

# **Crown Pastoral Land Tenure Review**

**Lease name : MT DALGETY**

**Lease number : PT 003**

## **Conservation Resources Report - Part 2**

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.

**October 07**

### 2.5.3 Problem Plants

Wilding pines are very sparsely scattered across the property. Most occur above Mackenzie Pass Road where a group of 30 or more are present near a fenced erosion gully. Other woody weeds in this gully are Khasia berry, white poplar, Canadian poplar, crack willow, hybrid willow and alder. Willows and poplars also occur in a western fenced erosion gully closer to Mackenzie Pass. Bishop pine and willows occur next to the road just outside the northern property boundary. Some wilding pines are present in several eastern catchments with the catchment immediately north of the hut in the Hakataramea valley appearing to contain the most with around 10 trees. Also present in eastern catchments are two silver birches just inside the property boundary near the Lockharts Stream 'shingle trap'. This area also contains conifers and poplars and may be a source of future wilding tree spread. The southwest slopes above Dalgety Stream contain a few scattered wilding pines, as do western slopes just north of Hakataramea Pass. One wilding pine is present on the Snow River floodplain near the valley entrance immediately south of Hawkey Stream. A few willows and poplars occur adjacent to the Dalgety Stream floodplain, and while they appear to be outside the property they are a potential threat. A ready source of wilding pines is present on properties to the south and west.

One gorse plant was seen on the ridge between Fett and Hawkey streams. One gooseberry was seen in a toe slope shrubland in the catchment immediately north of the hut in the Hakataramea valley. St John's wort is present in some low altitude areas, such as in shrubland and short tussock grassland above the Hakataramea River. A substantial broom infestation occurs in the upper Snow riverbed and a patch is present near the junction of the valley south of Hawkey Stream. More is likely to be present downstream and upstream given its presence on the adjacent property. Sweet brier is scattered through matagouri shrublands in the western corner of the property, especially on the Snow River floodplain. Thistles are scattered across the property, mostly above Mackenzie Pass Road where nodding thistle are common, and on northeast margins where Scotch thistle and Californian thistle are common.

## 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 bat is present in South Canterbury. The closest bat records to Mt Dalgety 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 in the area.

### 2.6.2 Birds and Lizards

The birdlife of Grampians Ecological District is characterised by native and introduced species of open tussockland and shrubland habitats (McEwen, 1987). Native bird species recorded on adjacent The Grampians and Bauchops Hill pastoral leases are Australasian harrier, banded dotterel (threat status: gradual decline), black shag (sparse), grey warbler, New Zealand falcon (gradual decline), New Zealand pipit, paradise shelduck, silvereye, southern black-backed gull, South Island fantail, South Island pied oystercatcher, spur-winged plover and welcome swallow (Sedgeley, 2006a; Sedgeley, 2006b). Blue duck (nationally endangered) have also been recorded from the district (McEwen, 1987). Interestingly, a pair of kea was regularly seen on the Dalgety Range, although not in recent times (Tim Guerin, Mt Dalgety, *pers. comm.*).

There are no lizard records for the property in the Department of Conservation's Herpetofauna database. Threatened species of lizard recorded within 20 km include jewelled gecko (threat status: gradual decline), long-toed skink (sparse), scree skink (gradual decline) and spotted skink (gradual decline). Nearest known localities for these species are Hakataramea Pass (jewelled gecko), Grampian Mountains (scree skink) (Lettink, 2007), and Edwards Stream and the upper Tekapo River (long-toed skink and spotted skink). Two large skinks observed on a boulderfield above Mackenzie Pass on Mt Dalgety Pastoral Lease in the 1960s are most likely to have been scree skinks (Peter Johns, *pers. comm.*; Espie *et al.*, 1984; McEwen, 1987). Jewelled geckos have been observed at several sites on the property (Tim Guerin, *pers. comm.*). The more common lizard species (common skink, McCann's skink and Southern Alps gecko) are widespread and abundant in the Mackenzie Ecological Region, and have been recorded from nearby pastoral leases (Sedgeley, 2006a; Sedgeley, 2006b; Lettink, 2007).

Bird and lizard species observed on Mt Dalgety Pastoral Lease are described for three geographic areas of the property.

### Lockharts Stream Catchments

This area covers the northeast slopes of the Dalgety Range, between Mackenzie Pass Road to the north and the Conservation Area (a soil and water retirement area) to the south. Vegetation on the crest of the Dalgety Range includes snow-tussocklands, short tussock and herbfield interspersed with rock outcrops, talus and fellfield. Lower slopes above Lockharts Stream support tussockland and substantial areas of matagouri shrubland. Gullies typically contain rock outcrops and shrublands dominated by matagouri, and small-leaved *Coprosma* and *Olearia* species.

Native bird species recorded from this area were Australasian harrier, grey warbler, New Zealand falcon (one sighting) (gradual decline), New Zealand pipit, silvereye, southern black-backed gull, spur-winged plover and welcome swallow. Introduced bird species observed were blackbird, Californian quail, chaffinch, goldfinch, greenfinch, house sparrow, Australian magpie, redpoll, skylark, song thrush and yellowhammer.

Lizard species recorded were Southern Alps gecko (87 sightings) and McCann's skink (20 sightings). Lizards were recorded from the top of the Dalgety Range, the slopes above Mackenzie Pass Road, and along the four-wheel drive track into Lockharts Stream. Habitats for these species include fellfield, rock outcrops, talus, streambeds, shrubland and tussockland. A patch of shrubland located approximately 1.5 km east of Mackenzie Pass was searched for jewelled gecko (gradual decline). This shrubland is dominated by mature, small-leaved *Coprosma* species. Such shrublands provide excellent potential habitat for the arboreal jewelled gecko. No geckos were found during a one hour search in reasonable survey conditions.

### Hakataramea River Catchments

This large area covers the southern and southeast slopes of the Dalgety Range, draining into the Hakataramea River and Dalgety Stream. The top of the Dalgety Range has extensive rockland, with numerous tors, outcrops and fellfield. Native vegetation includes snow-tussockland, herbfield, cushionfield and patches of short tussock. Snow-tussockland is found at all altitudes throughout these catchments. Shrubland dominated by matagouri is common on lower slopes, gullies and streambeds. Mature, small-leaved *Coprosma*-dominated shrublands are present in a few gullies.

Native bird species recorded from this area were Australasian harrier, grey warbler, New Zealand falcon (gradual decline), New Zealand pipit, silvereye, spur-winged plover and welcome swallow. Introduced bird species observed were dunnoek, goldfinch, greenfinch, house sparrow, Australian magpie, redpoll, skylark and yellowhammer.

Lizards recorded were Southern Alps gecko (50 sightings), McCann's skink (14 sightings) and two unidentified skinks that are likely to have been McCann's skink. Lizards were recorded from a range of altitudes and habitats throughout this area, including rock tors and fellfield, streambeds, shrubland and tussockland. McCann's skink was recorded just below the summit of Mount Dalgety, at the upper altitudinal limit for this species.

Two sites where jewelled gecko (gradual decline) was seen prior to this survey (Tim Guerin, *pers. comm.*) were visited in an attempt to confirm the presence of this species. One site is a gentle, southeast-facing slope covered with snow-tussock punctuated with *Dracophyllum* bushes. Here, a farm worker was reported to have seen five or six geckos approximately five years ago, all on *Dracophyllum* bushes. Unfortunately, weather conditions prevented an effective survey on the two occasions (day and night) that this site was visited. The other site has c.1 m tall matagouri-dominated shrubland. The lessee reported finding a single jewelled gecko at this site approximately one year ago. No geckos were found during a 45 minute day-time search in warm, sunny conditions. The site was checked with a spotlight at night, but weather conditions were unsuitable. Further unsuccessful searches for jewelled gecko were conducted at two sites with apparently ideal habitat.

### Snow River Catchments

This area covers the drier, western slopes of the Dalgety Range (including Mount Dalgety). It is defined by Hakataramea Pass to the south, Snow River to the west and the boundary of The Grampians Pastoral Lease to the north. Rockland (fellfield, rock outcrops and scree) dominates at high altitudes and vegetation is sparse. Snow-tussockland rarely extends below the mid slopes, except near Hakataramea Pass. Mid and low slopes contain short tussockland, matagouri shrubland and hawkweed-infested exotic pasture. River terraces are dry and sparsely-vegetated in some areas.

Native bird species recorded from this area were Australasian harrier, grey warbler, New Zealand pipit, silveryeye and welcome swallow. Introduced bird species observed were dunnoek, goldfinch, greenfinch, skylark, starling and yellowhammer.

Lizards recorded were Southern Alps gecko (10 sightings), McCann's skink (nine sightings) and scree skink (gradual decline - one sighting of a pregnant female on a scree slope at 1483 m altitude approximately 1.5 km north of Mount Dalgety). Lizards were recorded at various altitudes and habitats including fellfield, rock outcrops, scree, streambed, shrubland and tussockland.

### Bird Species Recorded

Twenty-one bird species were recorded on Mt Dalgety Pastoral Lease during this survey: eight native species (Table 2) and 13 introduced species. Introduced bird species recorded were Australian magpie, blackbird, California quail, chaffinch, dunnoek, goldfinch, greenfinch, house sparrow, redpoll, skylark, song thrush, starling and yellowhammer.

**Table 3** Native bird species recorded from Mt Dalgety Pastoral Lease, January/February 2007.

Bird species	Threat status	Distribution on property
Australasian harrier	Not threatened	Throughout.
grey warbler	Not threatened	Indigenous shrubland throughout.
New Zealand falcon (eastern)	Gradual decline	Throughout.
New Zealand pipit	Not threatened	Throughout.
silveryeye	Not threatened	Indigenous shrubland throughout.
southern black-backed gull	Not threatened	Throughout.
spur-winged plover	Not threatened	Lockharts Stream catchments.

welcome swallow

Not threatened

Throughout, in wetter areas.

**Lizard species recorded**

One hundred and ninety-three lizards representing three species (Table 3) were recorded from 82 sites on the property. This total represents 43 McCann's skinks, one scree skink, 147 Southern Alps geckos and two unidentified skinks (most likely to have been McCann's skink). The low ratio of skinks to geckos is likely to reflect weather conditions rather than relative abundance. Extremes of temperature were experienced during much of the survey, and at such times skinks become more difficult to find than geckos.

**Table 4** Lizard species recorded from Mt Dalgety Pastoral Lease, January/February 2007.

Lizard species	Threat status	Distribution on property
McCann's skink	Not threatened	At a range of altitudes and habitats throughout.
scree skink	Gradual decline	Scree on Dalgety Range.
Southern Alps gecko	Not threatened	At a range of altitudes and habitats throughout.

**Significance of the Bird and Lizard Fauna**

Mt Dalgety Pastoral Lease provides feeding and breeding habitat for two 'chronically threatened' species: scree skink and New Zealand falcon (both gradual decline). The property also provides extensive feeding and breeding habitats for five non-threatened native species: grey warbler, McCann's skink, New Zealand pipit, silvereye and Southern Alps gecko. Suitable habitat is present for an additional four species of lizard not recorded during this survey but recorded in surrounding areas previously. These are two 'chronically threatened' species: jewelled gecko and spotted skink (both gradual decline), one 'at risk' species: long-toed skink (sparse) and one species considered 'not threatened' (common skink).

Insert Bird and Lizard Values Map

### 2.6.3 Freshwater Fauna (fish and invertebrates)

Mt Dalgety Pastoral Lease lies within two river catchments, the Opihi and the Waitaki. The northeast part of the property is drained by tributaries of the Opihi River i.e. Hayter and Lockharts streams. The southern part of the property is drained by tributaries of the Waitaki River i.e. Dalgety Stream and the Hakataramea River, which converge and flow south down the Hakataramea Valley to the Waitaki River below the hydro-electric dams. The northwest part of the property is drained by the Mackenzie River, the Snow River, and its tributaries, Fett and Hawkey streams, which flow to Lake Benmore and the Waitaki River via Grays and Tekapo rivers.

One of the distinguishing features of the Waitaki River catchment is the presence of hydroelectric dams. This has two major effects on fish communities. The first is that fish communities upstream from the dams are generally composed of only non-diadromous species (those species without a marine phase in their lifecycle), although some exceptions do occur (e.g. longfin eel may still be present and common bully and koaro have become non-diadromous substituting lakes for the sea). The second effect is that fish communities are separated into discrete populations preventing re-colonization of previously dewatered streams. In contrast, the Opihi River has no dams and the Hakataramea River converges with the Waitaki below the dams. This has two main effects on fish communities. The first is that the fish communities are more likely to have diadromous species present (species with a sea phase in their lifecycle). The second effect is that fish are able to migrate between streams, allowing colonisation of previously dewatered streams.

The New Zealand Freshwater Fish Database (NZFFD) has 94 records from the Opihi River catchment and 1090 records from the Waitaki River catchment (at 23<sup>rd</sup> March 2007). No species are recorded in the NZFFD from the Opihi River catchment near the property, although Canterbury galaxias and upland bully have been recorded from Hayter Stream in 2005 (Bowie, 2006a). Species recorded in the NZFFD from the Snow River catchment near the property are Canterbury galaxias and upland bully. Alpine galaxias, Canterbury galaxias, upland bully, brown trout and rainbow trout have been recorded from the Snow and Mackenzie rivers in 2006 (Bowie, 2006b).

Species recorded in the NZFFD from the Hakataramea River catchment near the property are longfin eel, Canterbury galaxias, upland bully, rainbow trout, brook char and brown trout. Brook char, brown trout and rainbow trout were also recorded in Dalgety Stream in 2006 (Bowie, 2006b). Longfin eel is considered threatened (gradual decline) by Hitchmough *et al.*, 2007).

All of the Opihi River catchment and most of the Waitaki River catchment, including all tributaries on the property, are listed as 'Type II' Waters of National Importance (Chadderton *et al.*, 2004), indicating that the water bodies contain special features of national significance.

The property comprises three main catchments of freshwater habitat. The habitats and the fish and macro-invertebrate species recorded are described below for each of these catchments.

#### Opihi River Catchment

This area incorporates the parts of the property that lie within the Opihi River catchment. Characteristic freshwater habitats in this area are the permanent and ephemeral streams that flow into the larger Lockharts and Hayter streams. There are also occasional springs and wetlands throughout this area, generally on the lower slopes above Lockharts Stream. The wetlands are palustrine 'ephemeral wetlands' or 'seepages' (Johnson and Gerbeaux, 2004). Freshwater habitats lie within grassland, tussockland and shrubland plant communities. Streambeds support willow, poplar, tutu and monkey musk. A 'gravel trap' on the property boundary in Lockharts Stream has catchment plantings of willow and poplar. The wetlands support grassland species, turf plants, rushes and sedges.

on Shenley PL

Stock and wild animal access appears to be unrestricted. A vehicle track runs along the boundary of the property beside Lockharts Stream, fording all tributaries. The streams vary in width from 500 mm to over two metres. The wetlands are up to 60 metres long and 20 metres wide. All flowing streams are between 100 and 200 mm deep, with pools up to 500 mm deep. Ephemeral streams appear to be less than 100 mm deep during rain events. Many of the ephemeral streams have substrates of earth or silt; larger stream substrates are boulders, cobbles and bedrock.

Ten sites were electro-fished in this area. Species recorded during this survey and from Hayter Stream during the survey of the adjacent Bauchops Hill Pastoral Lease (Bowie, 2006a) included Canterbury galaxias and upland bully. No fish were recorded at two sites. No records of other fish species are listed for this area in the NZFFD.

Macro-invertebrates observed in this area were: mayflies (*Coloburiscus humeralis*, *Deleatidium lillii*-group, *Deleatidium myzobranchia*-group, *Nesameletus* sp. and *Oniscigaster* sp.), stoneflies (*Stenoperla prasina*, and *Zelandobius* sp.), caddisflies (*Aoteapsyche* sp., *Helicopsyche* sp., *Hydrobiosis frater*, *Hydrobiosis* sp.; *Hydropsychidae* sp., *Olinga feredayi* and *Pycnocentria* sp.), dobsonfly (*Archichauliodes diversus*), two-winged flies (*Austrosimulium* spp. and *Neocurupira hudsoni*-group), snail (*Potamopyrgus* sp.), flatworm (*Cura* sp.) and worm (*Oligochaete* sp.). Macro-invertebrate species diversity indicates that habitats in this area have high water quality.

### Snow River Catchment

This area incorporates the parts of the property that lie within the Snow River and Mackenzie River catchments. Characteristic freshwater habitats in this area are small rivers, permanent streams, ephemeral streams, and riverine 'shallow water' wetlands. Freshwater habitats lie within grassland, tussockland and shrubland plant communities. Monkey musk is present in most permanent stream channels. The wetlands along Snow River support sedges, rushes and grasses, and are generally bordered by scrub.

Stock and wild animal access is unrestricted. Vehicle tracks cross many of the stream channels. The streams vary in width, from three metres in the Snow River to one and a half metres in the other permanent waterways. The wetlands are all less than 30 metres long and 10 metres wide. The Snow River is c.200 mm deep in its upper reaches and 300 mm deep in its lower reaches, with pools over 600 mm deep. Other streams are between 100 and 200 mm deep with pools up to 500 mm deep. All ephemeral streams appear to be no more than 100 mm deep during rain events. The wetlands have areas of open water between 100 and 500 mm deep. Substrates of all permanent streams comprise bedrock, boulders and cobbles; ephemeral streams and wetlands generally have silt substrates.

Four sites were electro-fished and one site was hand-netted in this area. Species recorded during this survey and in Snow River during the survey of the adjacent The Grampians Pastoral Lease (Bowie, 2006b) were upland bully, Canterbury galaxias, brown trout and alpine galaxias. Alpine galaxias, Canterbury galaxias and upland bully were recorded together at four sites.

Macro-invertebrates observed in this area were: mayflies (*Coloburiscus humeralis*, *Deleatidium lillii*-group, *Deleatidium myzobranchia*-group and *Nesameletus* sp.), stonefly (*Stenoperla prasina*), caddisflies (*Aoteapsyche* sp., *Helicopsyche* sp., *Hydrobiosis* sp.; *Hydropsychidae* sp., *Neurochorema* sp., *Olinga feredayi*, *Pycnocentria* sp., and *Pycnocentroides aeris*), dobsonfly (*Archichauliodes diversus*), two-winged flies (*Austrosimulium* spp., *Chironominae* sp. and *Hexatomini* sp.), snail (*Potamopyrgus* sp.), flatworm (*Cura* sp.) and worm (*Oligochaete* sp.). Macro-invertebrate species diversity indicates that habitats in this area have high water quality.

## Hakataramea River Catchment

This area incorporates the parts of the property that lie within the Hakataramea River and Dalgety Stream catchments. Characteristic freshwater habitats in this area are a small river, permanent streams, ephemeral streams, riverine 'shallow water' wetlands, palustrine 'seepage' wetlands, palustrine 'ephemeral' wetlands and palustrine 'fen' wetlands. Freshwater habitats lie within grassland, tussockland and shrubland plant communities. Tutu and monkey musk are present in most permanent stream channels. The wetlands support sedges, rushes and grasses, and are generally bordered by scrub. The acidic fen-wetland on the terrace above the Hakataramea River supports comb sedge, bladderwort and sundew.

Stock and wild animal access is unrestricted. Vehicle tracks cross some stream channels, particularly in the Hakataramea River valley. Dalgety Stream is one and a half metres wide in the upper reaches and over six metres wide in the lower reaches; the Hakataramea River is about two metres wide in the upper reaches and over eight metres wide in the lower reaches. The other permanent waterways are up to three metres wide, though most are less than one and a half metres wide. The wetlands are generally no more than 20 metres long by 10 metres wide, except for the acidic fen wetland which is about 60 metres long and 40 metres wide. Dalgety Stream is generally about 200 mm deep, with pools up to one metre deep. The Hakataramea River is between 200 and 300 mm deep along much of its length, with pools up to two metres deep. The other permanent waterways are generally about 100 mm deep, with pools up to 500 mm deep. The ephemeral streams appear to be no more than 100 mm deep during rain events. The wetlands generally have only subsurface water, except for the few open-water wetlands along Dalgety Stream, which are up to 300 mm deep. The substrates of all permanent streams are boulders and cobbles, with some bedrock in places. The ephemeral streams have silt substrates and the wetlands are silt or peat based.

Twenty five sites were electro-fished in this area. Species recorded were Canterbury galaxias, rainbow trout, brook char, upland bully and brown trout. Canterbury galaxias and upland bully were present together at three sites. Three sites had no fish species present. An additional species in the Hakataramea River catchment recorded in the NZFFD is longfin eel (threat status: gradual decline).

Macro-invertebrates observed in this area were mayflies (*Coloburiscus humeralis*, *Deleatidium lillii*-group, *Deleatidium myzobranchia*-group, *Nesameletus* sp., *Oniscigaster* sp. and *Zephlebia* sp.), stoneflies (*Stenoperla prasina*, *Zelandobius* sp. and *Zelandoperla* sp.), caddisflies (*Aoteapsyche* sp., *Helicopsyche* sp., *Hydrobiosis* sp.; *Hydropsychidae* sp., *Olinga feredayi* and *Pycnocentria* sp.), dobsonfly (*Archichauliodes diversus*), two-winged flies (*Aphrophila* sp., *Austrosimulium* spp., *Chironominae* sp. and *Neocurupira hudsoni*-group), snail (*Potamopyrgus* sp.), flatworm (*Cura* sp.) and worm (*Oligochaete* sp.). Macro-invertebrate species diversity indicates that habitats in this area have high water quality.

## Species Recorded

Six fish species were recorded during this survey of Mt Dalgety Pastoral Lease. A diverse macro-invertebrate fauna was recorded, reflecting the mosaics of freshwater habitats and high water quality.

**Table 5** Fish species recorded from Mt Dalgety Pastoral Lease, January 2007.

<b>Fish Species</b>	<b>Threat Status</b>	<b>Known Distribution on Property</b>
alpine galaxias	Not threatened	Snow River catchment.
brook char	Introduced	Hakataramea River catchment.
brown trout	Introduced	Snow River and Hakataramea River catchments.
Canterbury galaxias	Not threatened	Throughout in permanent streams (mostly in upper reaches).
rainbow trout	Introduced	Hakataramea River catchment.
upland bully	Not threatened	Throughout in permanent streams (mostly in lower reaches).

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

No threatened fish species were recorded in freshwater habitats on the property, though the diverse macro-invertebrate communities present indicate that these habitats are in relatively good condition, especially in their upper reaches. One area of freshwater habitat in the Snow River and Hawkey Stream area is significant for species diversity (three native fish species).

Insert Freshwater Fauna Values Map

## 2.6.4 Terrestrial Invertebrates

Mt Dalgety Pastoral Lease's western boundary adjoins The Grampians Pastoral Lease which was assessed for invertebrate values in 2006. The northwest slopes of the Dalgety Range on The Grampians Pastoral Lease were recognised as having significant invertebrate values (Emberson and Syrett, 2006). The speargrass weevil, *Lyperobius carinatus* (threat status: sparse), has previously been recorded from Mt Dalgety (Craw, 1999).

Invertebrates of Mt Dalgety Pastoral Lease are described below for the three distinct parts of the property.

### Lockharts Stream Catchment

This area comprises the north and east slopes of the Dalgety Range that drain into Lockharts and Hayter streams. A Conservation Area that protects erosion-prone slopes bound it to the south. The steep slopes are dissected by numerous, somewhat gorged, streams. Vegetation in this area consists mainly of tussockland with remnant patches of shrubland in the stream gullies and a large patch of shrubs on the northern slopes above Mackenzie Pass Road.

The main invertebrate values identified were associated with shrublands, especially those in tributaries of Lockharts Stream. The beetle fauna at these sites included seven species of host-specific weevils belonging to the genera *Peristoreus* and *Praolepra*, associated with *Carmichaelia petrei*, *Muehlenbeckia* and *Coprosma* spp.; a species of longhorn beetle, three species of ladybirds, two flower beetles and three species of marsh beetles. Specimens of a darkling beetle, *Zeadelium zelandicum*, not previously recorded from the Mackenzie Basin, were collected from under rocks beside streams in this area. An undescribed species of puppet beetle, from an undescribed genus, was beaten from shrubby vegetation beside Mackenzie Pass Road. Also collected at this site were four species of weevils in the genus *Peristoreus* and a bark beetle, all restricted to native broom. At higher altitude (1110 m) the speargrass weevil, *Lyperobius carinatus* (threat status: sparse), was collected from golden speargrass. A mountain stone weta and a group of five velvet worms were found under rocks at 1360 m.

### Hakataramea River Catchment

This area includes the east slopes of the Dalgety Range, south of the Conservation Area. These slopes drain into the southward flowing Hakataramea River. The terrain is generally steep, with small areas of flatter terraces towards the river, especially at the southern end of the property. The southern end of the Dalgety Range attains higher altitude than the northern section, culminating in Mount Dalgety at 1752 m, and supports characteristic cushionfield vegetation.

The insect fauna associated with this area comprises healthy populations of the range-restricted alpine grasshopper, *Brachaspis* 'Hunter Hills', as well as the ubiquitous *Sigauss australis*. The giant scree weta, *Deinacrida connectans*, was also found here. Two large flightless beetles, the weevil *Inophloeus* c.f. *sulcifer*, and the ground beetle, *Megadromus alternus*, were collected from under rocks. Tussockland on the eastern slopes supports a characteristic insect fauna including ground beetles, cockroaches, tussock butterflies and grasshoppers. Feeding damage and frass from the speargrass weevil was observed on golden speargrass. An uncommon flightless *Anagotus* weevil was beaten from shrubs in a mid-altitude gully.

The shrublands in side streams of the Hakataramea River support a diverse and representative beetle fauna including five species of host specific weevils from the genus *Peristoreus* and a puppet beetle. A single specimen of the uncommon borer beetle, *Leanobium undulatum*, was beaten from shrubs in a lower-altitude gully. Grasshoppers and tiger beetles were collected from short tussock grassland on

the river terraces. Under gravel by the Hakataramea River an unusually rich fauna of five streamside ground beetles from the genus *Bembidion* were collected. Tiger beetles, and the sun-loving ground beetle, *Scopodes* sp., were also found here.

### Dalgety Stream and Snow River Catchments

This area includes all the western slopes of the Dalgety Range. The southern part of this area comprises steep slopes running from Mount Dalgety to Dalgety Stream, south of Hakataramea Pass. Slopes to the north of Mount Dalgety drain into Snow River north of Hakataramea Pass. In the western corner of the property is a gently sloping area of river terrace between the Snow River and Fett Stream.

Areas over 1600 m provide habitat for a similar fauna to that described for higher altitudes on the southeast slopes of the Dalgety Range (above). On the ridge running south from Mount Dalgety an unusual darkling beetle (*Zeadelium simplex*), not previously recorded in the Mackenzie Basin, was collected at 1540 m, whilst lower down, between 900 and 1350 m, a substantial population of the speargrass weevil, *Lyperobius carinatus*, was found on golden speargrass. Beating coral broom on the main mid-altitude southern ridge yielded a distinctive species of host specific weevil, *Peristoreus* sp., not found on other native brooms, and not seen previously. A diverse and representative beetle fauna (including a longhorn beetle, a leaf beetle, a hooded beetle, a ladybird, four host specific weevils, a mildew beetle, two flower beetles, a manuka beetle, a marsh beetle, a cadelle beetle and a soft leaping beetle) was beaten from shrubs in the valley of a tributary of Dalgety Stream immediately west of the main ridge of the Dalgety Range.

A small longhorn beetle in the genus *Hybolasius* was collected from a remnant shrubland alongside Dalgety Stream, which yielded little else of interest. Cattle had heavily trampled the area. Tributaries of the Snow River draining the northwest slopes of Mount Dalgety support remnant shrubland in relatively good condition. The beetle fauna collected here was diverse and included weevils, flower beetles, ladybirds, borer beetles, longhorn beetles, a chequered beetle, manuka beetles, a leaf beetle, shelf fungus beetles and marsh beetles. The threatened grasshopper, *Sigaus minutus*, was collected from a degraded slope just south of spot height 895 m. The edge of a terrace above the Snow River that supports only sparse, low vegetation provides good habitat for three species of short-horned grasshopper, including the uncommon *Phaulacridium otagoense* seen here at the northern limit of its known distribution, as well as healthy populations of two species of tiger beetles, and the boulder copper butterfly.

### Species Recorded

During this survey, 119 species of insects and one velvet worm species were collected or observed from 49 sites on the property. All but five were identified at least to tribe, and most to genus or species. There were 91 beetle (Coleoptera) species from 24 families. Only three beetle species are introduced species, including two biological control agents. This unusually low proportion of exotic beetle species reflects the generally high quality and good condition of the habitat. Eleven notable species were recorded: one is in gradual decline, one is sparse, one is range restricted, two represent extensions of range, one is near its northern limit, one is a large weevil vulnerable to mammalian predation, one is a new undescribed genus and three are rarely collected.

**Table 6** Notable invertebrate species collected from Mt Dalgety Pastoral Lease, January 2007.  
\*Threat status from Hitchmough et al., 2007

Threatened Species	Significance	Distribution on Property
<i>Brachaspis</i> 'Hunter Hills'	Range restricted*.	Crest of the Dalgety Range.
<i>Lyperobius carinatus</i>	Large, flightless weevil, vulnerable to mammalian predation, sparse*.	On golden speargrass between 900 and 1350 m, north and south ends of the

		Dalgety Range.
<i>Sigauss minutus</i>	Reproducing populations of a species in gradual decline*.	On degraded hill slopes at the northwest corner of the property.
<b>Significant Species</b>		
Aderidae gen. et. sp. nov. (puppet beetle)	Undescribed species from undescribed genus, rare in collections.	Beaten from shrubs, lower-altitude eastern slopes.
<i>Anagotus</i> sp.	A flightless weevil rare in collections.	Beaten from shrubs, mid-altitude eastern gully.
<i>Inophloeus</i> c.f. <i>sulcifer</i>	Large, flightless weevil vulnerable to mammalian predation.	On vegetation and under rock, crest of Dalgety Range.
<i>Leanobium undulatum</i>	An uncommon species, rare in collections.	Beaten from shrubs, lower-altitude southeast gully.
Onychophoran gen. & sp. indet. (velvet worm)	Rarely collected in this habitat.	Under rock at 1360 m, northern Dalgety Range.
<i>Phaulacridium otagoense</i>	An uncommon species near its northern limit (Morris, 2002).	On dry terrace near the Snow River.
<i>Zeadelium simplex</i>	A significant range extension.	Crest of the Dalgety Range at 1540 m.
<i>Zeadelium zelandicum</i>	Previously recorded from Mid Canterbury only (Watt, 1992).	Under rocks beside streams, lower-altitude eastern gullies.

### Significance of the Invertebrate Fauna

Invertebrate values are widespread over the property. Eleven notable invertebrate species were recorded. One species (*Sigauss minutus*) is in gradual decline, one is sparse (*Lyperobius carinatus*), one is range restricted (*Brachaspis* 'Hunter Hills'), two represent extensions of range, one is near its northern limit, one is a large weevil vulnerable to mammalian predation, one is a new genus and three are rarely collected. The speargrass weevil, *Lyperobius carinatus* (sparse), attains possibly the largest known population of the species on the property and is near the southern limit of its known distribution.

Insert Invertebrate Values Map

## **2.6.5 Problem Animals**

Fallow deer, Bennett's wallaby, hares, rabbits and possums, or their sign, were observed on the property. Collectively, these introduced herbivores browse native vegetation, exacerbating damage caused by stock. Predators such as feral cats, hedgehogs, mustelids (ferrets, stoats and weasels) and rodents are likely to be present. These animals include native birds and lizards in their diets and pose a significant threat to invertebrates, especially the larger, flightless species. Populations of some invertebrate species are found only at higher altitudes where these predators are less numerous.

## **2.7 HISTORIC**

### **2.7.1 European Heritage Values**

Early land tenure in the upper Hakataramea valley is unclear (Pinney, 1971). It appears that during the late 1850s and early 1860s the Dalgety Range was part of leasehold country claimed by G D Lockhart, though this area was part of Hakataramea Downs Station and held by C Wyatt. The northern end of the property, at Mackenzie Pass, appears to have originally been part of Opawa Station, though in 1858 this area was incorporated into Hakataramea Station. Mt Dalgety Pastoral Lease was created from the division of the northern part of Hakataramea Downs Station in 1911 (Pinney, 1971).

In the head of the Hakataramea River are the remains of a stone hut, probably an old boundary hut. Old wooden mustering huts exist in Lockharts Stream and near Hawkey Stream, with the one in Lockharts Stream being in the best condition.

Mackenzie Pass at the northern boundary of the property and the Mackenzie Basin west of the property derive their names from the Scotsman James McKenzie. In March 1855, 1000 sheep were taken from the Levels Run by James McKenzie and mustered inland up the Tengawai River (Andersen, 1916). It is difficult to discern fact from folklore in accounts of the event. However, McKenzie was captured just west of Mackenzie Pass on what was then part of the Opawa Run (Pinney, 1971). The Mackenzie Memorial stands at this site today. Mackenzie Pass, Hakataramea Pass and the saddle between Lockharts Stream and the Hakataramea River have been important routes for travellers and stock movement since the country was first settled.

### **Significance of Historic Resources**

The remains of the stone hut in the headwaters of the Hakataramea Stream and the musterers hut in Lockharts Stream are of interest. The major mountain passes on the property boundaries, notably Mackenzie Pass and Hakataramea Pass, are important historic routes. Mackenzie Pass is the route taken by James McKenzie and the 1000 sheep he rustled from Levels Run in 1855.

## **2.8 PUBLIC RECREATION**

### **2.8.1 Physical Characteristics**

The property is adjacent to two important passes and historic portals to the Mackenzie Basin, Hakataramea Pass and Mackenzie Pass. Lockharts Saddle on the eastern side of the Dalgety Range provides a low crossing between the headwaters of the Hakataramea River and Lockharts Stream. The property can be divided into four recreation units.

### **Mackenzie Pass Faces**

The Mackenzie Pass faces are the north faces of the Dalgety Range above the Mackenzie Pass Road, defined by the property boundary to the west and a ridge separating the north and east faces of the Dalgety Range. Vehicle tracks, fences, gates, power pylons and power lines are present. The recreation setting on lower slopes is predominantly cultural due to the farming influence and the presence of electricity pylons and lines. Nearer Mackenzie Pass there is sufficient tussock cover and shrubland to maintain an indigenous cover. The narrow pass and steep high mountains together with vegetation patterns contribute to a predominantly natural setting albeit modified to a certain extent by the presence of power pylons and lines.

### **Lockharts Stream Faces**

This area covers the east faces of the Dalgety Range north of the saddle separating the Hakataramea River from Lockharts Stream. These mountain slopes form a series of high basins and dissected gullies along the range. Relatively intact tussockland, shrubland, rockland and herbfield at higher altitudes provide a highly natural setting for recreation. Modified tussockland, grassland and shrubland at lower altitudes provide a semi-natural recreation setting. A vehicle track and a musterers' hut are present on the lower slopes.

### **Mount Dalgety East Faces**

This area covers the slopes east of Mount Dalgety and south of the saddle between Lockharts Stream and the Hakataramea River. It includes steep mountain slopes rising to 1752 m altitude at Mount Dalgety and gentler lower slopes and terraces adjacent to the Hakataramea River. Extensive tussockland, shrubland, rockland and herbfield at higher altitudes provide a highly natural setting for recreation. Modified tussockland, grassland and shrubland at lower altitudes provide a semi-natural recreation setting. A vehicle track, fences and a musterers' hut are present at lower altitudes.

### **Hakataramea Pass Faces**

This area covers the south and southwest slopes of the Dalgety Range. Higher altitude parts of this area are dominated by tussockland, rockland and herbfield, and provide a highly natural setting for recreation. Plant communities are more modified at lower altitudes, and dominated by grassland depleted tussockland, shrubland and hawkweed. This part of the area provides a semi-natural setting for recreation, influenced by the presence of Hakataramea Pass Road and farm tracks on lower slopes. Hakataramea Pass Road is a very scenic route and provides opportunities for spectacular views of the Mackenzie Basin.

## **2.8.2 Legal Access**

### **Roads**

Good access to the property is available from Mackenzie Pass Road along the northern property boundary and Hakataramea Pass Road along the southwest property boundary. An unformed legal road traverses the Lockharts Stream and upper Hakataramea River valleys, adjacent to the eastern property boundary. *but wholly within Shendry*

Vehicle access on the property is along farm tracks which do not follow legal roads. A track traverses the crest of the Dalgety Range to a point just south of spot-height 1622 m. Other tracks provide access to Lockharts Stream valley, Lockharts Saddle and the Hakataramea River valley.

### **Adjoining Crown and Public Conservation Land**

Mt Dalgety Pastoral Lease surrounds an area of public conservation land west of upper Lockharts Stream (Mt Dalgety Conservation Area) on three sides.

### **Marginal Strips**

No existing marginal strips appear to be present along streams on or within the property boundary. Mt Dalgety Pastoral Lease is subject to Section 58 of the Land Act 1948 along all rivers and streams over three metres wide (now subject to Section 24(3), Conservation Act 1987).

### **2.8.3 Activities**

There are no commercial recreation permits issued for the pastoral lease. Known recreational activities include hunting, tramping, four wheel driving and scenery appreciation. Higher altitude parts of the property provide good opportunities for tramping, walking, hunting, nature study, scenery appreciation and in winter months may provide opportunities for skiing. Lower altitude parts of the property provide good opportunities for hunting, tramping, walking, horse riding, mountain biking, four wheel driving, picnicking and nature study.

Existing walking/tramping routes on the property include the ridges between Mount Dalgety and Hakataramea Pass, the crest of the Dalgety Range and the Lockharts Stream to Hakataramea River valley route. Existing vehicle routes are the track on the crest of the range and the Lockharts-Hakataramea valleys vehicle track. The Lockharts-Hakataramea valleys track provides good access between the two valleys and opportunities for recreational access to the northern part of The Hunters Hills and eastern slopes of the Dalgety Range.

### **Significance of Recreation**

Substantial parts of the property provide highly natural settings for recreation, notably the higher-altitude slopes and crest of the Dalgety Range. The property also provides a natural to semi-natural setting and highly scenic backdrop for travellers on the Mackenzie Pass and Hakataramea Pass roads. Vehicle tracks along the range crest and along the eastern property boundary in the Lockharts Stream and Hakataramea River valleys provide important opportunities for recreational access. The Dalgety Range and Mount Dalgety provide opportunities for spectacular views of the Mackenzie Basin, Southern Alps and South Canterbury mountain ranges in a highly natural setting.

## 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 4<sup>th</sup> September 2006 and at Geraldine on 5<sup>th</sup> September 2006. Comments made at those meetings are summarised below.

- PNAP surveys identified several areas on the property for protection including Mackenzie Pass, the southeast faces of Mount Dalgety (which contain a threatened plant species), the totara tree area near Lockharts Stream and the Hakataramea Pass vicinity.
- The Mackenzie landscape study by Graham Denson identifies the southeast face of Mount Dalgety as an important landscape.
- The top of Mount Dalgety is not in very good condition and needs protecting.
- Lockhart Stream and Hakataramea River have good water quality.
- The stream bed on the right of the Hakataramea Pass has lots of vegetation growth in it and would recover well.
- There was a soil and water conservation track put in along the main ridge,
- The area around the homestead is good stock-carrying land.
- Game animals on the land are wallabies, rabbits, hares and occasional deer.
- Ascent of Mount Dalgety from Hakataramea Pass is a regular tramp. It is an easy half day tramp from the pass up the main spur to Mount Dalgety then back down the next spur to the south. The route is used regularly and the current lessee is co-operative. This access should be protected.
- Mount Dalgety to Mackenzie Pass along the range top looks a good tramping route; this ridge is important for recreational opportunities.
- Lockhart Stream and Hakataramea River valleys should be available for tramping access.
- It would be good to obtain vehicle access to suitable points for access and fire control.
- Suggest that proposed easement routes be retained as Crown Land, to prevent easements being relocated.
- Mt Dalgety Conservation Area is a soil and water retirement area.
- There is a land improvement agreement registered on the title which contains constraints on the use of high elevation areas of Mt Dalgety Pastoral Lease.
- Queried whether much of the southern end of the property was suitable for grazing.
- It would be logical to retain the whole southern end of the lease as Conservation Land to provide for complete altitudinal sequences from the tops down to the river and also to provide for good catchment protection.

### 3.2 DISTRICT PLANS

Mt Dalgety Pastoral Lease lies within the Rural Zone of the Mackenzie District. Three Sites of Natural Significance are present on the property:

- 47b: on and north of Hakataramea Pass.
- 47c: southeast slopes of Mount Dalgety (Grampians RAP 5).
- 48: the small fenced totara reserve in Lockharts Stream valley (Grampians RAP 4) now devoid of totara.

The Mackenzie District Plan contains a number of rules relating to land use activities within sites of natural significance, within riparian areas and in high altitude areas (i.e. areas above 900 m):

### **3.3 CONSERVATION MANAGEMENT STRATEGIES**

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

- 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.
- To protect and enhance the viability of priority threatened species populations and their habitat(s) in the Waitaki Unit.
- To improve the range of viable riparian habitats for indigenous species in the Mackenzie Basin.
- 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 provide quality interpretation at priority sites in the Mackenzie Basin.
- 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

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>
alder*	<i>Alnus glutinosa</i>
bishop pine*	<i>Pinus muricata</i>
blue tussock	<i>Poa colensoi</i>
blue wheatgrass	<i>Elymus solandri</i>
bog pine	<i>Halocarpus bidwillii</i>
bog rush	<i>Schoenus pauciflorus</i>
bracken	<i>Pteridium esculentum</i>
bristle tussock	<i>Rytidosperma setifolium</i>
bromes*	<i>Bromus</i> spp.
broom*	<i>Cytisus scoparius</i>
browntop*	<i>Agrostis capillaris</i>
cabbage tree/ti rakau	<i>Cordyline australis</i>
Californian thistle*	<i>Cirsium arvense</i>
Canadian poplar*	<i>Populus Xcanadensis</i>
catsear*	<i>Hypochoeris radicata</i>
Chewings fescue*	<i>Festuca rubra</i>
clover*	<i>Trifolium</i> sp.
cocksfoot*	<i>Dactylis glomerata</i>
comb sedge	<i>Oreobolus pectinatus</i>
coral broom	<i>Carmichaelia crassicaule</i>
crack willow*	<i>Salix fragilis</i>
creeping mapou	<i>Myrsine nummularia</i>
creeping pohuehue	<i>Muehlenbeckia axillaris</i>
crested dogstail*	<i>Cynosurus cristatus</i>
downy brome*	<i>Bromus tectorum</i>
dwarf inaka	<i>Dracophyllum pronum</i>
edelweiss	<i>Leucogenes grandiceps</i>
everlasting daisy	<i>Helichrysum bellidioides</i>
fescue tussock	<i>Festuca novae-zelandiae</i>
giant speargrass/taramea	<i>Aciphylla scott-thomsonii</i>
golden speargrass/taramea	<i>Aciphylla aurea</i>
gooseberry*	<i>Ribes uva-crispa</i>
gorse*	<i>Ulex europaeus</i>

harebell .....	<i>Wahlenbergia albomarginata</i>
hawkweed* .....	<i>Hieracium</i> sp.
Khasia berry* .....	<i>Cotoneaster simonsii</i>
king devil* .....	<i>Hieracium praealtum</i>
kowhai .....	<i>Sophora microphylla</i>
lawyer .....	<i>Rubus schmidelioides</i>
Maori onion .....	<i>Bulbinella angustifolia</i>
matagouri.....	<i>Discaria toumatou</i>
mingimingi .....	<i>Coprosma propinqua</i>
monkey musk* .....	<i>Mimulus guttatus</i>
mountain clubmoss.....	<i>Lycopodium fastigiatum</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>
narrow-leaved snow-tussock .....	<i>Chionochloa rigida</i>
native broom.....	<i>Carmichaelia australis</i>
native violet .....	<i>Viola cunninghamii</i>
necklace fern.....	<i>Asplenium flabellifolium</i>
nodding thistle* .....	<i>Carduus nutans</i>
patotara .....	<i>Leucopogon fraseri</i>
penwiper.....	<i>Notothlaspi rosulatum</i>
plume grass.....	<i>Dichelachne crinita</i>
pohuehue .....	<i>Muehlenbeckia australis</i>
poplar*.....	<i>Populus</i> sp.
porcupine shrub .....	<i>Melicytus alpinus</i>
prickly shield fern.....	<i>Polystichum vestitum</i>
prostrate kowhai .....	<i>Sophora prostrata</i>
pukio.....	<i>Carex secta</i>
purging flax* .....	<i>Linum catharticum</i>
red woodrush .....	<i>Luzula rufa</i>
rock fern .....	<i>Cheilanthes sieberi</i>
ryegrass*.....	<i>Lolium perenne</i>
scabweed .....	<i>Raoulia australis</i>
Scotch thistle* .....	<i>Cirsium vulgare</i>
scrub pohuehue.....	<i>Muehlenbeckia complexa</i>
selfheal*.....	<i>Prunella vulgaris</i>
sheep's sorrel*.....	<i>Rumex acetosella</i>
silver birch*.....	<i>Betula pendula</i>
silver tussock/wi.....	<i>Poa cita</i>
silvery hair grass*.....	<i>Aira caryophylla</i>
slim snow-tussock .....	<i>Chionochloa macra</i>
snowberry .....	<i>Gaultheria depressa</i>
snow totara .....	<i>Podocarpus nivalis</i>
snow tussock.....	<i>Chionochloa</i> sp.
soft brome* .....	<i>Bromus hordeaceus</i>
soft rush* .....	<i>Juncus effusus</i>
sphagnum moss .....	<i>Sphagnum cristatum</i>
star sedge* .....	<i>Carex echinata</i>
St John's wort* .....	<i>Hypericum perforatum</i>
suckling clover* .....	<i>Trifolium dubium</i>
sundew.....	<i>Drosera arcturi</i>
sweet brier* .....	<i>Rosa rubiginosa</i>
sweet vernal* .....	<i>Anthoxanthum odoratum</i>

tall oat grass*	<i>Arrhenatherum elatius</i>
tauhinu	<i>Ozothamnus leptophyllus</i>
thistle*	<i>Cirsium</i> sp.
thousand-leaved fern	<i>Hypolepis millefolium</i>
turpentine shrub	<i>Dracophyllum uniflorum</i>
tutu	<i>Coriaria sarmentosa</i>
vegetable sheep	<i>Raoulia eximia</i>
viper's bugloss*	<i>Echium vulgare</i>
white clover*	<i>Trifolium repens</i>
white fuzzweed	<i>Vittadinia australis</i>
white poplar*	<i>Populus alba</i>
willow*	<i>Salix</i> sp.
wire moss	<i>Polytrichum juniperinum</i>
woolly moss	<i>Racomitrium pruinatum</i>
woolly mullein*	<i>Verbascum thapsus</i>
Yorkshire fog*	<i>Holcus lanatus</i>

### Animal Species

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 (\*).

<u>Common name</u>	<u>Scientific name</u>
alpine galaxias	<i>Galaxias paucispondylus</i>
Australasian harrier/kahu	<i>Circus approximans</i>
Australian magpie*	<i>Gymnorhina tibicen</i>
banded dotterel	<i>Charadrius bicinctus bicinctus</i>
bat	see South Island long-tailed bat
Bennett's wallaby*	<i>Macropus rufogriseus rufogriseus</i>
blackbird*	<i>Turdus merula</i>
black shag/koau	<i>Phalacrocorax carbo novaehollandiae</i>
blue duck/kowhiowhio	<i>Hymenolaimus malacorhynchus</i>
boulder copper butterfly	<i>Lycaena boldenarum</i>
brook char*	<i>Salvelinus fontinalis</i>
brown hare*	<i>Lepus europaeus occidentalis</i>
brown trout*	<i>Salmo trutta</i>
brush-tail possum*	<i>Trichosurus vulpecula</i>
California quail*	<i>Callipepla californica brunnescens</i>
Canterbury galaxias	<i>Galaxias vulgaris</i>
chaffinch*	<i>Fringilla coelebs</i>
common bully	<i>Gobiomorphus cotidianus</i>
common skink	<i>Oligosoma nigriplantare polychroma</i>
dunnock*	<i>Prunella modularis</i>
eleven-spotted ladybird	<i>Coccinella undecimpunctata</i>
European hedgehog*	<i>Erinaceus europaeus occidentalis</i>
European rabbit*	<i>Oryctolagus cuniculus cuniculus</i>
fallow deer*	<i>Dama dama dama</i>
feral cat* (house cat)	<i>Felis catus</i>
ferret*	<i>Mustela furo</i>

giant scree weta .....	<i>Deinacrida connectans</i>
goldfinch* .....	<i>Carduelis carduelis</i>
greenfinch* .....	<i>Carduelis chloris</i>
grey warbler/riroriro .....	<i>Gerygone igata</i>
hare* .....	see brown hare
hedgehog* .....	see European hedgehog
house cat* .....	<i>Felis catus</i>
house sparrow* .....	<i>Passer domesticus</i>
jewelled gecko .....	<i>Naultinus gemmeus</i>
kea .....	<i>Nestor notabilis</i>
koaro .....	<i>Galaxias brevipinnis</i>
longfin eel/tuna .....	<i>Anguilla dieffenbachii</i>
long-toed skink .....	<i>Oligosoma longipes</i>
manuka beetle .....	<i>Pyronota</i> spp
McCann's skink .....	<i>Oligosoma maccanni</i>
mountain stone weta .....	<i>Hemideina maori</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>
possum* .....	see brushtail possum
puppet beetle .....	Aderidae gen. et. sp. nov.
rabbit* .....	see 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>
silvereye .....	<i>Zosterops lateralis lateralis</i>
skylark* .....	<i>Alauda arvensis</i>
song thrush* .....	<i>Turdus philomelos</i>
Southern Alps gecko .....	<i>Hoplodactylus</i> aff. <i>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>
speargrass weevil .....	<i>Lyperobius carinatus</i>
spotted skink .....	<i>Oligosoma lineocellatum</i>
spur-winged plover .....	<i>Vanellus miles novaehollandiae</i>
starling* .....	<i>Sturnus vulgaris</i>
stoat* .....	<i>Mustela erminea</i>
thistle receptacle weevil .....	<i>Rhinocyllus conicus</i>
tiger beetle .....	<i>Cicindela</i> spp.
tussock butterfly .....	<i>Argyrophenega</i> spp.
upland bully .....	<i>Gobiomorphus breviceps</i>
velvet worm .....	Onychophoran gen. & sp. indet
wallaby* .....	see Bennett's wallaby
weasel* .....	<i>Mustela nivalis vulgaris</i>
welcome swallow .....	<i>Hirundo tahitica neoxena</i>
yellowhammer* .....	<i>Emberiza cintrarella</i>

#### 4.1.2 References Cited

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