature porcupine shrub, harebell, sheep's sorrel, white clover, sweet vernal, browntop, haresfoot trefoil, *Carex* sp., scabweed, *Raoulia hookeri*, *R. apicinigra*, wire moss, woolly moss and lichens. Occasionally present are *Carmichaelia vexillata* and creeping pohuehue.

Additional species present on the lower terraces and the small terrace scarps at the western edge of the area are matagouri, *Coprosma intertexta*, *Olearia odorata*, scattered narrow-leaved snow-tussock, *Clematis marata* and St John's wort. The open bed of Longden Stream, at the eastern edge of the area supports creeping pohuehue, mouse-ear hawkweed, sheep's sorrel, *Acaena inermis*, *Epilobium microphyllum* and silver tussock.

A riverine swamp at the western (Hakataramea River) edge of the area supports a sedgeland-rushland plant community dominated by rautahi, bog-rush and jointed rush. Other common species are *Juncus dipsacea*, toetoe, Yorkshire fog, monkey musk, white clover, red clover and unidentified species of hook sedge (*Uncinia* sp.) and rush (*Juncus* sp.). Present in the wetland channels are red pondweed, retoreto and water forget-me-not.

Another riverine swamp is present in lower Cabbage Tree Gully, at the confluence of the two branches of the stream. This swamp supports sedgeland dominated by rautahi, with scattered patches of shrubland at its margins. Other important species in the sedgeland are pukio, soft rush, jointed rush, bog rush, Yorkshire fog, *Stellaria gracilentia*, monkey musk and white clover. Wetter parts of the swamp support red pondweed, retoreto, water forget-me-not, *Hydrocotyle sulcata* and *Wolffia australiana*. Shrubland at parts of the swamp margin is dominated by matagouri and/or *Coprosma intertexta*. On other margins the swamp grades to pasture with scattered rautahi and silver tussock.

A small group of cabbage trees is present in an incised section of the small stream between Nessing Stream and Cabbage Tree Gully. Otherwise the vegetation in this area is substantially modified.

### Notable Species Recorded

Plant species listed as threatened by de Lange *et al* (2004) and other notable plant species observed during this inspection of Hunter Hills Pastoral Lease are listed in Table Two below.

**Table Two** Notable plant species, Hunter Hills Pastoral Lease, January 2006.

Plant Species	Threat Status	Distribution on Property
<i>Aciphylla subflabellata</i>	Sparse.	Local, in upper Anderson Stream.
<i>Carmichaelia crassicaule</i> (coral broom)	Gradual decline.	Scattered, throughout.
<i>Carmichaelia vexillata</i>	Serious decline.	Common, throughout in depleted tussockland.
<i>Coprosma intertexta</i>	Sparse.	Common and locally abundant, in main valleys.
<i>Myrsine divaricata</i> (weeping mapou)	Not threatened; locally uncommon.	Two Mile Stream.
<i>Pimelea pseudolyallii</i>	Sparse.	Local, throughout.
<i>Sophora microphylla</i> (kowhai)	Not threatened; locally uncommon; representative of the original woody vegetation.	South branch Cabbage Tree Gully; Two Mile Stream.
<i>Sophora prostrata</i> (prostrate kowhai)	Not threatened; locally uncommon.	A small population on rockland in lower Two Mile Stream valley.

### Significance of Vegetation and Flora

Indigenous scrub, shrubland and rockland plant communities in the lower reaches of the main steep-sided valleys on the property (south branch of Cabbage Tree Gully, Anderson Stream and Two Mile Stream) are representative of the original woody (and non-woody) vegetation. These plant communities are linked by scattered shrubland and scrub communities along the streams to extensive areas of formally-protected tall tussockland and shrubland at higher altitudes on The Hunters Hills. Adjoining mid-altitude tussocklands on the property are dominated by indigenous species and have high restoration potential, but are not representative of the original vegetation.

Indigenous short tussockland, herbfield and wetland communities on lower altitude alluvial sites at the northern end of the property support species characteristic of the original vegetation (despite the occasional dominance of introduced plant species) and occupy 'much reduced' ('acutely threatened' and 'chronically threatened') or 'at risk' land environments. Healthy populations of several threatened plant species are present on the property: *Carmichaelia crassicaule*, *C. vexillata*, *Coprosma intertexta* and *Pimelea pseudolyallii*.

### 2.5.3 Problem Plants

Introduced plants that may have an important effect on indigenous plant communities on the property and that can be controlled or contained, are listed and discussed below. Other ubiquitous naturalised species for which containment or control are probably impractical, such as mouse-ear hawkweed and pasture grasses, are not discussed here but are listed in the vegetation descriptions.

#### Broom

A small infestation of broom is present near the lower vehicle track in Two Mile Stream. A single broom plant was observed at the base of a small bluff on south-facing slopes in mid Anderson Stream.

#### Wilding pines

A number of felled (dead) wilding pines were observed on mid-altitude slopes. Wilding trees within Hunters Hills Conservation Area, adjacent to the property were removed by the Department of Conservation in 2005. Continued monitoring for new infestations and removal of seedlings will be required to protect conservation values on the property and on the adjoining Hunters Hills.

#### Elderberry

Elderberry trees are present in lower Anderson Stream valley. Elderberry fruits are readily dispersed by birds.

#### Rowan

A single rowan sapling was observed beside the lower vehicle ford across Two Mile Stream. This sapling was removed (pulled from the ground).

#### Crack willow

One large and several small crack willow trees are present alongside Two Mile Stream below the lower vehicle track.

#### Other weeds

St John's wort, woolly mullein, male fern, sweet brier, soft rush and thistles are present on the property, mostly at lower altitudes.



## **2.6 FAUNA**

### **2.6.1 Bats**

Short-tailed bats have not been recorded in Canterbury since the arrival of Europeans. A small population of South Island long-tailed bats is present in South Canterbury. The closest bat records to Hunter Hills Pastoral Lease are from the Tengawai River (Sedgeley, 2002). The property was not surveyed for bats because bat roosting and feeding habitats (forest and mature shrubland) are not present on the property.

### **2.6.2 Birds**

No substantial stands of forest are present in this part of the Hakataramea Valley, so forest birds are absent from the area. However, birds of shrubland habitats such as South Island fantail, silvereye and grey warbler are present. Australasian harrier, New Zealand pipit and New Zealand falcon (threat status: gradual decline) have been recorded in open and upland habitats in the Hakataramea Valley. Black shag (sparse) is common throughout the Hakataramea and Waitaki valleys. Banded dotterel (gradual decline), black-billed gull (serious decline), Australasian pied stilt, South Island pied oystercatcher and black-fronted tern (nationally endangered) feed and nest in the more open parts of the braided Hakataramea River. Blue duck (nationally endangered) have been recorded from the other (eastern) side of The Hunters Hills. Birds observed on the property are described below for each part of the property surveyed.

#### **Two Mile Stream**

The incised reaches of Two Mile Stream provide scrub, shrubland, stonefield (talus), rockland and stream habitats. New Zealand falcon was present here and some of the large rock outcrops could provide suitable falcon nesting sites. Grey warbler, silvereye, South Island fantail and welcome swallow were present during the survey. Introduced birds were common.

#### **Anderson Stream**

Areas alongside Anderson Stream provide scrub, shrubland, tussockland, rockland and stream habitats. A pair of black shags (sparse) was seen here. Other birds observed were silvereye, South Island fantail, grey warbler and welcome swallow. The area provides suitable habitat for New Zealand falcon. Introduced birds were common.

#### **High Altitude Slopes**

Slopes above c.800 m on the flanks of The Hunters Hills provide tussockland habitats with smaller areas of rockland, stonefield (talus) and shrubland. New Zealand falcon and New Zealand pipit were observed throughout this area. Silvereye and grey warbler were recorded from shrublands and Australasian harrier was recorded from over tussocklands. Introduced birds such as skylark, redpoll, yellowhammer and dunnock were abundant.

#### **Nessing Stream and Cabbage Tree Gully**

These stream gullies provide scrub, shrubland, tussockland, rockland and stream habitats. Silvereye and grey warbler were recorded from shrublands, Australasian harrier was seen throughout and welcome swallow recorded alongside streams. Introduced birds were common.

## Low Altitude Flats

The alluvial flats and terraces on the northwest part of the property are dominated by fescue tussockland, mossfield and mouse-ear hawkweed-dominated herbfield. Australasian harrier, New Zealand pipit and spur winged plover were seen here. Introduced birds such as skylark, redpoll, Australian magpie and yellowhammer were common. Little owls were heard calling from the pine tree shelter belts.

## Species Recorded

Twenty-five bird species were recorded from Hunter Hills Pastoral lease during this inspection: 11 indigenous species (Table Three) and 14 naturalised species.

**Table Three** Indigenous bird species recorded from Hunter Hills Pastoral Lease, January 2006.

Bird species	Threat status	Distribution on property
Australasian harrier	Not threatened.	Throughout.
black shag	Sparse.	Anderson Stream.
grey warbler	Not threatened.	Shrubland throughout.
New Zealand falcon	Gradual decline.	Throughout.
New Zealand pipit	Not threatened.	Throughout.
paradise shelduck	Not threatened.	Two Mile Stream; low-altitude pastures.
silvereve	Not threatened.	Shrubland throughout.
southern black backed gull	Not threatened.	Low-altitude pasture throughout.
South Island fantail	Not threatened.	Two Mile Stream shrubland and Anderson Stream.
spur-winged plover	Not threatened.	Low-altitude pastures and streambeds.
welcome swallow	Not threatened.	Streams throughout.

Naturalised bird species observed on the property were Australian magpie, blackbird, California quail, chaffinch, dunnock, goldfinch, greenfinch, house sparrow, little owl, redpoll, skylark, song thrush, starling and yellowhammer.

## Significance of the Bird Fauna

Twenty-five bird species were recorded from Hunter Hills Pastoral lease during this inspection, including 11 indigenous species. Two threatened bird species occur on the property: black shag (sparse) and New Zealand falcon (gradual decline). Most higher-altitude parts of the property provide suitable habitat for New Zealand falcon and stream gorges may provide suitable breeding habitat. Major streams on the property provide habitat for black shag. The property is contiguous with more extensive areas of high-altitude habitat on The Hunters Hills.

## 2.6.3 Lizards

Common species of lizard such as common skink, McCann's skink and Southern Alps gecko are widespread and abundant throughout the area. Scree skink (gradual decline), green skink (gradual decline) and spotted skink (gradual decline) have been recorded from the mid Waitaki Valley. Spotted skink and scree skink have been unofficially reported from the Kirkliston Range on the west side of the Hakataramea Valley. Long-toed skinks (sparse) have been reported in the upper Tekapo River (Mackenzie Basin). Jewelled geckos (gradual decline) have been reported south of Hakataramea Pass c.10 kilometres northwest of the property (Department of Conservation

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Herpetofauna database). Lizards observed on the property are described below for each part of the property surveyed.

### **Two Mile Stream**

The gorged sections of Two Mile Stream provide scrub, shrubland, stonefield (talus) and rockland habitats. Common skink and Southern Alps gecko were located under stones in this area. Day-time searches for jewelled gecko were unsuccessful.

### **Wyatt Stream**

Wyatt Stream is a single-channel stream with shrubland, stonefield (talus), bare ground and grassland habitats along its margins. Southern Alps gecko was found under stones in the talus slopes and a whistling tree frog was located near the stream edge under a large rock.

### **Nessing Stream**

Nessing Stream is a single-channel stream with an active bed of around 15 metres. It provides shrubland, stonefield (riverbed) and grassland habitats. Common skink, McCann's skink and Southern Alps gecko were observed under stones in this area.

### **High Altitude Slopes**

Slopes above c.800 m on the flanks of The Hunters Hills provide tussockland habitats with smaller areas of rockland, stonefield (talus) and shrubland. Common skink, McCann's skink and Southern Alps gecko were observed under stones and in tussockland in this area.

### **Species Recorded**

Three lizard species were observed on the property: common skink, McCann's skink and Southern Alps gecko. Two main lizard habitats are present: tussockland with stonefield/boulderfield (scree/talus) and rockland and shrubland with stonefield and rockland. These habitats are most prevalent along stream gorges and on steeper slopes.

### **Significance of the Lizard Fauna**

The property provides good habitats for three common species of lizard: common skink, McCann's skink and Southern Alps gecko. These habitats are best developed along stream gorges and on upper slopes. Lizard habitats on the property are contiguous with more extensive areas of favourable habitat on The Hunters Hills.



## 2.6.4 Freshwater Fauna (fish and invertebrates)

Hunter Hills Pastoral Lease lies in the Hakataramea Valley within the catchment of the Waitaki River. The property is drained by Longden, Nessing, Cabbage Tree Gully, Two Legged, Scour, Anderson, Two Mile, Wyatt and Peter streams, all tributaries of the Hakataramea River. A feature of the Hakataramea River is that it is the only large tributary of the Waitaki River that is not affected by dams. This has two effects on the fish communities. The first is that diadromous species (those species with a sea-going phase in their lifecycle) are more likely to be present. The second effect is that fish are able to move between catchment tributaries, allowing re-colonisation of streams.

The New Zealand Freshwater Fish Database (NZFFD) has 890 records from the Waitaki River catchment (at 8<sup>th</sup> February 2006). Species recorded from streams near the property are longfin eel, Canterbury galaxias, upland bully, rainbow trout, brook char and brown trout. Lowland longjaw galaxias has been recorded in the lower Hakataramea River. Longfin eel has a threat status of gradual decline and lowland longjaw galaxias has a status of nationally critical (Hitchmough and Bull, *in press*; Hitchmough, 2002).

Hunter Hills Pastoral Lease comprises three main geographical areas of freshwater habitat covering the northern, central and southern parts of the property. Freshwater habitats and the fish and macro-invertebrate species recorded are described below for each of these areas.

### Northern Area

This area of approximately 665 hectares incorporates freshwater habitats on the northern part of the property, north of and including the south branch of Cabbage Tree Gully. Habitats present are springs, wetlands, ephemeral streams and permanent streams. The main streams in this area have their source beyond the property boundary and occur on the property as low gradient streams with occasional wetland margins or as periodically dry ephemeral streams. Longden Stream and the lower part of Nessing Stream were dry at the time of this survey. The streams flow through grassland and occasionally shrubland and willow trees. The wetlands have areas of sedgeland, rushland and grassland. Stock and wild animal access appears unrestricted. Several vehicle tracks ford the streams. The streams vary from about one to more than six metres wide in some locations, but are generally between one and two and a half metres wide. Most streams are 100 to 300 mm deep with occasional holes up to one metre deep. The stream substrates vary with mainly boulders and cobbles in most streams and mud in others.

Seven sites were electro-fished in this area: three in the Nessing Stream system and four in the Cabbage Tree Gully system. Upland bully were found at five sites, longfin eel, Canterbury galaxias and lowland longjaw galaxias were each found at three sites and brook char at one site. Of the lowland longjaw galaxias sites, two in lower Cabbage Tree Gully and one in a springfed tributary north west of Cabbage Tree Gully, the latter was found to have the largest population with more than 44 fish present. There are no NZFFD records from these catchments.

Macro-invertebrates observed in this area were *Archichauliodes diversus*, *Ameletopsis perscitus*, *Coloburiscus humeralis*, *Deleatidium* spp., *Nesameletus* sp., *Stenoperla prasina*, *Zelandobius* sp., *Aoteapsyche* sp., *Helicopsyche albescens*, *Hydrobiosis* sp., *Hydropsychidae* sp., *Olinga feredayi* and *Pycnocentria* sp.

### Central Area

This block of approximately 745 hectares incorporates the two main branches of Two Legged Stream and the small stream just south of Two Legged Stream. Freshwater habitats here are dominated by large streams flowing through shrubland, tussockland, grassland and areas of wetland vegetation. Monkey musk is growing in and beside some of these streams. Stock and wild animal

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access is unrestricted. Vehicle tracks ford the lower reaches of the streams. Stream widths vary from about one metre in the north branch of Two Legged Stream to about five metres in the south branch of Two Legged Stream. Streams are generally 100 to 200 mm deep, although holes more than one and a half metres deep occur in some areas. The upper reaches contain areas of bedrock, but generally stream substrates comprise boulders and cobbles with some mud in the lower reaches.

Four sites were electro-fished in this area: two in the upper reaches of the streams and two in the lower reaches. Canterbury galaxias were found at two sites and upland bully, brook char and brown trout at one site. No fish were recorded at one site in the lower reaches of the north branch of Two Legged Stream. There are no NZFFD records from this area.

Macro-invertebrates observed in this area were *Archichauliodes diversus*, *Ameletopsis perscitus*, *Coloburiscus humeralis*, *Deleatidium* spp., *Nesameletus* sp., *Stenoperla prasina*, *Zelandobius* sp., *Aoteapsyche* sp., *Helicopsyche albescens*, *Hydrobiosis* sp., *Hydropsychidae* sp., *Olinga feredayi* and *Pycnocentria* sp.

### Southern Area

This block of approximately 1275 hectares incorporates the parts of Scour, Anderson, Two Mile, Wyatt and Peter streams on the property. The main streams in this area have their source beyond the property boundary and on the property comprise large streams commonly with gorged sections in their lower and middle reaches. The streams flow through relatively extensive areas of shrubland and scrub and areas of tussockland and grassland. Monkey musk is present in some streams. Stock and wild animal access appears unrestricted, except for a small area of retired land above a fence at c.900 m altitude which restricts stock but not wild animal access. Vehicle tracks ford the streams near the lower and upper property boundaries. The streams vary from two to four metres wide near the lower boundary to about one metre wide near the upper boundary. They are between 100 and 200 mm deep with occasional holes about one metre deep. Stream substrates are mainly boulders and cobbles with some areas of bedrock.

Ten sites were electro-fished in this area: five in the Scour Stream-Anderson Stream system, three in the Two Mile Stream system and two in the Wyatt Stream system. Canterbury galaxias were found at four sites and brook char and brown trout were found at three sites. No fish were recorded at two sites in Wyatt Stream. There are no NZFFD records from this area.

Macro-invertebrates observed in this area were *Archichauliodes diversus*, *Ameletopsis perscitus*, *Coloburiscus humeralis*, *Deleatidium* spp., *Nesameletus* sp., *Stenoperla prasina*, *Zelandobius* sp., *Aoteapsyche* sp., *Helicopsyche albescens*, *Hydrobiosis* sp., *Hydropsychidae* sp., *Olinga feredayi* and *Pycnocentria* sp.

### Species Recorded

Six fish species were recorded during this survey of Hunter Hills Pastoral Lease (Table Four).

**Table Four** Fish species recorded from Hunter Hills Pastoral Lease, January 2006.

Fish species	Threat status	Distribution on property
brook char	Introduced.	Gorgy sections of some streams.
brown trout	Introduced.	Some large streams.
Canterbury galaxias	Not threatened.	Many permanent waterways.
longfin eel	Gradual decline.	Northern area: lower-altitude spring-fed streams.
lowland longjaw galaxias	Nationally critical.	Northern area: lower-altitude spring-fed streams.
upland bully	Not threatened.	Many permanent waterways at lower-altitudes.

### **Significance of the Freshwater Fauna**

Two threatened species: longfin eel (gradual decline) and lowland longjaw galaxias (nationally critical) are present in the northern part of the property at low altitudes in small spring-fed streams in the Nessing Stream-Cabbage Tree Gully area. The occurrence of lowland longjaw galaxias is particularly significant, as this represents a new distribution record for the species and also provides an intermediate linkage between the Kakanui River and upper Waitaki River populations of lowland longjaw galaxias. The numbers of individual lowland longjaw galaxias observed (44 at one site) is also significant. The south branch of Cabbage Tree Gully also provides significant freshwater habitats, supporting four indigenous fish species including the two threatened species and no introduced species. Streams on the property are part of a freshwater ecosystem ranked as Waters of National Importance Type II (Chadderton *et al*, 2004). Type II implies that the waterway contains special features of national significance. Only sections of Type II catchments are of national importance. This significance is because it is in the top ten sites by Natural Heritage Value score in its biogeographical unit and also for its threatened bird, plant and fish communities.



## 2.6.5 Terrestrial Invertebrates

No entomological information relevant to this assessment was available prior to this survey. This survey targeted beetles, spiders, weta, aquatic insects, butterflies and moths. Invertebrates species observed on Hunter Hills Pastoral Lease are listed below.

### Species Recorded

#### Geoplanidae (flatworms):

Three species recorded (probably new species).

#### Athoracophoridae (veined slugs):

*Athoracophorus* or *Pseudoneitia*: not identified but some species are known to be highly restricted in their distributions.

#### Dalodesmidae (millipedes):

*Icosidesmus latidens*: a common millipede restricted in its distribution to The Hunters Hills and adjacent ranges (Peel Forest to Waimate).

#### Odonata (dragonflies and damselflies):

*Uropetala carovei*: although well known and common in the mountains it is not so in the drier, eastern parts of South Island. *Xanthocnemis zelandica*, *Austrolestes colenisonis* and *Procordulia* sp. nr. *grayi*: three species that require ponded water for larval development. All are common and widespread.

#### Anostomatidae (ground weta):

*Hemiandrus*: a new species. This is probably the same as that previously known only from the confluence of the Tekapo and Pukaki rivers and a few other riverine sites in the Mackenzie Basin. It is not the same as the distinctive *Hemiandrus* that is on the northeast side of The Hunters Hills and adjacent downlands.

#### Rhaphidophoridae (cave weta):

*Pleiopectron* sp.: probably not the common Canterbury species *P. simplex*. Only one female specimen was found and thus is difficult to identify.

#### Blattodea (cockroaches):

*Celatoblatta pallidicauda*: a species with restricted distribution and endemic to the Mackenzie Basin and The Hunters Hills (east to Waimate).

#### Cicadidae (cicadas):

A native species of cicada *Rhodopsalta cruentata* was collected during the inspection from low-stature shrublands. This species is considered to be common and widespread.

#### Carabidae (predatory ground beetles):

*Cicindela dunedensis*: isolated populations throughout Canterbury-Otago. *Oregus aereus*: widespread and common from Mid-Canterbury to North Otago. *Metaglymma ?tibiale*: perhaps the northernmost population of this Central Otago species. *Mecodema lucidum*: this is probably the northernmost and easternmost population of this species that is centred on Central Otago. *Holcaspis* (elytra only) sp., probably *ohauensis*: an easternmost population that is centred on the Mackenzie Basin. *Holcaspis ovatella*: only the second record in Canterbury of this relatively rare and restricted Central Otago species; the other record is from a very dry stony site close to Tekapo. *Megadromus* sp. (elytra only): probably a new species of the widespread genus in South Canterbury. *Mecyclothorax ?rotundicollis*: widespread and relatively common. *Scopodes edwardsi*: widespread and relatively common; observed along the upper vehicle track between Wyatt and Two Mile

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streams. *Scopodes* cf. *basalis*: this represents a new distribution record (outside of a very few specimens from the east Otago mountains); observed along the vehicle track in upper Wyatt Stream. *Demetriida dieffenbachi*: a widespread and common species.

### Staphylinidae (predatory rove beetles):

*Stenomalius* n. sp.: a new species recently recognised; it is known so far from the inside of the stalks of speargrass inflorescences.

### Scarabaeidae (grass grub and chafer beetles):

*Costelytra zelandica*: the widespread and common grass grub. *Odontria autumnalis*: widespread and common, at least in Canterbury. *Odontria* sp. nr. *smithi* or *rufescens*: widespread and common in the South Island. *Odontria* possible new species (wings normal). *Odontria*: new species (stenopterous); a very distinctive species; it is not the same as a similarly short-winged new species known from the southern end of the Kirkliston Range. These four *Odontria* species were observed at night feeding on matagouri and *Coprosma* at Two Mile Stream. *Pyronota festiva*: widespread in the South Island, though the colour form is that found commonly in the tussock country of Central Otago and the Mackenzie Basin.

### Tenebrionidae (phytophagous darkling beetles):

*Zeadelium* sp. nr. *zelandicum*: widespread. *Mimopeus impressifrons*: common in Central Otago, northwards to the Mackenzie Basin and the Hakataramea Valley; present in Two Mile Stream rock spaces under matagouri. *Mimopeus convexus*: formerly known from a few localities in the Mackenzie Basin, it is now known also from two sites in the Hakataramea Valley: Nessing Stream and its outwash fan. *Omedes substriatus*: this is one of the surprising finds; it has usually been regarded as restricted to dry vegetation of the coast, where it is known from North Canterbury, Banks Peninsula and a few sites in Otago. This is probably the second record of it from inland Canterbury. It seems to occupy the same habitat (roots and bark of matagouri and other shrubs and trees) as the much more common *Artystona* species, of which none was found.

### Curculionidae (phytophagous weevils):

*Pactola* sp.: a rarely collected species known from South Canterbury and Otago; associated with sub-alpine shrubland. This specimen was collected under a rock in the upper reaches of Two Mile Stream. *Nonnotis* sp.: an abundant species associated with golden speargrass at Burke Pass but is also present on speargrass in Wyatt Stream. This weevil has also been collected on neighbouring properties around the Mackenzie Basin. It is likely that the dense stands of golden speargrass could provide habitat for other rare and threatened weevil species such as *Hadramphus tuberculatus* which has recently been collected at Burke Pass and the more common *Lyperobius* species known from Hakataramea Pass and the Kirkliston Range, although none were collected during this inspection.

### Arachnida:

*Porrhothele antipodiana* (tunnelweb spider): a common and widespread species. *Misgolas* sp. (trapdoor spider): a common and widespread species. *Dolomedes minor* (nurseryweb spider). A wide range of common spiders were collected on the property but most spiders were not able to be identified to species level due to lack of available expertise.

### Diptera

Large hover fly (*Melangyna novaezelandiae*): a widespread and common species with an important ecological role in pollinating plants and eating introduced aphids.

### Hymenoptera

Ants (*Monomorium antarcticum* and *Monomorium smithii*): both species are common and widespread but make up an important component of New Zealand's small ant fauna. Native bees (*Lioproctus* spp.): common on the property; these widespread native species are known to be solitary. Exotic species such as *Bombus terrestris* and *Apis mellifera* were also present. *Priocnemis*?: a widespread and common spider-hunting wasp. A wide range of common native wasps and bees

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were collected on the property but most were not able to be identified due to lack of available taxonomic expertise.

### Lepidoptera (Butterflies and Moths)

Crambidae: several species were collected; most of the tussock-dwelling species are common but those associated with tussocks and sedges in wetlands are relatively rare and could be of high significance. Noctuidae: *Graphania nullifera*: a common species whose larva tunnels inside the inflorescences of speargrass. The tussock ringlet butterfly (*Argyrophenaga* sp.), common blue butterflies (*Zizina* spp.) and magpie moth (*Nyctemera amica*) were also observed.

**Table Five** Notable invertebrate species recorded from Hunter Hills Pastoral Lease, January 2006.

<b>Invertebrate Species</b>	<b>Threat Status</b>	<b>Distribution on property</b>
<i>Pactola</i> sp.	Range restricted/data deficient	Two Mile Stream.
<i>Pleioplectron</i> sp.	Data deficient.	Two Mile Stream headwaters
<i>Stenomaliium</i> n.sp.	Data deficient.	Upper Wyatt Stream area
<b>Significance</b>		
<i>Hemiandrus</i> n.sp.	Restricted to small sites in Mackenzie Basin and the Hakataramea Valley.	Two Mile Stream
<i>Holcaspis ovatella</i>	Local in Otago; very restricted in South Canterbury.	Two Mile Stream
<i>Mimopeus convexus</i>	Restricted to small sites in Mackenzie Basin and the Hakataramea Valley.	Nessing Stream outwash fan.
<i>Odontria</i> n.sp.	Probably a new species (wings normal).	Two Mile Stream.
<i>Odontria</i> n.sp.	A new species (stenopterous).	Two Mile Stream.
<i>Omedes substriatus</i>	Local.	Two Mile Stream
<i>Scopodes</i> cf. <i>basalis</i>	Local; Rock and Pillar Range and The Hunters Hills.	Upper Wyatt Stream area.

### **Significance of the Invertebrate Fauna**

The invertebrate fauna on the property is distinct from that known from other parts of The Hunters Hills and adjacent ranges. It bears little relationship with any known from the northeast side of the ranges between Peel Forest and Waimate. Instead, invertebrates on the property appear to represent outlying populations of species present in Central Otago and the Mackenzie Basin and are almost certainly isolated from those populations. Many other common and widespread invertebrate species collected on the property are representative of shrubland and tussockland habitats in the South Island. Important areas of invertebrate habitat on the property are the gentler slopes in the upper reaches of Wyatt Stream, the three tributaries of Two Mile Stream, the outwash fan and flats of Nessing Stream and the limestone scarp on the north side of lower Nessing Stream.



### **2.6.6 Problem Animals**

Introduced animal species that may have an important effect on indigenous plant or animal communities on the property and that can be controlled or contained, are listed and discussed below. Other ubiquitous naturalised species for which containment or control are probably impractical (such as rodents) are not discussed here.

#### Rabbits and hares

Hares were observed at higher altitudes on the property and rabbits were relatively common at lower-altitudes.

#### Wallaby

Wallabies were observed throughout higher-altitude parts of the property.

#### Chamois

One chamois was observed at the southeast corner of the property.

## **2.7 HISTORIC**

### **2.7.2 European Heritage Values**

Hunter Hills Pastoral Lease appears to have formerly been part of the 20000 acre (8000 ha) Hakataramea Downs (Run 163), which was granted to Joseph Longden in 1857. By March 1858 Charles William Wyatt was leasing the property. At this time George Duncan Lockhart had been claiming land in the Hakataramea Valley, including parts of Hakataramea Downs. Legal action and compensation payments followed and resulted in Lockhart holding the property till 1864 when financial difficulties led to transfer of the property to Joseph Steel Dalzell. Dalzell sold the property to McGregor & Co. in 1877. It was sold as "The Downs" to the New Zealand and Australian Land Company in 1900. Hakataramea Downs passed to William Tayler Smith in 1925 (Pinney, 1971). Other details about the more recent history of Hakataramea Downs, including the creation of the present Hunter Hills Pastoral Lease, were not located during the preparation of this report.

#### **Significance of Historic Resources**

No significant historic resources are known from the property.

## **2.8 PUBLIC RECREATION**

### **2.8.1 Physical Characteristics**

The property can be divided into two main recreation units.

#### **The Hunters Hills Unit**

This recreation setting covers most of the property on the slopes of The Hunters Hills. The dominance of tall tussockland on higher-altitude slopes and of shrubland and scrub within the main stream gorges, along with the lack of structures, provides a relatively natural setting for recreation. The relatively gentle terrain on the main slopes provides easy access for a range of recreational activities and the well-vegetated stream gorges provide areas of recreation and scenic interest. Vehicle tracks traverse the upper and lower slopes in this part of the property, providing access to the Hunters Hills Conservation Area and the crest of The Hunters Hills. Higher-altitude slopes on this part of the property are visible from public vantage points in the Hakataramea Valley.

#### **Lower Slopes and Valleys Unit**

This recreation setting covers the river flats and terraces at the northwest end of the property, on the floor of the Hakataramea Valley. It is largely modified, though still retains areas of wetland and river terrace that have a good cover of indigenous species. It provides a less natural setting with a stronger rural character. The proximity of this part of the property to the Hakataramea River and Hakataramea Valley Road is an important attribute for recreation. The area is traversed by a number of vehicle tracks and fences.

## **2.8.2 Legal Access**

### **Roads**

Hakataramea Downs Road provides access to the Hunter Hills homestead, on freehold land adjacent to Hunter Hill Pastoral Lease. Hakataramea Downs Road continues as a legal road, though not always following the formed track, up the Hakataramea valley to the boundary of Hunter Hills Pastoral Lease near the confluence of Cabbage Tree Gully stream and the Hakataramea River. Another unformed legal road provides access from Hakataramea Downs Road at the homestead to the western boundary of Hunter Hills Pastoral Lease just south of Two Legged Stream. An unformed legal road provides access to the northwest corner of the property from Hakataramea Valley Road. There are no legal roads leading to the southern part of the property.

### **Marginal Strips**

No marginal strips are present along streams within the property boundaries.

### **Adjoining Public Conservation Land**

Hunter Hills Pastoral Lease adjoins Hunters Hills Conservation Area (Conservation Land Unit J39134) along its entire eastern boundary on the upper slopes of The Hunters Hills.

## **2.8.3 Activities**

There is a vehicle track at the southern end of the property which provides access to the crest of The Hunters Hills just north of Mt Nimrod. Prominent spurs at the northern end of the property, including Two Legged Spur, provide suitable walking routes to the crest of The Hunters Hills just south of Mt Nessing. The northwest part of the property is readily accessible from Hakataramea Valley Road and the Hakataramea River. This northwest part of the property provides opportunities for walking, fishing, picnicking and mountain-biking. The eastern and southern parts of the property, including the slopes of The Hunters Hills and the main stream gorges, provide opportunities for walking, tramping, mountain-biking, horse-riding, nature study, four-wheel driving and hunting. Higher-altitude parts of the property form a backdrop for more passive road-based activities such as scenery viewing, for travellers on the Hakataramea Valley Road.

### **Significance of Recreation**

The most significant features of the property for recreation are its position adjacent to a relatively large area of public conservation land on The Hunters Hills and the proximity of the northwest part of the property to the Hakataramea River and Hakataramea Valley Road. Vehicle tracks and prominent spurs on the property have potential to provide access for public recreation on The Hunters Hills.

## **PART 3 OTHER RELEVANT MATTERS AND PLANS**

### **3.1 CONSULTATION**

Information-gathering meetings were held with representatives of non-governmental organisations (NGOs) at Christchurch on 5<sup>th</sup> September 2005 and at Geraldine on 6<sup>th</sup> September 2005. Comments made at those meetings are summarised below.

- Lower-altitude gullies and streams may have high natural values.
- The north end of the property looks interesting and may have higher natural values.
- Altitudinal sequences of vegetation should be protected.
- Retirement fencing is proposed in the Soil and Water Conservation Plan, though not all the retirement boundary is fenced; effective fences will be required to prevent stock trespass onto upper slopes.
- Legal roads that presently end at the property boundary should be extended through any freeholded land to provide access from the Hakataramea Valley to the Hunter Hills.
- The north end of the property appears to offer the best prospects for legal access to the Hunter Hills; Two Legged Spur may provide the most practical route for public access (though it may be too steep for mountain-biking and horse-riding).
- Public access to conservation land on the Hunter Hills is also available from the other side of the range.
- A marginal strip could be created along Peter Stream to provide access to the property boundary.

### **3.2 DISTRICT PLANS**

The northern part of Hunter Hills Pastoral Lease (north of Two Legged Stream) lies within the Rural Zone of the Mackenzie District and the southern part of the property lies within the Rural Zone of the Waimate District. No Sites of Natural Significance or Heritage Items are listed for the property in the Mackenzie District Plan, though the plan contains a number of rules relating to land use activities within riparian areas and in high altitude areas (i.e. areas above 900 m).

No Sites of Natural Significance or Heritage Items are listed for the property in the Waimate District Plan, though the Hakataramea River along the northwest boundary of the property is listed as a Site of Natural Significance. The Waimate District Plan contains a number of rules that restrict or control activities in the Rural Zone, covering activities such as the clearance of indigenous vegetation, tree planting and set-backs from waterways.

### **3.3 CONSERVATION MANAGEMENT STRATEGIES**

Hunter Hills Pastoral Lease lies within the Waitaki Place Unit of the Canterbury Conservancy. Relevant priority objectives for this unit are listed in the Canterbury Conservation Management Strategy (CMS) (Department of Conservation, 2000) as:

- To identify, maintain and seek to enhance the natural landscapes and natural landscape values of the Waitaki Unit.
- To identify the significant indigenous vegetation and threatened species of the Waitaki Unit.
- To use a range of effective methods to protect the indigenous biodiversity of the Waitaki Unit.

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- To protect and enhance the viability of priority threatened species populations and their habitat(s) in the Waitaki Unit.
- To prevent the loss of natural and landscape values from wilding trees on land managed by the Department.
- To liaise with land managers and regulatory agencies to control and contain wilding trees.
- To reduce and maintain rabbit and thar densities to levels that ensure their adverse effects on natural values are minimised.
- To provide new recreational facilities and opportunities by the Department and other organisations and concessionaires where natural and historic values are not compromised.
- To liaise with adjacent landholders to resolve conflicts over access for recreation to land managed by the Department.
- To increase public awareness of the natural and historic values of the Waitaki.

### **3.4 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. This strategy is a blueprint for managing the country's diversity of species and habitats. It sets a number of goals to achieve this aim. Of particular relevance to tenure review is Goal 3, 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 systems 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.

## PART 4 ATTACHMENTS

### 4.1 ADDITIONAL INFORMATION

#### 4.1.1 Scientific Names of Species

##### Plant Species referred to in text

Species names follow those in the published volumes of New Zealand Flora and the name changes listed in A Checklist of Indigenous Vascular Plants of New Zealand, 10<sup>th</sup> Revision (*Unpublished Document*, S. Courtney, Department of Conservation, Nelson). Maori names are included for taonga species listed in Schedule 97 of the Ngai Tahu Claims Settlement Act 1998. Naturalised species are indicated by an asterisk (\*).

<u>Common name</u>	<u>Scientific name</u>
blue tussock.....	<i>Poa colensoi</i>
bog rush.....	<i>Schoenus pauciflorus</i>
bracken.....	<i>Pteridium esculentum</i>
bristle tussock.....	<i>Rytidosperma setifolium</i>
broom*.....	<i>Cytisus scoparius</i>
browntop*.....	<i>Agrostis capillaris</i>
cabbage tree/ti rakau.....	<i>Cordyline australis</i>
catsear*.....	<i>Hypochoeris radicata</i>
coral broom.....	<i>Carmichaelia crassicaule</i>
cotton daisy/tikumū.....	<i>Celmisia spectabilis</i>
crack willow*.....	<i>Salix fragilis</i>
creeping pohuehue.....	<i>Muehlenbeckia axillaris</i>
dainty daisy.....	<i>Celmisia gracilentia</i>
Deptford pink*.....	<i>Dianthus armeria</i>
elderberry*.....	<i>Sambucus nigra</i>
fescue tussock.....	<i>Festuca</i> sp.
golden speargrass/taramea.....	<i>Aciphylla aurea</i>
harebell.....	<i>Wahlenbergia albomarginata</i>
haresfoot trefoil*.....	<i>Trifolium arvense</i>
inaka.....	<i>Dracophyllum uniflorum</i>
jointed rush*.....	<i>Juncus articulatus</i>
korokio.....	<i>Corokia cotoneaster</i>
koromiko.....	<i>Hebe salicifolia</i>
kowhai.....	<i>Sophora microphylla</i>
lawyer.....	<i>Rubus schmidelioides</i>
male fern*.....	<i>Dryopteris filix-mas</i>
Maori onion.....	<i>Bulbinella angustifolia</i>
matagouri.....	<i>Discaria toumatou</i>
monkey musk*.....	<i>Mimulus guttatus</i>
mountain flax/wharariki.....	<i>Phormium cookianum</i>
mountain toatoa.....	<i>Phyllocladus alpinus</i>
mountain totara.....	<i>Podocarpus hallii</i>
mountain wineberry.....	<i>Aristotelia fruticosa</i>
mouse-ear hawkweed*.....	<i>Hieracium pilosella</i>

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narrow-leaved snow tussock .....	<i>Chionochloa rigida</i>
native broom.....	<i>Carmichaelia petriei</i>
necklace fern .....	<i>Asplenium flabellifolium</i>
patotara .....	<i>Leucopogon fraseri</i>
porcupine shrub .....	<i>Melicytus alpinus</i>
prickly shield fern.....	<i>Polystichum vestitum</i>
prostrate kowhai .....	<i>Sophora prostrata</i>
pukio.....	<i>Carex secta</i>
rautahi.....	<i>Carex coriacea</i>
red clover* .....	<i>Trifolium pratense</i>
red pondweed .....	<i>Potamogeton cheesemanii</i>
red woodrush.....	<i>Luzula rufa</i>
retoreto .....	<i>Azolla filiculoides</i>
rowan*.....	<i>Sorbus aucuparia</i>
scabweed .....	<i>Raoulia australis</i>
scrub pohuehue.....	<i>Muehlenbeckia complexa</i>
sheep's sorrel*.....	<i>Rumex acetosella</i>
silver tussock/wi.....	<i>Poa cita</i>
snowberry .....	<i>Gaultheria depressa</i> var. <i>novae-zelandiae</i>
soft rush* .....	<i>Juncus effusus</i>
speargrass/taramea .....	<i>Aciphylla</i> sp.
St John's wort*.....	<i>Hypericum perforatum</i>
sweet brier* .....	<i>Rosa rubiginosa</i>
sweet vernal*.....	<i>Anthoxanthum odoratum</i>
tauhinu.....	<i>Ozothamnus leptophyllus</i>
thistles* .....	<i>Cirsium</i> spp.
thousand-leaved fern .....	<i>Hypolepis millefolium</i>
toetoe .....	<i>Cortaderia richardii</i>
tutu.....	<i>Coriaria sarmentosa</i>
water forget-me-not*.....	<i>Myosotis laxa</i> ssp. <i>caespitosa</i>
weeping mapou .....	<i>Myrsine divaricata</i>
white clover* .....	<i>Trifolium repens</i>
white fuzzweed.....	<i>Vittadinia australis</i>
wire moss .....	<i>Polytrichum juniperinum</i>
woolly moss .....	<i>Racomitrium pruinosum</i>
woolly mullein*.....	<i>Verbascum thapsus</i>
Yorkshire fog*.....	<i>Holcus lanatus</i>

### Animal Species referred to in text

Species names follow King (1990) for mammals, the June 2003 version of the New Zealand Recognized Bird Names list (compiled by C.J.R. Robertson and D.G. Medway for the Ornithological Society of New Zealand Inc.) for birds, Whitaker (1998) for lizards and McDowall (2000) for fish. Common names for invertebrates are those listed in the Entomological Society of New Zealand's Handbook of New Zealand Insect Names (Scott and Emberson, 1999). Maori names are included for taonga species listed in Schedule 97 of the Ngai Tahu Claims Settlement Act 1998. Naturalised species are indicated by an asterisk (\*).

#### Common name

#### Scientific name

Australasian harrier/kahu .....	<i>Circus approximans</i>
Australasian pied stilt/poaka .....	<i>Himantopus himantopus leucocephalus</i>
Australian magpie* .....	<i>Gymnorhina tibicen</i>
banded dotterel .....	<i>Charadrius bicinctus bicinctus</i>

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bat.....	<i>see</i> South Island long-tailed bat
Bennett's wallaby*	<i>Macropus rufogriseus rufogriseus</i>
black-billed gull.....	<i>Larus bulleri</i>
blackbird*.....	<i>Turdus merula</i>
black-fronted tern.....	<i>Sterna albostrata</i>
black shag/koau.....	<i>Phalacrocorax carbo novaehollandiae</i>
blue duck/kowhio.....	<i>Hymenolaimus malacorhynchos</i>
brook char*.....	<i>Salvelinus fontinalis</i>
brown hare*.....	<i>Lepus europaeus occidentalis</i>
brown trout*.....	<i>Salmo trutta</i>
California quail*.....	<i>Callipepla californica brunnescens</i>
Canterbury galaxias.....	<i>Galaxias vulgaris</i>
chaffinch*.....	<i>Fringilla coelebs</i>
chamois*.....	<i>Rupicapra rupicapra rupicapra</i>
common skink.....	<i>Oligosoma nigriplantare polychroma</i>
dunnock*.....	<i>Prunella modularis</i>
European rabbit*.....	<i>Oryctolagus cuniculus cuniculus</i>
goldfinch*.....	<i>Carduelis carduelis</i>
greenfinch*.....	<i>Carduelis chloris</i>
green skink.....	<i>Oligosoma chloronoton</i>
grey warbler/riroriro.....	<i>Gerygone igata</i>
hare*.....	<i>see</i> brown hare
Himalayan tahr*.....	<i>Hemitragus jemlahicus</i>
house sparrow*.....	<i>Passer domesticus</i>
jewelled gecko.....	<i>Naultinus gemmeus</i>
little owl*.....	<i>Athene noctua</i>
longfin eel/tuna.....	<i>Anguilla dieffenbachii</i>
long-toed skink.....	<i>Oligosoma longipes</i>
lowland longjaw galaxias.....	<i>Galaxias cobitinus</i>
McCann's skink.....	<i>Oligosoma maccanni</i>
New Zealand falcon/karearea.....	<i>Falco novaeseelandiae</i>
New Zealand pipit/pihoihoi.....	<i>Anthus novaeseelandiae novaeseelandiae</i>
paradise shelduck/putakitaki.....	<i>Tadorna variegata</i>
rabbit*.....	<i>see</i> European rabbit
rainbow trout*.....	<i>Oncorhynchus mykiss</i>
redpoll*.....	<i>Carduelis flammea</i>
scree skink.....	<i>Oligosoma waimatense</i>
short-tailed bat.....	<i>Mystacina tuberculata</i>
silvereve.....	<i>Zosterops lateralis lateralis</i>
skylark*.....	<i>Alauda arvensis</i>
song thrush*.....	<i>Turdus philomelos</i>
Southern Alps gecko.....	<i>Hoplodactylus aff. maculatus</i> "Southern Alps"
southern black-backed gull/karoro.....	<i>Larus dominicanus dominicanus</i>
South Island fantail/piwakawaka.....	<i>Rhipidura fuliginosa fuliginosa</i>
South Island long-tailed bat.....	<i>Chalinolobus tuberculatus</i>
South Island pied oystercatcher.....	<i>Haematopus ostralegus finschi</i>
spotted skink.....	<i>Oligosoma lineocellatum</i>
spur-winged plover.....	<i>Vanellus miles novaehollandiae</i>
starling*.....	<i>Sturnus vulgaris</i>
tahr*.....	<i>see</i> Himalayan tahr
upland bully.....	<i>Gobiomorphus breviceps</i>
wallaby*.....	<i>see</i> Bennett's wallaby
welcome swallow.....	<i>Hirundo tahitica neoxena</i>
yellowhammer*.....	<i>Emberiza cintrarella</i>

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