

Crown Pastoral Land Tenure Review

Lease name : DUNSTAN PEAKS

Lease number : PO 200

Conservation Resources Report

As part of the process of Tenure Review, advice on significant inherent values within the pastoral lease is provided by Department of Conservation officials in the form of a Conservation Resources Report. This report is the result of outdoor survey and inspection. It is a key piece of information for the development of a preliminary consultation document.

Note: Plans which form part of the Conservation Resources Report are published separately.

These documents are all released under the Official information Act 1982.

March

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DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF DUNSTAN PEAKS PASTORAL LEASE

PART 1

INTRODUCTION

This report describes the conservation resources of Dunstan Peaks Station, a 5376 hectare property located at the south end of the upper Waitaki Basin between the Ewe and Wether Ranges. The altitudinal range extends from around 600 metres to 1800 metres. The adjacent pastoral properties are Twin Peaks Clifton Downs to the north and north-east, Berwen to the east, Twinburn to the south and Dunstan Downs to the west.

Most of Dunstan Peaks is in the St Bathans Ecological District, within the Waitaki Ecological Region. A small lower altitude portion of the property is in Omarama Ecological District, within the Mackenzie Ecological Region. Dunstan Downs has not been surveyed under the Protected Natural Areas Programme and there are no protected natural areas present on the property.

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

2.1 Landscape

2.1.1 Landscape context

Dunstan Peaks is located at the south end of the one of the most extensive outstanding natural landscapes in the Canterbury Region – the Upper Waitaki Basin. The Upper Waitaki/Mackenzie Basin is “one of the most investigated, painted, written about, visited, eulogised and argued over landscapes in New Zealand” (BMP and LA 1993¹)

The Basin retains very high “natural” qualities because of its overwhelming dominance of natural landform and the extensive presence of short grassland, and scattered shrublands which still retain a component of native species and continues to support a diversity of indigenous insects, lizards and birds.

It is also a highly visible landscape. A major tourist highway (SH8) passes through the middle of the basin and much of it can be viewed from the highway. The Basin is moderately to highly vulnerable to visual change through developments such as forestry and cultivation.

¹ Boffa Miskell and Lucas Associates – Canterbury Regional Landscape study, vol. 1 & 2

2.1.2 Landscape description

Property Level Landscape Description

There are two main land types on the property - a fault block mountain range and a basin floor. Within these land types four landscape units can be recognised.

Fault block mountain range – the Wether Range

1. Range Summit

This unit includes part of the summit ridge, several cirque basins and the deeply dissected headwaters of Omarama Stream.

The summit of the range is flat to broadly rolling, and characterised by rock pavement, patterned ground and several rocky knobs. The micro-topography is surprisingly varied and supports a diversity of vegetation, including remnants of tall tussock, patches of rusty red prostrate *Dracophyllum*, mounds of speargrass *Aciphylla dobsonii*, cushion plants, mosses and lichens. The summit ridges are a very distinctive and special element of the transitional Otago-Canterbury ranges.

The three shallow cirque basins, each more than 1 km across have steep sidewalls with rock bluffs and outcrops. They drop away steeply into the valleys below. Alpine tussockland and cushion bogs with small water-courses are a feature of the cirque basin floors. In combination with the masses of shattered angular rock, they form a colourful mosaic of grey, ochre and greens. At lower altitudes, tall tussock becomes prevalent with the rusty red prostrate *Dracophyllum*. Like the ridges, these basins are a very distinctive and visually impressive element.

Below the rolling summit and cirque basins, the topography changes to large ridges and deep, winding, stream valleys (see landform description for more details). The overall impression is of very steep and planar slopes dropping steeply for hundreds of metres to narrow valley floors. It is a raw, dramatic, large-scale landscape. Scree and talus form a streaky mosaic with the pale ochre tall tussock grassland, and a blotchy mosaic with the rusty red *Dracophyllum*, or occasionally, the olive-coloured snow totara. These patches are a distinctive element of this landscape.

Tall tussock, scree, fellfield, and cushion bog communities are prominent, with grey shrubland around rock outcrops, in lower gullies and valley floors. Burning and grazing has modified the vegetation, and the area is virtually enclosed by a stock fence. 4WD tracks traverse the range crest and main ridges, and extend into the Omarama Stream valley.

2. Higher Rangeland

This unit includes parts of the headwaters of a number of catchments that drain into the Omarama Stream, immediately west of Omarama Saddle. It is similar to the large-scale valley landscape in the Range Summit Unit, but it is of lower altitude and not quite so dramatic. Tussock cover is extensive and dense grey shrublands are common in gullies and valleys.

The unit is extensively grazed and while there are some fences and 4WD tracks, the area generally appears to be highly natural and intact. Modification of the vegetation cover is obvious, as heavy grazing and burning has depleted the tall tussock and induced short

tussock. OSTD (oversowing and topdressing) has produced a green hue and vigorous matagouri growth on lower slopes, especially in the Omarama Stream valley.

3. *Lower Rangeland*

This unit is comprised of the lower hills in the eastern half of the property. Vegetation cover is a mosaic of tall tussock on south and west aspects and at higher altitudes, with short tussock/exotic grasses/hieracium/grey scrub on hard-grazed ridge crests and sunnier aspects. Thistles and other exotic weeds are locally common, especially in sheep camps. Much of the areas has been OSTD, as indicated by the greenish hue and vigorous matagouri growth, and some shrublands have been burnt. Mixed grey shrublands are widespread, particularly in gullies, around rock and talus and on valley floors. Dense exotic grassland and scattered short tussock characterises valley floors, with sweet brier also present.

The area has been subdivided into semi-extensive grazing blocks, and several 4WD tracks wind up spurs and along valley floors.

Basin Floor

4. *Basin Floor Flats*

This small unit is comprised of alluvial flats formed by Omarama Stream and its tributaries. Much of the area is closely subdivided and has been cultivated, OSTD or border-dyked. The vegetation is dominated by exotic pasture or crops, though there are dense shrublands of matagouri/Coprosma/Olearia/ sweet brier. Exotic shelterbelts line some paddock boundaries, and the homestead is located in this unit.

2.1.3 Visual values

Visual values are a major component of landscape values and are closely tied to other values (eg, ecological, geological/scientific). They are assessed in terms of inherent visual values and visibility.

Inherent Visual Values

These relate to what the landscape actually looks like, regardless of whether it is publicly visible. High visual quality is characterised by:

- A high degree of perceived naturalness and intactness.
- Visual coherence (the degree to which the elements fit together, including cultural ones).
- Legibility (the ability to clearly see the different elements and how they were formed).
- Visual distinctiveness/vividness and how memorable it is e.g. (unusual things or contrasting elements).

These attributes also contribute to the special character or "sense of place" of an area. Indigenous flora and fauna and landforms in their natural state are particularly important, though cultural patterns can be very important too.

(i) Upper Wether Range/Omarama Stream Catchment

This is a very natural looking area with high coherence, intactness and legibility, which confers high inherent visual quality. It is a significant part of the visually distinctive fault-block mountain landscape of Central Otago/South Canterbury. The broadly rolling summit plateau has a smooth, sweeping and simple visual appearance, which contrasts to the steep rock-studded slopes adjacent. Shattered rock pavement, ancient talus and fresher scree dominate the summit and upper slopes, and the cirque basins are highly impressive, well-defined features. The juxtaposition of steep sidewalls, bedrock outcrops, snowbanks, and undulating basin floors with their mosaic of different colours and textures forms a vivid image. The presence of tarns adds to the vividness, especially the brilliant blue-green one in the southern basin. Below the basins the Range is deeply dissected and forms a very dramatic, large scale landscape with steep slopes plunging to valley floors. Numerous rock outcrops add to the drama. At a detailed level other vivid images include the periglacial micro-topography, the rich colours of lichens and fellfield vegetation, and rugged rock outcrops contrasting with pale, fine-textured snow tussock.

Vehicle tracks and fences have caused some visual scarring, while burning and grazing have severely depleted the tussock cover in some areas. Despite this the overall scale, power and beauty of the landscape remains largely intact.

The summit provides expansive views into Central Otago and the Upper Waitaki/Mackenzie Basin.

(ii) Other Catchments and south-facing slopes above Omarama Stream

These upper catchments, and the south-facing slopes above Omarama Stream, are not as dramatic or impressive. They have moderately high inherent visual quality due to a high degree of naturalness, intactness, coherence and legibility. There is little apparent modification on the upper slopes, but the lower slopes have been substantially modified and "greened". Tracks have caused some visual scars, and the tussock has also been depleted, but overall visual values are moderately high.

The visual patterns created by the combination of scree, talus, tussock, *Dracophyllum* and other vegetation imparts a high visual quality. Additional visual elements include golden spaniards, extensive tussock and dense mixed grey shrublands in gullies and valley floors, giving a subtle mix of textures and colours. The uniform tussock cover enables every detail of the underlying landform to be seen with clarity and allows the interplay of light and shadow creating a landscape of great beauty. Panoramic views across the Mackenzie Basin are also gained from the ridges here.

In the lower less visually significant area, the rocky side slopes on the true left of Omarama Stream are notable for their planar form and straight alignment. The juxtaposition of blocky rock outcrop and fine-textured grey shrubland presents a vivid image. Dense mixed grey shrublands are a notable visual feature in many gullies and along the Omarama Stream floodplain.

Visibility

This refers to the visibility of a landscape or area from public viewpoints such as roads, lookouts and recreational areas. Landscapes that are more regularly seen from public areas have more values for more people. In the case of Dunstan Peaks, public views of are limited to the lower eastern half of the property, except for a very small part of the Wether Range crest.

(i) Views from SH8

SH8 is about 8-9kms north of Dunstan Peaks. The main views of the property are gained from about 1km east of Killermont homestead to about 3km west of Omarama, as landforms and tree plantings screen views from elsewhere. The most important views are gained travelling west from Omarama, with the Wether Range and the north end of the Dunstan Range being directly in front view. The central ridge between Omarama Stream and the side Creeks form a visually impressive skyline feature. This screens the back country except for a tantalising glimpse of the summit of the Wether and St Bathans Ranges, which are distinguished by their dark grey colour and summer snowbanks.

The Wether Range is visible from SH8 from as far north as the Pukaki Dam. Together with the northern Dunstan Range, it forms the backdrop to some impressive views across the Mackenzie Basin and to Omarama township. In these distant views the range appears as an entity, though the skyline is a natural visual focus. More of the summit can be seen in these views, and in winter the range is very impressive with its snow cover. It is also distinctive, as its fault-block structure contrasts with the more angular and irregularly outlined mountain ranges in other parts the Mackenzie.

(ii) Other Views

Views similar to those from SH8 are gained from the Clay Cliffs Conservation Area, on the other side of the Ahuriri River.

Closer and detailed views of the property are gained from minor local roads - Short Cut Road between SH8 and Berwen Road, and Broken Hut Road. These views are however, restricted to the lower "front" country east of the central ridge. A rocky side slope on the true left of Omarama Stream is a notable natural feature from the Broken Hut Road. This road connects with popular 4WD tracks over Omarama and Camp Creek Saddles into Central Otago. Panoramic views across the property are gained from tracks, with views of the upper Wether Range being particularly impressive.

2.1.4 Overall evaluation of landscape

The upper catchments of Omarama Stream, smaller Creeks, and the lower Omarama Stream valley have significant natural landscape values. This higher altitude country has high to very high degrees of naturalness, intactness, coherence and legibility. It is an area of high visual quality containing many powerful visual images related to landform, rock and scree and the particular characteristics of the vegetation cover. It is an integral part of the wider landscape of the St Bathans/Wether Ranges and Ewe/Hawkdun/St Mary Ranges. This very distinctive and dramatic landscape encompasses the transition between Canterbury greywacke and Otago schist, where cirque glaciation and periglacial processes have created special and unique landform features. Dunstan Peaks is a significant part of this landscape, and contains many good examples of cirque glaciation and stone patterning. 4WD tracks, fences and degraded vegetation are visually detracting elements, but they do not significantly reduce the overall inherent landscape values of the area.

The Wether Range is one of the major ranges enclosing and defining the south end of the Upper Waitaki/Mackenzie Basin, and they are part of that outstanding natural landscape (BMP 1993). Excellent panoramic views are gained from the summit of the ranges into Central Otago and the Mackenzie Basin.

The lower "front" country has relatively low natural landscape values due to the extent of modification, though it contains localised areas of higher value. These areas are related to

mixed grey shrublands, rock outcrops, scree/talus, and remnant snow tussock. The rocky planar spur ends are a notable natural feature when viewed from Broken Hut Road.

The Omarama Stream valley forms the immediate visual corridor for people travelling between Otago and Canterbury over the Omarama and Camp Creek saddles, where impressive views are gained across the entire property.

2.2 Landforms and Geology

Dunstan Peaks comprises a substantial portion of the eastern side of the Wether Range, adjacent to the St Bathans Range. It is one of several fault-block mountain ranges that are transitional between Canterbury greywacke and Otago schist, and are distinctive for their cirque glaciation and periglacial features. The range trends north-south, with a very steep western face and a deeply dissected and partly glaciated eastern dip-slope. The range crest varies from 1760-1828m asl, while lower slopes descend to around 600m at the Basin floor. The property also includes about 3km of the range crest, and a very small portion of the Upper Waitaki Basin floor.

There are two distinct landform types on the property - a fault block mountain range (Wether Range) and a small area of basin floor alluvial flats.

Wether Range

The upper part of the range is composed of low-grade semi-schist of the Haast Schist Group (Chlorite Subzone II). The middle and lower slopes are composed of strongly indurated dark grey greywacke and black argillite with localised siliceous grey-blue greywacke. The transition zone between the two is not obvious. The change in topography from range crest to lower slopes is a more a result of cirque glaciation, periglacial and fluvial processes rather than underlying bedrock. Cirque basins and rock-paved plateau summits characterise the upper slopes and range crest, while screes and talus descend from ridge crests to narrow stream valley floors in the mid altitude zone. Lower altitude areas are characterised by steep but shorter slopes and narrower ridge crests.

The summit and upper slopes of the range are very distinctive, with three shallow glacially formed cirque basins, which are all more than 1km across. The basins have steep sidewalls punctuated by rock bluffs and outcrops, and contain snowbanks well into summer. Floors are hummocky to undulating ground moraine and shattered rock and contain alpine bogs. The basins drop away steeply into the valleys below, and lateral moraines sometimes occur at their entrance. Internal ridges within the basins are often thin, sharp and rocky due to ice scouring from both sides. The southernmost basin contains a small tarn. Minor cirque basins occur at the head of one of the smaller creeks.

The summit of the range is flat to broadly rolling, characterised by rock pavement and several rocky knobs. It is thought to be the remains of an ancient uplifted peneplain, which has been weathered under periglacial conditions to reduce rock outcrops to a flat pavement. Patterned ground is present including stone drains, nets and stripes, and while some are active features, most are relicts of a colder period.

Below the rolling summit and cirque basins, the topography changes to large ridges and deep, winding, stream valleys. Ridge crests are gently rounded and typically rock-paved like the range summit. Rock outcrops are common immediately below ridge crests and across slopes, and screes and stable talus patches are widespread.

At lower altitudes again, ridges are smaller and narrower and spread out in a radial drainage pattern. On the valley side slopes, screes are a minor element, though rock outcrops and

talus remain common. Valley floors contain narrow floodplains and terraces, which expand into the Basin floor.

Basin Floor

This area is comprised of flat to gently sloping floodplains and alluvial terraces formed by the Omarama Stream and its tributaries, and small piedmont alluvial fans. Streams in the area are confined to obvious stony channels with vegetated banks, and their floodplains and terraces are also well vegetated.

2.3 Climate

The Upper Waitaki Basin has a continental like climate with hot summers and cold winters and extreme ranges in temperature. According to climate records from the NZ Met Service, rainfall is normally evenly spread throughout the year, but there is a wide seasonal and annual variability from year to year. Rainfall increases with altitude from about 600 mm at the homestead to an estimated 1600 mm on top of the ranges. Snow falls on the high St Bathans and Dunstan Ranges at any time of year and forms a near continuous cover for at least 4 months. The tops are exposed to high winds resulting in snow accumulation on leeward slopes in cirques with patches often remaining into late summer. The frequent high winds and frosts make the tops of the range unpleasant for plant and animal life for much of the year.

2.4 Vegetation

2.4.1 Introduction

Pasture and introduced grasses dominate the flat land, extending up the wider valley bottoms and onto some lower oversown and topdressed (OSTD) slopes. Hard tussock (*Festuca novae-zelandiae*) often remains as scattered tussocks, but can be quite prominent on shaded slopes or where shrubland is present. The three major valleys contain diverse shrublands with *Olearia odorata*, which often extend onto hill slopes. Recent burning and mechanical clearance has reduced the shrublands in some areas. The upper slopes have a good snow tussock cover, denser on shady slopes and extending to lower altitudes on shady faces too. The summit ridges, upper spurs and basins are comparatively bare rockfields and fellfield with a patchy cover of cushion plants and slim-leaved snow tussock (*Chionochloa macra*). Wetlands and snowbanks occur in the basins, which are favoured sheep grazing areas.

2.4.2 Shrublands

Diverse shrublands are found in the three main stream valleys on the property. In some localities they have been burnt or mechanically cleared but extensive areas remain. They often extend up slope to at least 1000m and they may cover entire hillsides at lower levels e.g. on the northern boundary above one of the smaller creeks. The shrublands are dominated by matagouri (*Discaria toumatou*), with *Olearia odorata* being prominent in the three valleys. This shrub daisy is recognised as an important invertebrate host plant. Other species include *Coprosma propinqua*, indigenous broom (*Carmichaelia petriei*), mountain wineberry (*Aristotelia fruticosa*), porcupine shrub (*Melicytus alpinus*), and the climbers *Parsonsia capsularis*, *Clematis marata*, *Muehlenbeckia australis*, *M. complexa* and *Rubus schmidelioides*. The introduced sweet brier (*Rosa rubiginosa*) is common and occasionally dominant. The ferns *Polystichum vestitum* and *Hypolepis millefolium* are sometimes prominent, and bracken fern (*Pteridium esculentum*) occurs in patches on some north-facing slopes. Silver tussock (*Poa cita*), blue tussock (*Poa colensoi*), hard tussock and scattered narrow-leaved snow tussock (*Chionochloa rigida*) are also present.

A less diverse, low matagouri shrubland grows patchily on lower hill slopes and appears to be recovering from past burning. Indigenous broom, porcupine shrub and *Coprosma propinqua* may also be present. Skinks are common where the ground is stony.

At higher altitudes and particularly on south and east facing, rocky slopes, *Dracophyllum prunum* shrublands are prominent with cushion plants, small herbs and grasses.

2.4.3 Lower grasslands

Most of the lower hill country has been OSTD, as high as 1200m in places. Despite this sweet vernal (*Anthoxanthum odoratum*), browntop (*Agrostis capillaris*) and white clover (*Trifolium repens*) are only conspicuous below about 900m on sunny faces, lower valley floors and ridge tops where sheep congregate. Mouse ear hawkweed (*Hieracium pilosella*) is common throughout.

Hard tussock and mountain fescue (*Festuca mathewsii*) are usually present and often dominant, and silver tussock (*Poa cita*) occurs on more fertile soils. Indigenous plants typical of short tussock grasslands include patotara (*Leucopogon fraserii*), *Coprosma petriei*, *Pimelea traversii*, *Pimelea oreophila*, *Raoulia subsericea*, *Anisotome flexuosa*, *Brachyscome sinclairii*, harebell (*Wahlenbergia albomarginata*), indigenous violet (*Viola cunninghamii*), *Geranium sessiliflorum*, *Celmisia gracilentia*, *Scleranthus uniflora*, *Luzula rufa*, *Poa colensoi*, *Rytidosperma pumilum*, *Blechnum penna marina*, lichens and mosses. Coral broom (*Carmichaelia crassicaule*), *Coprosma cheesemanii* and *Leucopogon colensoi* occur sporadically. Scattered narrow-leaved snow tussock is found on shady faces, while in open stony areas, indigenous chickweed (*Stellaria gracilentia*), everlasting daisy (*Anaphalioides bellidioides*), *Colobanthus strictus* and the grass *Koeleria cheesemanii* are found.

2.4.4 Upper tussockland

Short tussock grassland is usually dominant from about 900-1000m on sunny slopes. Mountain tussock forms about 25% cover with mouse ear hawkweed 30-40%, white clover (*Trifolium repens*) 5-10%, suckling clover (*Trifolium dubium*) up to 5%, bare or stony ground 10-15%, blue tussock (*Poa colensoi*) 5%, *Raoulia subsericea* 5%, sheep's sorrel (*Rumex acetosella*) to 5%, *Rytidosperma pumilum*, *Pimelea oreophila*, *Scleranthus uniflora*, *Luzula rufa*, harebell, and king devil hawkweed (*Hieracium praealtum*). The indigenous brooms *Carmichaelia petriei* and *C. vexillata* are present here and at higher altitudes. The burnt bases of snow tussocks are visible in some areas, with remaining tussocks occurring as scattered individuals or up to 15-20% locally. Snow tussock can descend to around 600m on the valley floor in places.

From about 1000-1500m tall tussock grassland is the main plant community. Narrow-leaved snow tussock (*Chionochloa rigida*) is dominant at lower levels, while slim-leaved snow tussock occurs at higher altitudes or on shady slopes. Patches of introduced grasses and *Hieracium* occupy small areas on ridge tops and near fence lines. The snow tussock communities are relatively open due to the stony nature of the steep slopes and the dry climate. Narrow-leaved snow tussock has a cover of 20-30% and is around 600mm high, though in damp gullies its cover can reach 80%. Rock and stones usually make up 25-30% of cover and a diversity of other plants is present. They include mountain fescue 10%, *Raoulia subsericea* 5%, mouse ear hawkweed to 25% on sunny faces, with most of the rest of the cover made up with tussock hawkweed (*Hieracium lepidulum*), patotara, blue tussock, *Rytidosperma pumilum*, *Lycopodium fastigiatum*, golden speargrass (*Aciphylla aurea*), *Celmisia lyallii*, *Leptinella pectinata*, *Celmisia gracilentia*, *Luzula rufa*, *Carex breviculmis*, *Carmichaelia vexillata*, *Carmichaelia crassicaule* and browntop and sweet vernal locally.

Dracophyllum pronum occurs in scattered patches with cushion plants where soils are especially thin, or it can form extensive areas on shady slopes.

2.4.5 Wetlands

These are concentrated in cirque basins but seepage areas are also found on steeper slopes and in gullies. The wetlands are floristically diverse with 35-55 species often being present. For example, a small stream and flush at 1275m in tall tussockland contained at least 35 species including *Schoenus pauciflorus*, *Nertera balfouriana*, *Epilobium komarovianum*, *Gaultheria parvula*, *Isolepis aucklandica*, *Lagenifera barkeri*, *Pratia angulata*, *Agrostis pallescens*, *Deschampsia chapmanii*, *Ranunculus cheesemanii*, *Brachyscome* sp., *Luzula leptophylla*, *Bulbinella angustifolia*, *Uncinia divaricata* and *Agrostis muscosa*. A large bog/snowbank community at 1570m on a broad spur supported more than 50 species including a new record for the tiny, threatened gentian *Gentiana lilliputiana*. This tiny annual was plentiful in mossy wet ground. Other plants present included *Ourisia glandulosa*, *Ourisia caespitosa*, *Coprosma atropurpurea*, *Psychrophylla obtusa*, *Colobanthus apetalus*, *Neopaxia sessiliflora*, *Luzula "tenuis"*, *Oreobolus pectinatus*, *Abrotanella caespitosa* and *Celmisia sessiliflora*. The tussock-like sedge *Carex muelleri* formed large straw-coloured patches in this basin. Similar wetlands are found in cirque basins, such as at the head of Omarama Stream where *Gentiana lilliputiana* was quite plentiful.

The only lowland wetland was beside a small stream near the northern boundary of Dunstan Peaks. This stream is one of the numerous streams that flow across the lower flats and eventually into the Omarama Stream. This wetland occurred in open shrubland with exotic grasses, supporting *Carex secta*, *Carex buchananii*, toetoe (*Cortaderia richardii*), *Schoenus pauciflorus* and *Elaeocharis acuta*.

2.4.6 Cushion and snowbank communities

Cushion plant communities occur on most exposed ridge tops where the soils are thin. Plants present include *Dracophyllum muscoides*, *Hectorella caespitosa*, *Craspedia lanata*, *Kelleria villosa*, *Leptinella pectinata* var. *villosa*, *Chionohebe densifolia* and *Brachyscome "montana"*. In hollows where the soil is deeper, there are patches of slim-leaved snow tussock and *Celmisia viscosa*, the latter covering extensive areas in upper basins. Plants found on stony or rocky ground include *Schizeilema hydrocotyloides*, *Colobanthus buchananii*, *Agrostis muelleriana*, *Celmisia laricifolia*, *Raoulia petriensis* and *Raoulia grandiflora*. Snowbanks are not extensive and contain a similar cushion plant community. *Celmisia sessiliflora* is prominent with tiny plants such as *Lobelia linnaeoides*, *Plantago lanigera*, *Euphrasia zealandica* and mosses.

2.4.7 Fellfield, scree and rock outcrops

Ridge tops are characterised by shattered rock with scattered cushion plants and patches of slim-leaved snow tussock. Typical plants include *Dracophyllum muscoides*, *Raoulia hectorii*, *Luzula pumila*, *Poa colensoi*, *Dracophyllum pronum*, *Phyllachne colensoi*, *Hebe buchananii*, *Anisotome flexuosus* and lichens. Large areas are virtually devoid of vascular plants except for the occasional mound of the speargrass *Aciphylla dobsonii*. Specialised scree plants include *Ranunculus haastii*, *Ranunculus crithmifolius* and *Epilobium pychnostachyum*. Rock outcrops provide habitat for plants such as *Celmisia angustifolia*, *Celmisia densiflora*, *Koeleria cheesemanii*, *Epilobium tasmanicum*, *Luzula traversii* and *Epilobium porphyrium*.

2.4.8 Evaluation

There is evidence of recent burning, and grazing appears to be intensive in places. Most of the flat land has been developed, and OSD of the hill country has occurred up to 1200m. Large areas of higher ridge tops and summits support fellfield and scree with sparse vegetation. Below this the snow tussock is fairly intact but open due to the thin soils and relatively dry climate. Aspect is important with the colder south and east faces having a better and more diverse plant cover than the drier, sunny north and west faces.

The cirque basins, flush and bog communities support a high plant diversity, including the threatened *Gentiana lilliputiana*. The threatened broom *Carmichaelia vexillata* is present in tall tussocklands, while the threatened climber *Clematis marata* is associated with valley shrublands. The threatened *Hebe buechananii* is found in rocky areas. *Raoulia petriensis* is uncommon here, with its type locality being the nearby Mt. St. Bathans. The scree buttercup (*Ranunculus haastii*) occurs in very small numbers and is highly palatable

There is a diversity of plants in the tussockland, cushion and fellfield communities. If they were not burnt or grazed, the snow tussock would recover slowly and the *Dracophyllum pronum* shrublands would probably expand.

The diverse shrublands on valley floors and lower hill slopes are important in their own right and as habitat for invertebrates, lizards and birds. They have the potential to spread back into areas where they have been removed. They are part of a community that was once much more widespread (McGlone 1998) in pre-human times i.e. mountain totara, bog pine (*Halocarpus bidwillii*), Halls totara, snow totara, other small trees and grey shrub species.

2.5 Fauna

2.5.1 Birds

Fauna records and observations made by staff and ornithologists over the years list some 30 plus bird species. For the endemic species the main habitats these birds are found in are the stream systems (black-fronted terns, black shag, banded dotterel), and the upper basins. Tarns and shrubland remnants may have tomtit, rifleman, grey warbler, pipits and skylarks, along with the occasional New Zealand falcon.

2.5.2 Fish

A total of 3 freshwater species are known to be on the property, two endemic and one species of introduced fish. These were the Canterbury galaxiid (*Galaxias vulgaris*) and the upland bully (*Gobiomorphus breviceps*) and Brown trout, which was common.

2.5.3 Invertebrates

In all, 184 species of insects were recorded, but the total insect diversity on the station is clearly much more as 80 of these species were flies. Patrick has recorded over 100 moth species from the district at Tara Hills and the nearby Ewe and Hawkdun Ranges. In addition, six species of spider were recorded during the survey.

Snow tussock - speargrass *Aciphylla aurea*

Grasshoppers and green cicadas were quite prominent in the tussock grassland, and they have been quite well documented from the district by Patrick (1992) and Gage (1999). The most abundant leafhopper species collected was the yellow and dark banded *Limnotettix pallidus*.

Lyperobius patriki. Had previously been only recorded as far west as St Mary's Range. The wet damaged crown microhabitat also supported both the bright red native earthworm *Maoridrilus alpinus* and the large root gnat *Bradysia ?brunnipes*. The developing seedheads of *A. aurea* had largely been abandoned by aphids at this stage in the season, but still there were two ladybird beetle species (mainly the introduced eleven spotted species) and both the large hover fly adults and some of it's larvae present too. In addition, pollen from male plants was keenly sought by a range of Muscidae, Tachinidae and Syrphidae flies (Appendix 2). Thus this species is a key plant in supporting not only the conservationally important weevil *Lyperobius patriki* but also a considerable range of other insects and a native earthworm.

Predators and parasites

The most conspicuous and quite common predator collected in snow tussock grassland was the robber fly *Neoitamus walkeri* complex and it seemed to be near its seasonal peak in activity. The presence of this robber fly indicates the presence of ground dwelling scarabid beetles probably both *Pyronota* and *Odontria* species, on which their larvae probably prey. Adults of the similarly slender and almost as large grey stiletto fly *Anabaryhchus robustus* were less common and the presence of both groups of predators on the North ridge is an excellent indication of an excellent level of naturalness of the snow tussock invertebrate community.

Small numbers of two species of ground beetle were collected in pan traps, but neither appeared to be additional records from the area (Patrick 1992) and so the limited collection from these conservation department surveys only indicated a limited range of common ground beetle species in the district and habitat. However, the known diversity of ground beetles species in the Central Otago region is quite high.

A good representative and diverse range of parasitic wasps (4 Chalcoidea families), Braconidae and Ichneumonidae were collected from both the snow tussock and short fescue tussock grassland. This array of mainly endemic parasites include the first records for New Zealand beyond the family level previously recorded (Barratt & Patrick 1987) to the generic level from snow tussock grassland for a number of small native wasps - Eulophidae, Encyrtidae, Mymaridae and Pteromalidae. The main species in snow tussock was the smetallic blackish and wingless Encyrtidae *Odiaglyptus bififormis* *Ogocodes*. Another valued record of a less common parasitic species was of the spider parasite *Ogocodes* sp. at a quite high altitude in short tussock grassland.

Scree plateau/fellfield

The weevil *Lyperobius barbarae* was collected in damaged crowns of *A. dobsoni* on Dunstan Peak less than 5 km away. Thus these plants are likely to be periodically infested with this flightless weevil and this plant resource is an important reserve for these weevils on the upper parts of the Wether and St Bathans Ranges. In addition, crowns of both *A. dobsoni* and *Aciphylla aurea* damaged by the weevil were found to have both the little known native earthworm *Megadrillus alpinus* and a large (3.5-4mm long) root gnat (apparently *Bradysia ?brunnipes*) clearly associated with the wet rotting damaged area of the crown on Dunstan Peak.

Alpine semipeat area

Apart from several species of moths, which were not all collected this area had at least one characteristic undescribed species of *Hilara* (dance flies) as well as quite a range of parasitic Tachinidae flies. Also the grey wolf spider *Anetoopsis hilaris* was quite conspicuous in this

area. Larvae of the dance flies probably live among the damp peaty soil. Whether these *Hilara* are confined to alpine areas in the South Island remains to be determined, when current revisionary work begun 12 months ago is completed. Thus the spectrum of flies from this special habitat are to the best of current knowledge excellent examples of species that are alpine species or species that extend into this area.

A considerable fauna of small day flying moths and an exciting diversity of distinctive tachinid parasitic flies was observed in this habitat.

Grey shrubland

In areas of grey shrubland in the Omarama Stream floor - an undescribed *Aphis* species was beaten from *Olearia odorata*. This is a new host for native aphid species, so it could be a new species. Subsequently, Teulon (pers comm.) revisited the area and found more specimens here and at the Rock and Pillar range. There is another undescribed native *Aphis* species, which has *Coprosma* species as hosts. These grey shrublands are important as hosts for more than just the exceptional 20 species of Lepidoptera that feed on *Olearia odorata* alone (Patrick 2000). The survey also revealed a consistent association of *Rhomna scotti* with *Olearia odorata* and the collections included 3rd and fifth instar nymphs so this lygaeid can be added to the list of insects, which these shrub species support. The grey shrubland in the central west flowing creek off Omarama Stream was assessed to be the premier grey shrubland for both insects and birds, because it had a full range of secondary plant species such as *Cotoneaster* and Maori jasmine and bush lawyer *Rubus* sp. in addition to the dominant matagouri, and subdominant *Coprosma* spp., and *Olearia odorata* to host a wider range of herbivorous insects and their associated parasites. It also had relatively high naturalness to its structure and less introduced grass under it. The diversity of species of fungus consuming gnats (Mycetophilidae, Keratophilidae) and perhaps even Ditymiidae is not known but the cursory sampling achieved on Dunstan Peak and on Berwen station at similar altitudes revealed at least a few species.

Thrips were also common as *Olearia odorata* was in an early stage of flowering and plenty of the smallish dark brown rove beetle *Hydora* sp. were also associated with the flowers. They were likely to be preying on the thrips. *Leioproctus pekanui* was collected off flowers of grey shrubland on Twinburn and was present in the Omarama saddle area. The smaller *Lasioglossum sordidum* was collected off *Olearia odorata* too and the considerably less common yellow spotted native bee *Hylaeus capitosus*, which depends on grey shrubs for nest sites was also present in the Omarama stream valley.

Streams, creeks and tarns

The upper Omarama Stream has only been surveyed for caddisflies and other aquatic insects to a limited extent, so this survey added some valuable records for the Canterbury Museum databases. Environment Canterbury had surveyed the Omarama stream close to the Dunstan Peak homestead on Broken Hut road at 620m. The Environment Canterbury sample of over 420 insects at 620m on Omarama stream found the dominant insects in the water were *Deleatidium* (mayflies), *Aoteapsyche*, *Olinga*, *Pycnocentria* and *Pycnocentrodes* (caddisflies) and elmids beetles. This site is downstream of irrigation inlets, but it indicates the likely composition of insects in the larger streams at these lower altitudes. Smaller samples a further 60m upstream on Little Omarama stream (Berwen station, Macfarlane 2002) provided guidance on the caddis fly *Hydrobiosis* species, which the Environment Canterbury survey recorded to genus.

Stonefly nymphs were recovered quite readily in one of the two site sampled and even in the lower reaches where the predatory *Sternaperla* was collected (Environment Canterbury). Adult stone flies were also collected from the station and district sheltering in *Olearia* shrubs

near to the streams. The presence of both *Stenoperia* and *Zelandobius* indicates high quality water as they have MCI values of 9 and 10 respectively (Collier and Winterbourn 2000).

Mayfly diversity in the district includes a new species of *Deleatidium*, which is among the species in inland south Island with a more restricted distribution. The density of *Deleatidium* was quite high. Three dance fly (Empididae) species including at least an undescribed *Hilarempis* species near *ochrozona* were present in the Omarama Stream catchments during this period.

There are a limited number of sites with springs at mid (1000-1,200m) to upper altitudes (over 1,200m) on Dunstan Peaks. Sampling of three representative springs was made on Dunstan Peaks or close to it on Twinburn. The most scientifically valuable finds from this habitat were an undescribed dance fly (Empididae) *Heterophlebus* species, and an undescribed dark alpine soldier fly (Stratiomyidae) species of *Odontomyia*. These records indicate that the alpine area has quite an extensive range of undescribed species, when added to the flies that probably originate from the wet peaty upland soil (*Hilara* two undescribed species). Species of shore flies (Ephydriidae) *Scatella* were present at all wetland sites from 710 to 1580m. Also two wetland crane fly species *Zelandotipula* *?otagoensis* the *Limonia* sp. were only found at the spring at 1140m and the three biting midge species (Ceratopogonidae) were also aquatic species. Thus even the lower reaches of the streams and springs contain an excellent diversity of aquatic insects including in the upper altitudes.

Females of the damselfly *Xanthocnemis zelandica* were ovipositing in the upland spring at 1570 m. The upland tarn with mainly rocky surrounding at around 1565 m not far north of the West Omarama saddle ridge had considerable less vegetation surrounding it than the N W Lake in Twinburn and seems unlikely to be suitable for alpine redcoat damselfly *Xanthocnemis sinclairi*, which is only known from the upper Rakaia at present (Rowe 1987). Patrick collected three species of caddisfly from the tarn area (CMNZ records) so the tarns on the southern Whether range seem quite unlikely as undiscovered sites for *X. sinclairi*.

Discussion

The most important vegetation and scientifically underexplored and recorded habitats for invertebrates are the upland mat-cushion plant and peat vegetation with such plants as *Dracophyllum prunum* and an array of plants that host a diverse range of moths and their associated parasitic wasp (virtually unstudied) and tachinid fly parasites. The much simpler botanically scree vegetation is precious too, because it hosts *Lyperobius patriki*, which is on the list of beetles requiring conservation. These habitats have high naturalness with the few accidentally introduced insect species present being mainly aphids and their parasites. The wetland sources of the Omarama Stream and peaty soil clearly contain further undescribed species of flies and probably other insects too.

The grey shrubland also remains under-investigated in relation to the full diversity of even the moths that feed on it in the district as evident by the recording of further species by light trapping at Berwen station. The litter and fungi among this litter could support a considerable range of representative fly species, which are only hinted at in this survey.

2.6 Public Recreation

2.6.1 Physical characteristics.

Dunstan Peaks lies at the southern end of the Wether Range. The properties upper reaches on the Wether Range is primarily a back country environment that is largely natural and very open. It is very accessible, easy to traverse, but is extensive

2.6.2 Legal Access

Legal road access to the station is from Omarama via Broken Hut Road past the Dunstan Peaks homestead. An unformed legal road continues south along the eastern boundary of the property to the Omarama Saddle. There are no known marginal strips laid off within the property boundaries.

2.6.3 Activities.

Current recreational use is relatively low, largely due to the fact no legal access exists on the property. A number of farm 4WD tracks traverse the property and a track along the boundary of Dunstan Peaks and Twinburn allows access over Omarama Saddle into Otago. This access track is available if permission of the lessee of Dunstan Peaks is sought. The tops and valley systems provide access for tramping, Mountain biking, horses and cross country skiing.

PART 3

OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

An early warning meeting was held in Christchurch and Timaru on the 25 and 26th September 2002. The various umbrella groups and organisations made the following points -

- Most of the higher parts of the lease should be protected.
- That there should be assured public access to Omarama Saddle and along the crest of the Range, from the north to the south.

Subsequently written comments have been received from FMC.

3.2 District Plans

Dunstan Peaks lies within the Waitaki District. The proposed Waitaki District Plan was publicly notified in December 1996. Following public submissions and hearings on the proposed plan, the District Plan as amended by Council decisions was released in September 1999. Dunstan Peaks lies within the Rural S (Rural Scenic) Zone. The Rural Scenic Zone contains areas of the District which have significant scenic values – the high country, rangelands and inland basin areas. The majority of this zone lies above the 400 m contour (a.s.l).

The Plan establishes what sort 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.

3.3 Conservation Management Strategies

Dunstan Peaks pastoral lease lies in the CMS unit known as Waitaki. The key objectives for this unit relevant to tenure review are:

- To seek to protect, maintain and enhance the natural landscapes and natural landscape values of the Waitaki – through appropriate methods such as tenure review and district plans
- To identify the significant indigenous vegetation and threatened species of the unit and to use a range of effective methods to protect the indigenous biodiversity as well as protecting and enhancing the viability of priority threatened species populations and their habitats in the unit.
- For recreation and access the Conservancy's objectives are to provide new recreational facilities and opportunities by the Department, 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 thar densities to levels that ensure their adverse effects on natural values are minimised

Other priorities identified in the CMS that are Conservancy wide and relevant to tenure review on these properties 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 New Zealand falcon, wrybill, black-fronted tern and banded dotterel.

PART 4 MAPS ETC.

4.1 Additional information

4.1.1 References

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4.2 Photographs

4.3 Illustrative Maps (attached)

4.3.1 Topo/Cadastral

4.3.2 Values