

## **Crown Pastoral Land Tenure Review**

**Lease name : ROSTRIEVER**

**Lease number : PO 309**

### **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.

They are released under the Official information Act 1982.

**February 05**

gullies such as those facing Smiths Creek below Forks Hut, and on some steep north-facing slopes above the farm track at the boundary of Dalrachney Pastoral Lease. Matagouri is the dominant shrub with *Coprosma propinqua*, *Olearia odorata*, scrub pohuehue and porcupine shrub. *Coprosma intertexta* is present along Smiths Creek.

The most interesting areas on this block, containing the best native cover, are the steep, rocky south-facing slopes above the Lindis Pass Tarras Road (State Highway 8). The lower slopes with their rocky clefts and boulder-fields support a diverse shrubland with many native herbs, grasses and a few ferns. Species present include matagouri, *Coprosma propinqua*, *Olearia odorata*, mountain wineberry, *Coprosma ciliata*, porcupine shrub, *Carmichaelia petriei*, *Helichrysum intermedium*, *Gaultheria crassa*, *Pimelea traversii*, *Gaultheria macrostigma*, *Ozothamnus leptophylla*, *Leucopogon suaveolens*, *Myrsine nummularia*, *Parsonsia heterophylla*, *Rubus schmidelioides*, scrub pohuehue, *Clematis marata*, silver tussock, fescue tussock, blue tussock, narrow-leaved snow tussock, wheat grass, plume grass, *Rytidosperma pumilum*, prickly shield fern, *Asplenium richardii*, *Hypolepis millefolium*, *Blechnum penna-marina* and many herbs including *Anisotome brevifolia*, *Celmisia densiflora*, *Lagenifera cuneata*, *Acaena dumicola*, *Ranunculus gracilipes*, *Ranunculus maculatus*, *Bulbinella angustifolia*, *Anaphalioides bellidifolia* and *Brachyglottis haastii*. Above the steeper lower slopes there is a good cover of narrow-leaved snow tussock with small areas of slim snow tussock right at the top. Along the Pass Burn beside the road are patches of red tussock.

## SUMMARY

The overall impression of the vegetation on the Otematata Block is one of degradation, with most of the grassland in a depleted state and virtually gone from many of the lower, drier north-facing slopes. However, it is at these locations that several of the uncommon and threatened plants persist and probably thrive because of the lack of competition from more robust plants. None of these plants are tolerant of shading. The threatened species present include two of the three *Convolvulus* species, two *Raoulia* species, *Acaena buchananii*, *Leptinella serrulata* and *Ceratocephala pungens*. All are likely to be found at other similar sites on the property if a more detailed search was carried out, although none are likely to be common.

The *Olearia fimbriata* seen in Big Gully also occurs up the Otamatapaio River and near Lindis Pass, but is uncommon especially in Canterbury. The few trees here appear to be remnants of a larger population that could expand if grazing and burning were removed. The presence of this species in Big Gully, together with the variety of habitats and plant communities, means the inherent values are high to outstanding. Several of the larger rock outcrops along the ridge tops above Big Gully contain remnant shrublands with prostrate kowhai, *Hebe pimeleoides* and *Carmichaelia curta*.

The shrublands below Pass Peak (above State Highway 83) are the most significant on the property, with high inherent values. In places they extend almost to the ridge top. Also present are several small populations of *Ceratocephala pungens*, two threatened *Raoulia* species and coral broom.

The bluffs close to the Waitaki River (beside Loch Laird Road) contain several interesting plants such as *Hebe pimeleoides* and prostrate kowhai, as well as good populations of the threatened *Convolvulus verecundus* and *Carmichaelia curta*.

Boundary Creek contains good representative silver tussock grassland with a small *Carex secta* wetland in the lower gully. An altitudinal sequence includes bare ridge-tops with small populations of *Convolvulus waitaha* and *Ceratocephala pungens*, and as well as the only remnant of snow tussock on the Otematata Block.

The Lindis Block is more degraded than expected, with much mouse-ear hawkweed. The only extensive tussock cover remaining is on the south-facing slopes above State Highway 8, where there are also good shrublands and a diverse range of native plants along the lower slopes. The inherent values of this area are high. Good shrubland is present along Smiths Creek, including patches of *Coprosma intertexta*. The inherent values of this area are moderate to high.

### 2.4.3 Notable Flora

Notable plant species recorded from the property are listed in Table 1 below. Threat categories are those proposed by Hitchmough (2002)

**Table 1** Threatened plant species recorded from Rostrievor Pastoral Lease, October 2003.

Plant Species	Known Distribution on Property
<b>Nationally Critical</b> <i>Ceratocephala pungens</i>	Present as small populations at widely-scattered sites on the Otematata Block, including on spurs north of the highway, in Big Gully, and on the ridge south of Boundary Gully
<b>Nationally Endangered</b> <i>Carmichaelia curta</i>	On rock outcrops on the ridge northeast of Big Gully and on cliffs near the Loch Laird Road (Otematata Block)
<b>Serious Decline</b> <i>Olearia fimbriata</i>	One plant in lower Big Gully and two plants at the head of the eastern branch of Big Gully (Otematata Block)
<b>Gradual Decline</b> <i>Acaena buchananii</i>	At several locations in and above Big Gully and on spurs south of Pass Peak (Otematata Block), and on the high ridge on the Lindis Block
<i>Carmichaelia crassicaule</i>	A good population on slopes southwest of Pass Peak, and occasional plants on the ridge northeast of Big Gully (Otematata Block)
<i>Hebe pimeleoides</i> var. <i>rupestris</i>	On rock outcrops on the ridge northeast of Big Gully and on cliffs near the Loch Laird Road (Otematata Block)
<i>Leptinella serrulata</i>	At several locations on the property
<i>Raoulia monroi</i>	On the slopes southwest of Pass Peak, in Big Gully, and at the rocky knob south of Trig Q (Otematata Block)
<i>Raoulia parkii</i>	At two locations on the slopes southwest of Pass Peak (Otematata Block)
<b>Sparse</b> <i>Aciphylla subflabellata</i>	A good population in lower Big Gully (Otematata Block)
<i>Clematis marata</i>	In shrublands on the slopes southwest of Pass Peak (Otematata Block)
<i>Convolvulus fractosaxosa</i>	On the dry north-facing slopes of Big Gully (Otematata Block)
<i>Convolvulus verecundus</i>	On the dry north-facing slopes of Big Gully and on slopes north of bluffs near Loch Laird Road (Otematata Block)
<i>Coprosma intertexta</i>	On the lower slopes southwest of Pass Peak, near the highway (Otematata Block), and near Smiths Creek (Lindis Block)
<i>Pimelea pseudolyallii</i>	On the ridge northeast of Big Gully (Otematata Block)

## 2.4.4 Problem Plants

Introduced plants that may have a significant 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.

### Gorse

Several clumps of gorse are present at the northeast corner of the Otematata Block in the vicinity of the electricity pylon road. This species poses a considerable threat to this part of the property, including nearby populations of threatened species. Removal of existing infestations would be relatively easy.

### Broom

An isolated broom plant was observed on the eastern part of the Otematata Block, near the farm track northeast of Big Gully. This species poses a serious threat and should be removed.

### Winged thistle

Localised infestations of winged thistle are present in the vicinity of sheep camps on the Otematata Block, notably along the ridge northeast of Big Gully. This species does not appear to pose a significant threat at present, though could potentially affect populations of threatened species on bare surfaces in the area.

### Sweet brier

Sweet brier is relatively common on both parts of the property, as scattered plants or as a component of shrublands. It does not appear to pose a significant threat, though localised control may be warranted.

### Wilding pines

Wilding pines are scattered across eastern slopes of the Otematata Block, above Lake Benmore. They appear to have spread from planted trees in the vicinity of the Benmore Dam. Wilding pines pose a significant threat to the property and should be removed. Ongoing monitoring and removal of new infestations will be required because of the large seed source present near Benmore Dam.

### Stonecrop

Stonecrop is present on dry rocky areas on the Otematata Block, notably on the ridge northeast of Big Gully. The threat posed by this species is unclear, though the habitat it favours also supports threatened plant species. Control of stonecrop is probably impractical.

### Elder

A few small elder trees were observed within scrub on the lower slopes south of Pass Peak. This species probably poses only a moderate threat, although dispersal of its seeds by birds means it may threaten a wide area. These trees should be removed before further spread occurs.

## 2.5 FAUNA

### 2.5.1 Birds

The bird fauna of the region is characterised by open country and wetland species, reflecting the paucity of native forest (Bull *et al.*, 1985, Jarman, 1987). Birds observed on three separate parts of Rostrievor Pastoral Lease are described below for each of the main habitats surveyed, and listed in Tables 2 and 3.

#### Otematata Block (north of State Highway 83)

##### Shrublands and wetlands

Most time was spent within the Big Gully RAP, which extends up-valley from a dam at approximately 330 m altitude, to an altitude of approximately 600 m. A small stream flows along the centre of the valley and wetter areas support *Carex secta*, toetoe and raupo. Shrublands are most extensive around the dam and about half way up the RAP extending into a side gully. Shrublands and seepage areas are also present in the southern part of the block, on the slopes and valley floor between Pass Peak and the highway.

Grey warbler and silvereye were recorded in all the shrublands, as well as many introduced species. Australasian harrier, spur-winged plover and black-backed gull were also noted. Eight New Zealand scaup, a pair of paradise shelduck with chicks and two Australian coots were seen on the dam at the bottom of Big Gully. The sedge and raupo wetlands in lower Big Gully are suitable habitat for marsh crake, which frequently inhabit sedge wetlands of much lower quality throughout the Mackenzie Basin (C. O'Donnell, R. Maloney, *pers. comm.*; Rebergen, 1999; Jarman 1987; Robertson *et al.*, 1983). The raupo reedland may also be extensive enough to support Australasian bittern.

##### Front paddocks and dams

The front paddocks are largely bare of woody vegetation, and support over-sown pasture. There are a series of small dams and interconnected wetlands with small areas of raupo reedland. A pair of threatened banded dotterels and their chick were observed in a bare and stony area of the front paddocks. Several species of waterfowl and wetland birds were observed on the ponds, including pied oystercatchers with three chicks, spur-winged plovers, four pied stilts, one black swan, nine New Zealand scaup, a pair of grey teal, a pair of Australasian shovelers and mallards.

#### Otematata Block (south of State Highway 83)

A pair of pied oystercatchers, three banded dotterels and three black-fronted terns was recorded, but no nests or chicks were observed, on cultivated paddocks on this part of the property.

#### Lindis Block

A New Zealand falcon was observed flying from the south-facing rocky bluffs alongside the Lindis Pass Tarras Road. It is possible the falcon was disturbed from a perch or nest site. Tomtit, grey warbler and common introduced birds were recorded in the shrublands on the lower hill slopes and on the valley floor beside the highway.

**SUMMARY**

A total of 41 bird species have been recorded from the property: 24 indigenous species (11 endemic species or sub-species and 13 native) and 17 introduced species (Tables 2 and 3). Six of the indigenous birds are listed as threatened by Hitchmough (2002) (Table 6). Eight introduced species of mammal and amphibian were also recorded.

**Table 2** Indigenous bird species recorded from Rostrievor Pastoral Lease, October 2003.

<b>Bird species</b>		<b>Known Distribution on Property</b>
Common name	Scientific name	
Australasian harrier	<i>Circus approximans</i>	Throughout
Australasian shoveler	<i>Anas rhynchos</i>	Dam, Otematata Block (north)
Australian coot	<i>Fulica atra</i>	Big Gully dam
banded dotterel	<i>Charadrius bicinctus</i>	Cultivated paddocks, Otematata Block
black-backed gull	<i>Larus dominicanus</i>	Throughout
black-billed gull*	<i>L. bulleri</i>	Dams, Otematata Block (north)
black-fronted tern	<i>Sterna albobriata</i>	Cultivated paddocks, Otematata Block (south)
black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Lake Benmore; Lindis Block*
black swan	<i>Cygnus atratus</i>	Dam, Otematata Block (north)
fantail	<i>Rhipidura fuliginosa fuliginosa</i>	Lindis Block*
grey teal	<i>Anas gracilis</i>	Dam, Otematata Block (north)
grey warbler	<i>Gerygone igata</i>	Throughout, shrublands
little shag*	<i>P. melanoleucos</i>	Dams, Otematata Block (north)
New Zealand falcon	<i>Falco novaeseelandiae</i> "eastern"	Bluffs above Lindis Pass Tarras Road
New Zealand pipit	<i>Anthus novaeseelandiae</i>	Throughout, open tops
New Zealand scaup	<i>Aythya novaeseelandiae</i>	Big Gully dam
paradise shelduck	<i>Tadorna variegata</i>	Throughout; Big Gully dam
piebald oystercatcher	<i>Haematopus ostralegus finschi</i>	Front paddocks, Otematata Blocks
piebald stilt	<i>Himantopus himantopus</i>	Dams, Otematata Block (north)
silveryeye	<i>Zosterops lateralis</i>	Throughout, shrublands
spur-winged plover	<i>Vanellus miles</i>	Big Gully; front paddocks, Otematata Block
tomtit	<i>Petroica macrocephala macrocephala</i>	Above Lindis Pass Tarras Road, boulder fields, shrublands
welcome swallow	<i>Hirundo tahitica</i>	Big Gully, Otematata Block (north)
white-faced heron*	<i>Ardea novaehollandiae</i>	Dams, Otematata Block (north)

\* Not observed on survey, but recorded by Simon Elkington between 1982 and 2003

**Table 3** Introduced bird species recorded from Rostrievor Pastoral Lease, October 2003.

<b>Bird species</b>	
Common name	Scientific name
Australian magpie	<i>Gymnorhina tibicen</i>
blackbird	<i>Turdus merula</i>
California quail	<i>Callipepla californica</i>
Canada goose	<i>Branta canadensis</i>
chaffinch	<i>Fringilla coelebs</i>
chukor	<i>Alectoris chukar</i>
dunnock	<i>Prunella modularis</i>
goldfinch	<i>Carduelis carduelis</i>
greenfinch	<i>Carduelis chloris</i>
house sparrow	<i>Passer domesticus</i>
mallard	<i>Anas platyrhynchos</i>
redpoll	<i>Carduelis flammea</i>
rock pigeon	<i>Columba livia</i>
skylark	<i>Alauda arvensis</i>
song thrush	<i>Turdus philomelos</i>
starling	<i>Sturnus vulgaris</i>
yellowhammer	<i>Emberiza citrinella</i>

### 2.5.2 Lizards

Lizards are among the most important elements of the North Otago, Central Otago and South Canterbury faunas. McCann’s skink and common skink are widespread and abundant in the Benmore, Hawkdun and Lindis ecological districts. Other species recorded in the area include common gecko, scree skink, spotted skink, green skink, Otago skink and grand skink. Three threatened lizard species (scree skink, spotted skink and green skink) have been recorded in the vicinity of the Otematata Block of Rostrievor Pastoral Lease. Five threatened lizard species (scree skink, spotted skink, green skink, Otago skink and grand skink) have been recorded in the vicinity of the Lindis Block (Whitaker *pers. comm.*; Whitaker *et al.*, 2002).

Of particular note are populations of Otago skink and grand skink located between the Lindis Pass and Lake Hawea. A population of grand skink was discovered on the Lindis Block of Rostrievor Pastoral Lease, near Smiths Creek in 1982 (Roberts, 1984), and was still known to be present in February 2003. Grand skinks were observed at an additional site during this survey. Otago skinks and grand skinks are known from only one other part of the Otago region (Macraes Flat). Therefore, the populations occurring in the Lindis area represent both the northern and western limits of their known range, with the grand skink population at Smiths Creek at the northwest limit for this species.

Lizards observed on the three separate blocks of Rostrievor Pastoral Lease are described below for each of the main habitats surveyed, and listed in Table 4.

#### Otematata Block (north of State Highway 83)

##### Rock outcrops, boulders and talus

Rock outcrops are plentiful throughout the Big Gully area and, in some locations, form part of a mosaic of shrubland and wetland habitats. Large rock bluffs with scree and boulders at the eastern edge of the Otematata Block, near Loch Laird Road, are also good lizard habitat. Common gecko (“southern alps”), common skink and McCann’s skink were widespread and

abundant throughout the Otematata Block at a range of altitudes (400 to 725 m), with McCann's skink the most prevalent.

### **Otematata Block (south of State Highway 83)**

#### Rock outcrops, boulders and talus

There were fewer areas of bare rock, outcrop and bluff on this part of the property compared with the Big Gully block. Three geckos and two skinks (most likely McCann's skinks) were observed by another member of the survey team in a rocky area above wetlands near the western boundary of the property.

#### Cultivated paddocks

A female McCann's skink was found underneath a piece of roofing iron near the gates into the paddocks on the valley floor.

### **Lindis Block**

#### Rock outcrops, schist plates, fractured rocks and talus

There are numerous small areas of bare rock outcrop, primarily schist plates, throughout this part of the property but scree is largely absent except alongside the State Highway. Some schist outcrops are surrounded by grassland and provide relatively exposed habitat, whereas others are sheltered by shrubs. Rocky areas are generally more extensive on the south-facing hill slopes above the Lindis Pass Tarras Road. In that area schist outcrops and bluffs, boulder fields, shrubland and wetland form a mosaic of habitats.

Four species of lizard were recorded on the Lindis Block: common gecko, common skink, McCann's skink and the endangered grand skink. The common species, particularly McCann's skink, were widespread and abundant throughout the block at a range of altitudes (600 to 1150 m). Grand skinks were observed at two sites, the previously-known site and a new site. High numbers of lizards were observed at the original grand skink site (Site A, see Values Map), including four grand skink (two adults, and two sub-adults), 20 common gecko, 14 McCann's skink and one common skink.

The newly-discovered grand skink site (Site B) is on a northeast-facing hill slope approximately two kilometres west of Site A. Two adult grand skinks were observed at this site, one basking on a small plate of schist and the other running across a large schist boulder a few metres distant. The rock outcrop at Site B is larger than that at Site A, and extended further down the hill to a wetter area at the base of the slope. The site has been burnt, over-sown and grazed, and appears to be under the same management regime as Site A. Sheep, rabbit and possum droppings were prevalent. Some cover was provided by porcupine shrubs. Two common geckos, one McCann's skink and one common skink were also observed at the site.

### **SUMMARY**

Four species of lizard were recorded on the property, one of which is classified as threatened (grand skink). Common skink, McCann's skink and common gecko, were recorded at a number of locations on the property, indicating an abundance of favourable lizard habitat.

The population of grand skinks at Smiths Creek is recognised as a priority population for protection and conservation management in the Otago and Grand Skink Recovery Plan (Whitaker & Loh, 1995) and in the management plan for conservation of lizards in the Otago Conservancy (Whitaker *et al*, 2002). Recent research on the genetic differences between Lindis and Macraes grand skink populations indicates that the populations are

genetically highly divergent. Grand skink is given the highest conservation priority ranking nationally (Hitchmough, 2002) and regionally (Otago Conservation Management Strategy, Department of Conservation, 1998).

**Table 4** Lizard species recorded from Rostrievor Pastoral Lease, October 2003.

Lizard species		Known Distribution on Property
Common name	Scientific name	
common gecko	<i>Hoplodactylus</i> aff. <i>maculatus</i> “southern alps”	Under rocks and talus throughout property
common skink	<i>Oligosoma nigriplantare polychroma</i>	Under rocks and talus throughout property, also grassy areas
grand skink	<i>Oligosoma grande</i>	Schist outcrops, Smiths Creek valley, Lindis Block
McCann’s skink	<i>Oligosoma maccanni</i>	Under rocks and talus throughout property

### 2.5.3 Fish

The Otematata Block of Rostrievor Pastoral Lease lies in the catchment of the Waitaki River, and the Lindis Block lies in the catchment of the Clutha River. Distinguishing characteristics of both these river catchments are the dams on the main rivers. These dams have two major effects on the fish communities. The first is that fish communities above the dams are generally composed of non-diadromous species (species without a marine phase in their lifecycle), although some exceptions do occur: longfin eels are still present in the river systems, and the normally diadromous common bully and koaro have become non-diadromous, substituting lakes for the sea. The second effect is that the fish communities are divided into separate populations, with little or no migration across the dams. This means that any re-colonisation of previously dewatered streams can only occur from within each dam catchment.

The New Zealand Freshwater Fish Database has (at 31<sup>st</sup> October 2003) 632 records from the Waitaki catchment and 1118 records from the Clutha catchment (McDowall and Richardson, 1983). Records from the Otamatapaio River (Otematata Block) include lowland longjaw galaxias, upland bully and brown trout. Records from Lake Benmore include longfin eel, koaro, common bully, upland bully, brown trout, rainbow trout, Chinook salmon and sockeye salmon. Records from the Lindis River (Lindis Block) include un-identified galaxiids (possibly “*Galaxias* sp. D”), longfin eel, common bully, upland bully, brown trout and rainbow trout. Records from Smiths Creek include un-identified galaxiids and brown trout. Three of these species are listed as threatened by Hitchmough (2002): longfin eel (gradual decline), lowland longjaw galaxias (nationally critical) and “*Galaxias* sp. D” (nationally vulnerable).

Seven different freshwater habitats are present on the property. These are classified by water source, resistance to drying and surrounding landform structure. The results of surveys of these habitats are described below.

#### Seepages

Seepages are present on both blocks of the property, although their characteristics differ between blocks. They occur in Big Gully and in the road side stream (north side of road) in the Otematata Block, and in most of the stream gullies in the Lindis Block. The seepages mostly support pasture and tussock, however in the Lindis Block some occur in less

developed country. Seepages are mostly unprotected from stock, although rocky outcrops provide some protection on the Lindis Block. Generally, seepages cover less than half a hectare on the Lindis Block, and less than one hectare on the Otematata Block. The absence of standing or flowing water precluded fish surveys of this habitat. However seepages often have a direct influence on freshwater habitats downstream.

### **Seepage Streams**

Streams derived from wetlands or springs are represented by a tributary of Smiths Creek flowing north from the centre of the Lindis Block, a small tributary of the Pass Burn at the southeast corner of the Lindis Block, and the lower section of Big Gully on the Otematata Block. The Smiths Creek tributary arises from several small seepages and reaches a maximum width of half a metre in a one-metre deep channel with a water depth of 150 to 300 mm. The Pass Burn tributary appears to be a temporary feature associated with snow melt, but at the time of survey contained several small channels. The Big Gully stream is approximately one metre wide but has a wet spongy margin up to three metres wide and an average depth of 150 mm and maximum depth of 250 mm.

All seepage streams on the property are accessible to stock. Riparian vegetation comprises pasture, tussock, shrubland, and occasionally reeds and sedges. The only fish recorded were brown trout in the tributary of Smiths Creek.

### **Wetlands**

Two wetlands are present on the property, both on the Otematata Block. The first runs parallel with Corbies Creek, from a spring to the property boundary where it joins the Otamatapaio River. It is less than 400 m long and most of the channel is less than two metres wide, although near the boundary it widens to more than four metres. The area near the spring has an average depth of 200 mm, but is closer to 400 mm deep near the boundary. The wetland is accessible to stock, with dense vegetation providing the only protection.

The second wetland covers approximately one kilometre of lower Boundary Gully, and flows directly to Lake Benmore. A culvert for a vehicle track is inset, allowing fish passage. All parts of the wetland are accessible to stock, with dense vegetation offering the only protection. The wetland is approximately two metres wide and 100 mm deep.

The wetlands and associated streams appear to be the most important habitats for fish on the property. Koaro were recorded in Boundary Gully, and lowland longjaw galaxias and brown trout were recorded in the wetland near Corbies Creek. Upland bullies were recorded in similar habitat during the survey of Bog Roy Pastoral Lease (Bowie, 2003).

### **High Altitude Streams**

Streams derived from higher-altitude sources are represented by Smiths Creek and the upper Pass Burn on the Lindis Block. Smiths Creek is larger than the Pass Burn and is crossed by several vehicle fords. Stock access to the streams is limited only by the eroded banks and dense matagouri or sweet brier scrub. Riparian vegetation comprises scrub, tussockland and pasture. Smiths Creek is generally wider than three metres and is approximately 200 mm deep (range 100 to 300 mm). The Pass Burn is approximately two metres wide and approximately 200 mm deep (range 100 to 400 mm). Fish surveys were undertaken at three sites along Smiths Creek, including the tributary running along the north edge of the property. Brown trout were present at all sites, and the endangered native "*Galaxias* sp. D" was present at one site.

## Rivers

The only river on the property is Corbies Creek, running through the Otematata Block to join with the Otamatapaio River. The one kilometre stretch of this river within the property boundary is approximately four metres wide and between 350 and 1000 mm deep. All parts of the river appear accessible to stock, although dense sweet brier and matagouri scrub protect the lower reaches. Other riparian vegetation includes tussock, pasture and sedges. The river was not sampled for fish during this survey, but results of the survey of the adjoining Bog Roy Pastoral Lease (Bowie, 2003) suggest it will contain brown trout and possibly upland bully.

## Water Races

One water race is present on the property, alongside Corbies Creek on the southern part of the Otematata Block. The source of the water race appears to be the Glen Bouie Creek wetland, itself a tributary of Corbies Creek. All parts of the water race are accessible to stock. Riparian vegetation is predominantly pasture, but reeds, willows, sweet brier and matagouri are also present. At the time of the survey the water race appeared to be running higher than normal, so it is hard to evaluate its normal flow regime. The water race was surveyed at two locations and upland bully recorded at one of those locations. Brown trout were recorded during the survey of the adjoining Bog Roy Pastoral Lease (Bowie, 2003), and are likely to be present.

## Artificially Contoured Streams and Ponds

These habitats are present on the front flats of the Otematata Block near the homestead. Water levels appeared to be at a seasonal high during this survey, and are likely to be lower for most of the year. These streams and their immediate catchments were formed by the removal of material during the construction of the Benmore Dam. All parts of this habitat are accessible to stock as the streams and ponds provide water for stock. Surrounding vegetation is mostly pasture with some willows and rushes.

The artificially-contoured streams and ponds were not surveyed with an electric fishing machine. They do not appear to be permanent waterways, except for the farm ponds and the small springs. No fish species are expected to occur here, however the introduced whistling frog was found in one of the dams.

## SUMMARY

Freshwater fauna communities of seven different aquatic habitats were surveyed at 13 sites on Rostrievor Pastoral Lease. Five fish species including four native species, and one introduced frog, were recorded. Native fish were found in less than half of the habitat types. Two threatened fish species were recorded, including a species listed as 'nationally critical' (lowland longjaw galaxias) and a species listed as nationally vulnerable ("*Galaxias* sp. D") by Hitchmough (2002). Water quality was best in the Lindis Block habitats. The best habitat diversity was in Big Gully on the Otematata Block, with springs and seepages feeding a small stream.

**Table 5** Fish species recorded from Rostrievor Pastoral Lease, October 2003.

Fish species		Known Distribution on Property
Common name	Scientific name	
brown trout	<i>Salmo trutta</i>	In all streams on the Lindis Block and in the river and adjacent wetland on the Otematata Block
"Galaxias sp. D"	<i>Galaxias</i> sp. D	Lower reaches of Smiths Creek
koaro	<i>Galaxias brevipinnis</i>	Boundary Creek near Lake Benmore
lowland longjaw galaxias	<i>Galaxias cobitinus</i>	Wetland near the confluence of Corbies Creek and Otamatapaio River
upland bully	<i>Gobiomorphus breviceps</i>	In the small water race from Corbies Creek but expected in most of the naturally-occurring flowing waterways

## 2.5.4 Invertebrates

### TERRESTRIAL INVERTEBRATES

Terrestrial invertebrate species observed on Rostrievor Pastoral Lease are described below for the nine areas sampled during the field survey.

#### Otematata Block

##### 1. Big Gully

Collecting from tussock, pasture and rock outcrops in this area produced 18 insect, one spider and one centipede species. Flies and moths were widespread. Tachinid flies were abundant and four beetle species were common. Two species of darkling beetle (*Artystona lata* and *Mimopeus elongatus*) appear restricted to rock outcrops. Carabid beetles were represented by *Mecodema politanum* and *Megadromus enysi*. The latter species was previously known only as far south as mid-Canterbury. A fifth beetle species (the broad nosed weevil *Irenimus capressus*) was also collected, making a total of five endemic beetle species in Big Gully alone. The grasshopper *Sigaus australis* was common on higher slopes.

The majority of species were found over the entire Otematata Block, except flightless insects (specifically cockroaches and beetles) which were restricted to un-grazed habitat enclaves such as rock outcrops or bluffs. A strip of reasonably healthy tussock running through the centre of Big Gully supports an endemic moth (*Tmetolophota acontistis*) which was collected in a light trap. Rock outcrops appear to provide the least disturbed micro-habitat for invertebrates. Condition and diversity is reasonable in those localities, with endemic beetles, spiders, cockroaches, centipedes and Collembola common.

##### 2. Ridge Tops

Collecting in this area produced 14 insect, three spider and one pseudoscorpion species. Flies and grasshoppers were common (especially *Lucilia* blow flies) at most ridge top sites. Darkling beetles (*M. elongatus* and *A. lata*) were also common under rocks among outcrops. Three Carabid beetle species were found from three genera. *Holcaspis implica* is apparently widespread on the tops of the property, while only one specimen of *Taenarthrus capito* (Migadopini) was found in moist soil deep under a large boulder. This species is known from the southern South Island only and prefers damp conditions (Larochelle and Lariviere,

2001). *Mecodema politum* also occurs on the tops. Species of hunting spider of the endemic genus *Miturga* were widespread and common under rocks and at the base of vegetation. Similarly, the common Lycosid spider (*Anoteropsis hilaris*) was found at a number of sites. One Salticid (jumping spider) was collected among rock outcrops.

The ridge tops cater reasonably well for small, sedentary and inconspicuous invertebrates. However, nearly all populations of flightless invertebrates found on the tops were frequent only in protected habitats, typically rock outcrops with dense vegetative cover. Invertebrate populations are typically more diverse at less accessible sites, in wind exposed areas and in unpalatable vegetation (e.g. *Aciphylla*).

### **3. Boundary Creek, Lake Benmore Shoreline and Access Road**

This lower-altitude part of the lease produced the highest species counts (21 insect, eight spider and two pseudoscorpion species). Seven species of native spider were collected (by sweep netting) from grasses on the shore of Lake Benmore. Pseudoscorpions were frequent among rocks at one site on the small peninsula near Boundary Gully. Diversity of these cryptic arthropods was higher at this site than on any other part of the property. Chironomid and Tachinid flies were common at all sites, as was the endemic Lygaeid (*Rhypodes*). Seven endemic species of moth (from two families and three genera) were caught in the light trap and all appeared abundant (catch numbers were high). The moth population appears large and probably reflects the diverse vegetation in the area. Similarly, spider populations appear abundant, concomitant with high numbers of aquatic flies such as Chironomids.

The area has two water sources: one flowing (Boundary Creek); the other still (Lake Benmore). Both provide alternate habitats and life-history stages for aquatic invertebrates and, in turn, prey species. Numbers of endemic invertebrates were surprisingly high given the number of introduced insects caught (only three species). Although the tussock slopes flanking the access road to Boundary Creek are only in moderate condition, they support a large population of nocturnal moths. Furthermore, more than 30 years after their creation, the shores of Lake Benmore now represent an established habitat.

### **4. Slopes north of State Highway 83**

Collecting produced three insect, three spider, one opilone and one amphipod species. Most species appear to be localised around a small seepage within dense matagouri scrub. There was a surprising diversity of species within the sampling area: Arthropods from five orders were collected including specimens of Opiliones (harvestman) and Amphipods (land hopper) that were not collected elsewhere on the property. Species of *Miturga* (hunting spider) appeared common at this site and on nearby scree; some were quite large (up to 25mm body length). This suggests either predator numbers are low or the spiders are escaping capture within dense scrub. The endemic nursery web spider (*Dolomedes minor*), was also collected.

The swampy matagouri habitat at this site is significant in an otherwise very dry area. The gullies of dense matagouri nearby may provide sufficient habitat for a number of endemic species, such as the spider *Dolomedes minor*.

### **5. Ridge south of State Highway 83**

Five insect and one spider species were collected from an area of approximately 300m<sup>2</sup> on lower slopes at the west end of the ridge. The common purple winged butterfly (*Lycaena boldenarum*) and the tussock butterfly *Argyrophenga antipodum* were abundant, and

grasshoppers (*Sigaus australis*) common. No insects were seen during a brief visit to the crest of the ridge (a plateau of over-sown clover and ryegrass pasture) in windy conditions.

This area is the most modified part of the property. Lack of time prevented further collecting from this area, although native insects are likely to be largely restricted to the less-modified lower slopes of the ridge.

## **Lindis Block**

### **1. Slopes north of State Highway 8 (gully and south-facing slopes)**

Collecting produced five insect species. Flies (Tachinidae and Muscidae) were common at both sites and fly populations appear to be widespread and thriving. Two species of endemic cockroach from two genera were found in the main roadside gully (*Celatoblatta anisoptera* and *Parellipsidion inaculeatum*). *C. anisoptera* is a local endemic, restricted to northern Otago and the southern Mackenzie Basin, whereas *P. inaculeatum* is widespread in the South Island. Cockroaches are detritivores and *Celatoblatta anisoptera* was common amongst dead foliage of sweet brier while *P. inaculeatum* was less frequent and strictly associated with decomposing matter of native speargrass and snowberry. These cockroach species were not observed elsewhere on the Lindis Block.

### **2. High Ridge (Point 1215)**

An even distribution of species was collected along the length of this ridge, including 11 insect, four spider and one centipede species. Species collected included numerous grasshoppers (*Sigaus australis*), five beetle species (three Carabidae, one Elatridae and one Staphylinidae), two native ant species distributed throughout all sites, one fly species of note (the Stiletto fly *Anabarhynchus* sp.? *robustus*), hunting spiders (*Miturga* sp. and *Anoteropsis* sp.) and one endemic centipede species (*Paralamyctes* sp.).

This area supports a typical assemblage of endemic invertebrates, although the diversity of taxa in this area was more significant than the number of individuals. However, grasshoppers and ants were numerous. The presence of Stiletto fly is significant. The New Zealand Stiletto flies are unusual in having a preference for inland open swampy tussock country. There are six species of Stiletto fly known from Canterbury, but the group is poorly studied (Pawson and Emberson, 2000).

### **3. Main Tussock Basin**

Collecting produced 14 insect and one spider species, distributed throughout the tussock basin. Butterflies (*A. antipodum* and *L. boldenarum*) and Crambid tussock moths were common. Flies were numerous and diverse, including species of Calliphoridae, Tachinidae, Muscidae and Tipulid. Tussockland in this basin provides habitat for endemic moths and butterflies, and populations appear widespread.

### **4. Smiths Creek**

Collecting produced 12 insect species. Carabid beetles (*Holcaspis implica* and *Demetrida sinuate*) and Tenebrionid beetles (*M. elongatus* and *A. lata*) were found under rocks on a low west-facing spur. Crambid tussock moths and Tachinid flies were frequently encountered. The endemic bee (*Lasioglossum sordidum*) was collected, apparently the first record of this species in the area (Valentine and Walker, 1991). One cicada nymph was collected, possibly *Kikihia* sp. Habitat condition in this area is fair, and invertebrate

populations are variable. Moth and fly populations are large, whereas populations of other taxa are patchy.

## FRESHWATER INVERTEBRATES

Freshwater invertebrates are described for each of the five main habitats on the property.

### Seepage Streams

The seepage-derived high-altitude streams on the property have good water quality. Several cased caddisfly species were observed in this habitat (*Olinga feredayi*, *Pycnocentria* sp., *Beraeoptera roria* and *Hudsonema* sp.).

### Wetlands

Water quality in wetlands was poor. Numerous amphipod and snail (*Physa* and *Potamopygrus*) species were observed. Some cased caddisfly (*Pycnocentria* and *Pycnocentroides*) species were present but not as many as expected.

### High-altitude Streams

High-altitude-sourced streams had good water quality. Species present were beetle larvae (*Ptilodactylidae* sp. and *Elmidae* sp.), caddisflies (*Olinga feredayi*, *Pycnocentria* sp.), stoneflies (*Megaleptoperla grandis*) and mayflies (*Coloburiscus humeralis*).

### Rivers

This habitat was not surveyed, but macro-invertebrate fauna is expected to be similar to that recorded during the survey of Bog Roy Pastoral Lease (Bowie, 2003). The dominant group is likely to be cased caddisflies (*Olinga feredayi*, *Conuxia gunni* and *Pycnocentria* sp.). Other species likely to be present are *Coloburiscus* sp. and *Deleatidium lillii*.

### Water Races

This habitat was not surveyed, but macro-invertebrate fauna is expected to be similar to that recorded during the survey of Bog Roy Pastoral Lease (Bowie, 2003). Species likely to be present include *Olinga feredayi*, *Pycnocentria* sp., *Oligochaete*, snails *Physa* sp., *Potamopyrgus* sp. and the bivalve (*Sphaeriid* sp.).

## SUMMARY

A surprisingly diverse but cryptic fauna of endemic terrestrial invertebrates exists on the property despite the extent to which some habitats have been modified. Spiders, beetles, cockroaches and centipedes are all present, and the large darkling beetle *Mimopeus elongatus* was common. Three areas are significant: the hill country between Big Gully and Lake Benmore; the lower slopes and gullies north of State Highway 83; and, the tussock basin and slopes at the south and east of the Lindis Block. The first area (Big Gully-Lake Benmore) provides a range of representative habitats (tussockland, shrubland, rock outcrop, stream, wetland and lakeshore). These provide important habitat for endemic flies, moths, beetles and spiders, including at least six species of endemic night-flying moths. The second area contains seepages with dense matagouri, providing habitat for a number of large endemic spiders. The third area provides habitat for an uncommon species of Stiletto fly, four species of endemic Carabid beetle, and species of moth and butterfly.

Freshwater invertebrate fauna is best represented in the high water-quality habitats on the Lindis Block and in the diverse habitats in Big Gully on the Otematata Block.

### 2.5.5 Notable Fauna

Notable animal species recorded from the property are listed in Table 6 below. Threat categories are those proposed by Hitchmough (2002).

**Table 6** Notable fauna recorded from Rostrievor Pastoral Lease.

<b>Animal Species</b> Common name	Scientific name	<b>Known Distribution on Property</b>
<b>Nationally Critical</b>		
grand skink	<i>Oligosoma grande</i>	Lindis Block, Smiths Creek valley
lowland longjaw galaxias	<i>Galaxias cobitinus</i>	Otematata Block, in the wetland near the confluence of Corbies Creek and the Otamatapaio River
<b>Nationally Vulnerable</b> “Galaxias sp. D”	<i>Galaxias</i> sp. D	Lindis Block, in the lower reaches of Smiths Creek
<b>Serious Decline</b>		
black-billed gull	<i>Larus bulleri</i>	Otematata Block (north), on dams
black-fronted tern	<i>Sterna albostrata</i>	Otematata Block (south), on paddocks
<b>Gradual Decline</b>		
banded dotterel	<i>Charadrius bicinctus</i>	Otematata Block (north), on paddocks
New Zealand falcon	<i>Falco novaeseelandiae</i>	Lindis Block, on bluffs above SH8
<b>Sparse</b>		
black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Otematata Block, near Lake Benmore; Lindis Block
<b>Not listed as threatened</b>		
ground beetle	<i>Taenarthrus capito</i>	New distribution record; unusual in dry habitats
ground beetle	<i>Megadromus enysi</i>	New distribution record; previously recorded as far south as mid Canterbury
native bee	<i>Lasioglossum sordidum</i>	New distribution record; previously recorded in Mackenzie Basin and mid Canterbury
Stiletto fly	<i>Anabarhynchus</i> sp.	Uncommon in the ecological district

## 2.5.6 Problem Animals

Introduced animals that may have a significant 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 and mustelids), or domesticated animals that are grazed on the property, are not discussed here.

### Rabbit

All parts of the property, and particularly the Otematata Block, are prone to rabbit infestations. Numbers appeared relatively low at the time of the field survey, though rabbits could quickly become a significant problem if the population were to increase. Control of rabbits is likely to be required to protect conservation values in any areas set aside as protected natural areas.

### Possum

Possum sign (droppings) was observed at numerous locations on the property, notably at rock outcrops and other areas of lizard habitat. The impact of possums on native plants or animals (especially invertebrates and lizards) is unclear. However, control of possums may be required to protect conservation values.

### Brown trout

Brown trout are present in all streams on the Lindis Block and in rivers and wetlands adjacent to the Otematata Block. It is likely that native fish populations are reduced at some locations because of the presence of brown trout. Maintaining some areas free of brown trout may assist with the protection of native fish populations.

## 2.6 HISTORIC

The Otematata Block of Rostrievor was originally part of Otematata Station (Run 160), a property first leased in 1857 (Pinney, 1981). In the 1870s an area named Rostrievor was acquired by William Grant Munro, a Scottish immigrant who had established a small hotel beside the Otematata River in 1862 (Sheridan, 1995). After William Munro died in 1897, Rostrievor was managed by his wife and youngest son, Roualeyn. Roualeyn and his brother, Tertius, acquired Mt Thomas Run (the present Lindis Block of Rostrievor), which was retained by Roualeyn when Tertius took over Longslip Run. Management of Rostrievor later passed to Roualeyn's son, Clifford.

The Otematata Block of Rostrievor was one of the areas most affected by the construction of dams for hydro-electric power generation in the Waitaki Valley. Approximately 730 hectares of the property were lost, including all the valuable river flats. The property was affected for ten years from 1956 by drilling, excavation of material for dam construction and carting of material along a haul road. Compensation was considered meagre. It was not until 1968 that a settlement of land was reached, in which part of Otematata Station (approximately 720 hectares) on the south side of State Highway 83 was transferred to Rostrievor.

An historic resource of some interest on Rostrievor is the old woolshed on the Otematata Block. The old woolshed was formerly the General Store at the Waitaki Dam. It was shifted to the site of the old homestead near the existing Otematata Hotel and, in 1962, shifted from there to its present location on the property. The building is in poor condition and of insufficient historic interest to warrant restoration or protection.

## 2.7 PUBLIC RECREATION

### 2.7.1 Physical Characteristics

The Otematata Block of Rostrievor Pastoral Lease lies within the 'pastoral' recreation opportunity class in the Recreation Strategy for Canterbury Conservancy (Department of Conservation, 1994). The Lindis Block of Rostrievor lies within Otago Conservancy. The property can be divided into two main recreation settings.

#### High Mountains (Lindis Block)

This recreation setting covers the high altitude country of the Lindis Block. It includes moderately steep hill country with areas of steep broken rock, narrow ridge crests and gentler basin and river terrace country. It is sparsely vegetated on upper slopes and has denser tussock and scrub on the lower slopes. The scrub is especially dense on the steeper southeast slopes above the Lindis Pass Tarras Road (State Highway 8). Snow often lies on these slopes during winter. The lower slopes to the northwest, especially nearer Smiths Creek have been extensively developed. The Lindis Block lies adjacent to a popular tourist route (State Highway 8) between Canterbury and the Otago lakes and is near to the well-known Lindis Pass Scenic Reserve.

#### Dry Eastern Hills (Otematata Block)

This recreation setting covers the gentle hill country in the dry Waitaki Valley, comprising the Otematata Block. It includes the area between the Waitaki Valley Highway (State Highway 83) and Lake Benmore, bounded to the north by Ahuriri Saddle and to the south by Otematata. It also includes the ridge south of the highway, adjacent to the Otamatapaio Valley. These areas comprise relatively gentle hill country, with broad ridge crests and gentle mid- to low-altitude basins. It is sparsely vegetated with areas of fescue and silver tussock grassland and patches of shrubland and scrub, especially in Big Gully and on the slopes north of highway. There are some steep rocky ridges, extending down towards Lake Benmore, where the rare native broom (*Carmichaelia curta*) and prostrate kowhai are present.

### 2.7.2 Legal Access

The Lindis Pass Tarras Highway provides legal access to the south side of the Lindis Block, and the Waitaki Valley Highway provides legal access to both parts of the Otematata Block. Loch Laird Road provides access to the east (Lake Benmore) side of the Otematata Block, and a formed public road up the Otamatapaio Valley provides access to the western side of the block. Access to the northeast corner of the Otematata Block is available by boat from Lake Benmore. Legal access to the back (west side) of the Lindis Block does not appear to be readily available.

### 2.7.3 Activities

Scenery appreciation is probably the most important recreational use of the property as both blocks of the property are readily visible from highways. The Lindis Block provides an impressive scenic backdrop to the Lindis Pass Tarras Highway. Similarly both parts of the Otematata Block provide an important scenic backdrop to the Waitaki Valley Highway where it bisects the property between the Otematata and Otamatapaio valleys. The views

are spectacular from Lake Benmore and also from Loch Laird Road between Otematata and the Benmore Dam.

The part of the Otematata Block that adjoins Lake Benmore provides opportunities for picnicking, boating, walking, swimming, photography, horseriding and botanising. The formed vehicle access to this part of the property offers potential for the provision of more formal recreational facilities such as toilets, picnic areas and camp sites. Rocky outcrops in this area provide potential for rock climbing or for scenic viewpoints, though these areas also support populations of threatened plants.

Both the Otematata and Lindis blocks have potential for walking, mountain-biking, horseriding, scenery viewing and nature study. The planned Te Araroa pathway passes close to the Lindis block and tracks on the block could be used as an extension or links to the pathway. The relatively high public use of areas near to the Otematata Block (Sailors Cutting, Benmore Dam and Lake Benmore) means that the development of recreational facilities such as walking tracks, picnic areas and viewing points may be appropriate.

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

### **3.1 CONSULTATION**

Early-warning consultation meetings were held in Christchurch on 28<sup>th</sup> October 2003 and in Timaru on the 29<sup>th</sup> October 2003. Issues raised at those meetings are listed below for each of the two blocks.

#### **Otematata Block**

- Protection of the RAP in Big Gully.
- Protection of the landscape corridor along the highway by retaining the area in Crown ownership and control (covenants are not suitable).
- Protection of landscape values on both Rostrievor and Otematata pastoral leases, particularly the view to Ahuriri Pass. The absence of fences and tracks along the main highway corridor is important.
- The recreation and landscape values around the lake should be protected.
- The need to protect an area wider than a 20 m marginal strip to adequately protect the lake-front for public access and enjoyment.
- The need to provide access along the lake shore towards Junction Island.
- One of the most important recreation settings is the lake-side, with good views to the lake, rock outcrops and some tussock still in good condition.
- The importance of the track to the lake from the Boat Ramp area.
- The obvious potential for lake-front development.

#### **Lindis Block**

- All the front country seen from the highway should be protected. A corridor of protection along the highway similar to Lewis Pass should be the goal. The existing scenic reserve is too small.
- The block would make an excellent addition to Lindis Pass Scenic Reserve, and would be an important landscape icon.
- It is very important to have the approaches to Lindis Pass protected, as an extension to the existing reserve, in Crown Control with no grazing. The reserve should include all the faces along the highway. There was lots of agreement to this proposal and a strongly-held view that there should be no grazing or burning of the area.
- Grazing of the block and low stock numbers was discussed.
- The block adjoins land proposed for protection as part of Dalrachney tenure review and would add value as an extended conservation area.
- The Smiths Creek area was discussed as part of Dalrachney tenure review. Dalrachney farms this area to the fence line.
- There is very little recreation land available near the highway in this area, which makes this block more important for recreation.
- It is necessary to have access along the track at the boundary with Dalrachney, and on the same terms as Dalrachney (foot, horse and mountain bike).
- Need to have physical access to Smiths Creek.
- Access up the road shown on the left (not legal) is important to allow a round trip in the future (even though Breast Hill is not presently in the tenure review programme).

### 3.2 DISTRICT PLANS

#### Otematata Block

The Otematata Block of Rostrievor Pastoral Lease lies within the Rural S (Rural Scenic) Zone of the Waitaki District. The Rural Scenic Zone contains areas which have significant scenic values: the high country, rangelands and inland basins. The majority of this zone lies above the 400m contour. The proposed Waitaki District Plan was publicly notified in December 1996. Following public submissions and hearings the district plan, as amended by council decisions, was released in September 1999. The plan establishes what type of activities are Permitted, Controlled, Discretionary or Non-complying. The plan also establishes Site Development Standards and Critical Zone Standards for these activities. A permitted or controlled activity that does not comply with any one or more of the Site Development Standards becomes a restricted discretionary activity. However, the Plan has undergone a number of changes in the Rural Scenic Zone following Council's decisions on submissions, and a number of matters are still to be resolved.

#### Lindis Block

The Lindis Block of Rostrievor Pastoral Lease lies within the Central Otago District. The Central Otago District Plan identifies areas over 900m in altitude as areas of Significant Landscape Value. The mid and upper slopes of the main ridge in the southern part of the Lindis Block lie within this zone. The Central Otago District Plan also identifies RAPs as Significant Natural Areas. Lindis RAP B2 (North Lindis Pass) includes the southeast-facing slopes at the eastern edge of the Lindis Block of Rostrievor Pastoral Lease, and is therefore a Significant Natural Area in the district plan.

### 3.3 CONSERVATION MANAGEMENT STRATEGIES

#### Otematata Block

The Otematata Block of Rostrievor Pastoral Lease is within the Waitaki Unit of the Canterbury Conservation Management Strategy (CMS). Key priorities are listed as:

- To identify, maintain and seek to enhance the natural landscape values of the unit through appropriate methods such as tenure review and district plans.
- To identify the significant native vegetation and threatened species of the unit and to use a range of effective methods to protect a representative range of indigenous biodiversity of the unit as well as protecting and enhancing the viability of priority threatened species populations and their habitats.
- To provide new recreational facilities and opportunities by the Department and other organisations and concessionaires where natural and historic resources and cultural values are not compromised, and to liaise with adjacent landholders to resolve conflicts over access for recreation to land managed by the Department.
- To reduce and maintain rabbit and tahr densities to levels that ensure adverse effects on natural values are minimised.

Other conservancy-wide priorities identified in the CMS that are relevant to tenure review on the property are to undertake necessary actions to secure the conservation of category A and B species, including predator control, fencing and habitat protection. The species listed as priority include *Carmichaelia curta*, the robust grasshopper, scree skink, long-toed skink, black-fronted tern and banded dotterel.

### **Lindis Block**

The Lindis Block of Rostrievor Pastoral Lease is within the Central Otago Zone of the Otago Conservation Management Strategy (CMS). General objectives for this zone are listed as:

- To encourage the retention of the special character of Central Otago's landscape as an open, predominantly non-forest area on the mountain slopes, crests and high valleys with oases of intensive cultivation on the intermontane valley floors.
- To recognise the distinctive contribution the ecosystems of Central Otago make to the diversity of New Zealand's flora, fauna and ecological communities and processes and to retain representative examples through protection at lower altitudes and more extensive protected areas at higher altitudes.
- To establish the presence and status of rare and vulnerable plant and animal species of Central Otago and to ensure their continued survival.
- The significance of traditional and historic sites in Central Otago will be ascertained (in consultation with Kai Tahu for sites of significance to them) and protection negotiated where warranted.
- To assist in maximising the potential of Central Otago for outdoor recreation through identification of areas offering opportunities, further development (including facilities) of opportunities on land administered by the department and by facilitating public access elsewhere.

The Lindis Block also lies within the Hawea-Lindis Special Place, which recognises the presence of grand skink and the scenic landscapes that can be viewed from State Highway 8.

## PART 4 ATTACHMENTS

### 4.1 ADDITIONAL INFORMATION

#### 4.1.1 Scientific Names of Species

##### Plant Species

Nomenclature follows the published volumes of New Zealand Flora (Allan, 1961; Moore and Edgar, 1976; Webb, Sykes and Garnock-Jones, 1988; and Edgar and Connor, 1999), Brownsey and Smith-Dodsworth (1989) for ferns, Allison and Child (1971) for mosses, the name changes listed in Connor and Edgar (1987) and recent names (for shrubs) listed in Wilson and Galloway (1993). Naturalised species are indicated by an asterisk (\*).

<u>Common name</u>	<u>Scientific name</u>
blue tussock	<i>Poa colensoi</i>
bog pine	<i>Halocarpus bidwillii</i>
broom*	<i>Cytisus scoparius</i>
browntop*	<i>Agrostis tenuis</i>
bush lawyer	<i>Rubus</i> spp.
catsear*	<i>Hypochoeris radicata</i>
Chewings fescue*	<i>Festuca rubra</i>
coral broom	<i>Carmichaelia crassicaule</i>
downy brome*	<i>Bromus tectorum</i>
elder*	<i>Sambucus nigra</i>
fescue tussock	<i>Festuca</i> sp.
golden speargrass	<i>Aciphylla aurea</i>
gorse*	<i>Ulex europaeus</i>
harebell	<i>Wahlenbergia albomarginata</i>
haresfoot trefoil*	<i>Trifolium arvense</i>
hawksbeard*	<i>Crepis capillaris</i>
hawkweed*	<i>Hieracium</i> sp.
kanuka	<i>Kunzea ericoides</i>
king devil*	<i>Hieracium praealtum</i>
kowhai	<i>Sophora microphylla</i>
matagouri	<i>Discaria toumatou</i>
mountain beech	<i>Nothofagus solandri</i> var. <i>cliffortioides</i>
mountain holly	<i>Olearia ilicifolia</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</i> sp.
nodding thistle*	<i>Carduus nutans</i>
patotara	<i>Leucopogon fraseri</i>
plume grass	<i>Dichelachne crinita</i>

porcupine shrub .....	<i>Melicytus alpinus</i>
prickly shield fern.....	<i>Polystichum vestitum</i>
prostrate kowhai .....	<i>Sophora prostrata</i>
raupo .....	<i>Typha orientalis</i>
red tussock .....	<i>Chionochloa rubra</i>
scabweed.....	<i>Raoulia australis</i>
scrub pohuehue.....	<i>Muehlenbeckia complexa</i>
sheep's sorrel* .....	<i>Rumex acetosella</i>
short tussock .....	<i>Festuca</i> sp.
silver tussock .....	<i>Poa cita</i>
slim snow tussock.....	<i>Chionochloa macra</i>
snow tussock.....	<i>Chionochloa</i> spp.
stonecrop* .....	<i>Sedum acre</i>
storksbill* .....	<i>Erodium cicutarium</i>
sweet brier* .....	<i>Rosa rubiginosa</i>
sweet vernal* .....	<i>Anthoxanthum odoratum</i>
toetoe .....	<i>Cortaderia richardii</i>
viper's bugloss* .....	<i>Echium vulgare</i>
wheat grass .....	<i>Elymus solandri</i>
white clover* .....	<i>Trifolium repens</i>
willow* .....	<i>Salix</i> spp.
winged thistle*.....	<i>Carduus tenuiflorus</i>
woolly mullein* .....	<i>Verbascum thapsus</i>

**Animal Species**

Nomenclature follows King (1990) for mammals, Heather and Robertson (1996) for birds, Whitaker (1998) for lizards and McDowall (2000) for fish. Naturalised species are indicated by an asterisk (\*).

<u>Common name</u> .....	<u>Scientific name</u>
Australasian bittern.....	<i>Botaurus poiciloptilus</i>
Australasian harrier.....	<i>Circus approximans</i>
Australasian shoveler.....	<i>Anas rhynchotis</i>
Australian coot.....	<i>Fulica atra</i>
banded dotterel .....	<i>Charadrius bicinctus</i>
black-backed gull.....	<i>Larus dominicanus</i>
black-fronted tern .....	<i>Sterna albostrata</i>
black swan .....	<i>Cygnus atratus</i>
brown trout* .....	<i>Salmo trutta</i>
Chinook salmon* .....	<i>Oncorhynchus tshawytscha</i>
common bully.....	<i>Gobiomorphus cotidianus</i>
common gecko.....	<i>Hoplodactylus</i> aff. <i>maculatus</i> “southern alps”
common skink .....	<i>Oligosoma nigriplantare polychroma</i>
grand skink .....	<i>Oligosoma grande</i>
green skink.....	<i>Oligosoma chloronoton</i>
grey teal .....	<i>Anas gracilis</i>
grey warbler.....	<i>Gerygone igata</i>
koaro .....	<i>Galaxias brevipinnis</i>
longfin eel.....	<i>Anguilla dieffenbachii</i>
lowland longjaw galaxias .....	<i>Galaxias cobitinus</i>
McCann’s skink.....	<i>Oligosoma maccanni</i>
mallard* .....	<i>Anas platyrhynchos</i>
marsh crake.....	<i>Porzana pusilla</i>
New Zealand falcon (karearea).....	<i>Falco novaeseelandiae</i>
New Zealand scaup.....	<i>Aythya novaeseelandiae</i>
Otago skink.....	<i>Oligosoma otagense</i>
paradise shelduck.....	<i>Tadorna variegata</i>
pied oystercatcher .....	<i>Haematopus ostralegus finschi</i>
pied stilt .....	<i>Himantopus himantopus</i>
possum* .....	<i>Trichosurus vulpecula</i>
rabbit* .....	<i>Oryctolagus cuniculus cuniculus</i>
rainbow trout* .....	<i>Oncorhynchus mykiss</i>
scree skink .....	<i>Oligosoma waimatense</i>
silveryeye.....	<i>Zosterops lateralis</i>
sockeye salmon*.....	<i>Oncorhynchus nerka</i>
spotted skink.....	<i>Oligosoma lineoocellatum</i>
spur-winged plover .....	<i>Vanellus miles</i>
tomtit.....	<i>Petroica macrocephala</i>
upland bully .....	<i>Gobiomorphus breviceps</i>

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## **4.2 MAPS**

**4.2.1** Landscape Units (at pages 4 and 5)

**4.2.2** Topo/Cadastral (pages 41 and 42)

**4.2.3** Values (pages 43-46)