

Crown Pastoral Land Tenure Review

Lease name :Maryburn

Lease number :PT 041

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.

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

Copied October 2002

DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF MARYBURN PASTORAL LEASE

PART 1 INTRODUCTION

This report describes the conservation resources of Maryburn Station. The property consists of 8,477 hectares in two separate parts. The main part is between the Mary Burn and Tekapo River, while a smaller section lies between Lake Pukaki and the Mary Range. Land between is freehold owned by a separate property. The adjoining properties to the north and north-west are The Wolds, to the west is Simons Hill freehold and land owned by Mackenzie District Council (for forestry) and to the south-west is Simons Hill pastoral lease. Land to the east is Crown Land, Tekapo Riverbed and a small piece of Maryburn freehold.

Maryburn is in the Tekapo and Pukaki Ecological Districts, which are within the Mackenzie Ecological Region. The Tekapo Ecological District is characterised by extensive moraines and lakes, with a humid to sub-humid climate of cold winters and warm summers. The vegetation is described as highly modified fescue/red tussock grasslands with a history of grazing. The Pukaki Ecological District is typically low topography, fluvio-glacial outwash and basin fill, a drier climate to the Tekapo district and with depleted fescue tussock grasslands with hawkweed and bare ground. The property has been the subject of several ecological surveys in the past. They resulted in protection recommendations in the Mackenzie Region PNA survey report for Maryburn Flats (RAP Pukaki 14). There are no protected areas on the property.

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

2.1 Landforms & Geology

The Maryburn Pastoral Lease is located in the middle of the Mackenzie Basin, a large structural depression or inter-montane basin. The depression has been partly in-filled by gravels, firstly by piedmont gravels coming off the hills formed around the basin and later by moraine and outwash associated with three known glacial advances of the last Otiran glaciation in the Mackenzie Basin - the "Balmoral", "Mt John" and "Tekapo" advances (listed from oldest to youngest). Three main types of landform are represented on Maryburn: **hard rock mountain range, moraine, outwash and alluvial surfaces.**

For the purposes of this report these three broad landform types can be subdivided into 10 geomorphic units. These units are described below.

Hard rock mountain ranges

(i) *Mary Range*

The southern end of the Mary Range lies within Maryburn Station. This low, isolated, hard-rock range runs north-south and is comprised of greywacke and argillite of medium induration of the Torlesse Group (Chlorite Subzone 1). In Maryburn the undulating summit of

the range is generally between 700 and 800m asl. The western side of the range has been glaciated, resulting in truncated spurs and steep planar side slopes with more rounded ridges and knobs above. The two basins have an uneven hummocky surface and may be filled with moraine or slump material. Glacial scouring decreased with height southwards, and that end of the range is more typical of hill range where mass movement processes and fluvial activity predominate. The east side of the range escaped glaciation, and its colluvial slopes and alluvial fans grade into adjacent outwash surfaces on the Basin floor. There is very little visible erosion on the Range.

Moraines

(ii) Balmoral Moraine (east block)

This very small "tongue" of moraine in the Mary Burn valley occurs at the northern boundary of the property, immediately west of SH8. It is typical of moraine areas, having a strongly rolling to hummocky topography strewn with erratics.

(iii) Balmoral Moraine (west block)

On the west side of the Mary Range, there are parallel bands of lateral moraine from consecutive advances, oriented north-south. The outermost band from the "Balmoral" advance comprises a terrace of rolling to undulating terrain with a marked absence of erratics.

(iv) Mt John Moraine

The middle band of moraine was deposited from the "Mt John" advance. It is comprised of strongly rolling terrain strewn with erratics, which often occur in groups. A small stream valley with minor outwash surfaces bisects it in the southwest.

(v) Tekapo Moraine

The inner-most band of moraine adjacent to Lake Pukaki is from the "Tekapo" advance, the second-youngest of the 5 glacial advances. It has "fresher" hummocky terrain, with numerous erratics and the occasional small tarn. The smoother planar slopes facing Lake Pukaki represent an ice-contact surface.

(vi) Inter-moraine Valley

This shallow valley separates the Balmoral and Mt John moraines. Undulating outwash surfaces form the flat valley floor, with the characteristic mound-and-hollow micro-topography (a product of wind erosion). A small stream winds down the valley, with short steep scarps and some minor terracing. The moraine landscape between the Mary Range and Lake Pukaki is part of a wider area previously identified for its significant geomorphological values (Mansergh 1978). This reflected the juxtaposition of inter-related landforms, their legibility and their relative lack of modification.

Outwash and alluvial surfaces

(vii) Balmoral outwash

A broad plain of fluvio-glacial gravels from the "Balmoral" advance extends to the south and east of the moraine on the east side of the Mary Range. Much of this outwash surface lies within Maryburn pastoral lease, bordering SH8. The two streams Mary Burn and Irishman Creek have dissected the surface resulting in three separate areas. The area west of the

Mary Burn has been extensively developed as farmland. The largest area straddles SH8, from the Mary Burn valley to the north property boundary. A third triangular area on the northern property boundary is separated from the highway outwash by Irishman Creek valley.

The surfaces slope evenly from northwest to southeast, and some small steep scarps form the margins of the area in places. The surface is flat to gently undulating with several minor channels and terraces and has a characteristic mound-and-hollow pattern. This older surface supports deeper soils than younger stonier outwash surfaces to the east.

(viii) *Tekapo outwash*

The large Tekapo outwash surface was formed during the "Tekapo" advance. It is characterised by a well-developed mound-and-hollow pattern, which contrasts with the older surface to the west. On the east side the Tekapo river has cut a high, steep and remarkably even scarp. This merges into a series of smaller scarps and terraces at the northern end, and at the southern end it gets smaller and eventually fades out. It is bisected by Irishman Creek, leaving a narrow band of outwash on its true right below the adjacent older Balmoral surface.

There are small areas of Tekapo outwash in the Mary Burn valley northwest of SH8. There is little recent floodplain development associated with the stream, and the valley is defined by short, steep, even scarps adjacent to older Balmoral surfaces.

(ix) *Tekapo River alluvial floodplain and terraces*

The Tekapo River has formed a long, wide, flat floodplain and low terraces below and east of the Balmoral and Tekapo outwash surfaces. All the land at the southern tip of Maryburn pastoral lease is recent gravel floodplain and terrace. The older terraces and floodplains are undulating and have a braided mound-and-hollow surface pattern with patches of river gravels and boulders. The younger floodplain has a more uneven surface with more exposed fresh gravels and boulders. Several minor stream channels drain into the Mary Burn.

(x) *Irishman Creek Floodplain*

Irishman Creek has a narrow, meandering, boulder/gravel floodplain bisecting Balmoral and Tekapo outwash surfaces. It is differentiated from these surfaces by obvious boulder and gravel drainage channels, a more uneven surface and the presence of shrub species.

2.2 Landscape

2.2.1 Landscape context

Maryburn pastoral lease is situated in the central part of the Mackenzie Basin, one of the most extensive outstanding natural landscapes in the Canterbury Region and "one of the most investigated, painted, written about, visited, eulogised and argued over landscapes in New Zealand" (BMP and LA 1993¹)

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

This 1993 study and a 1992 study by Boffa Miskell Partners² on landscape change in the Mackenzie Basin assessed its landscape values (primarily visual values) and identified a range of key attributes to support its outstanding status:

- Numerous important geological and biological sites
- Some of New Zealand's key features such as Aoraki
- Glacial lakes
- A variety of clearly expressed landforms, of huge scale.
- Its visual character - vast openness, strong horizontal emphasis, absence of trees, overwhelming dominance of landform, overall unity, simplicity and coherence of the landscape and high apparent naturalness, and the extensive cover of tussock grasslands.
- The area's cultural history

Most of the Basin is seen as a highly "natural" landscape. It has an outstanding array of glacially-derived landforms and is "a landscape which is New Zealand's most spectacular illustration of glacial morphology on a grand scale" (Molloy 1988). From an ecological perspective, much of it is in fact considerably modified, with hieracium, brier and exotic grasses widespread throughout the basin. However, the Basin retains very high "natural" qualities because of its overwhelming dominance of natural landform and extensive presence of short grassland, scattered shrublands which still retain a component of native species and continues to support a diversity of indigenous insects, lizards and birds. It is still regarded overall as one of the region's, and arguably the nation's, largest outstanding natural landscapes.

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, along with views from the canal roads which are popular for recreational driving. Several minor shingle roads afford "back-country" experiences of other parts of the Basin, such as the Mackenzie Pass, Hakataramea Pass and Braemar roads. The Basin is moderately to highly vulnerable to visual change through developments such as forestry and cultivation.

2.2.2.1 Significance of the Maryburn Landscape in the Mackenzie Basin

The Maryburn landscape is an important and integral part of the Mackenzie Basin landscape. Large parts of the property contribute significantly to the wider qualities of the Basin.

The vast outwash and alluvial surfaces are typical of the expansive fluvio-glacial surfaces that form the central Basin floor. These surfaces are one of the key physical and visual elements of the Basin and underlie the fundamental character of vast, flat, open, short grassland plain. They allow the renowned panoramic views across the Basin. One of the best views in the Basin is from SH8 across the Maryburn flats to the distant eastern ranges. Despite the short tussock grassland being degraded, the flats exemplify the classic "undeveloped" plain of the Basin.

The moraines between the Mary Range and Lake Pukaki are likely to have a limited role in the public perception of the Basin's landscape. Most parts are not seen from public roads, and where they are, they do not generally stand out as being particularly memorable. The moraine adjacent to the lake is within a "Lakeside Protection Area", the purpose of which is to retain the "natural" character of the lake margins (Mackenzie Proposed District Plan 1999). Overall, the small area of moraine on Maryburn facing the lakes is not visually significant in terms of the whole landscape context of the lake. The Mary Range and

² Boffa Miskell Partners Ltd – Landscape Change in the Mackenzie/Waitaki Basins

surrounding area was identified as a key area for glacial geomorphology, reflecting the close juxtaposition of a variety of landforms, their clarity and their surface patterns (Mansergh 1978). About one sixth of this defined area lies within the property.

The Mary Range rises abruptly from the expansive outwash plains and rolling moraines of the Basin floor. It is a significant visual feature and landmark in the Basin because of its isolation, prominent form and high visual profile from public roads. The Range appears largely natural, as there are few fences, tracks or tree planting's visibly evident, and the TV transmitter and access road are only minor cultural elements. The southern third of the range is in Maryburn, and is as significant as the remainder of the range in terms of its visibility from SH8. It is however, lower, less visually interesting and less significant for its glacial features.

There are several wetlands on *Maryburn* that are inherently important. A diversity of wetlands are scattered through the Basin and all are considered valuable as natural visual features and wildlife habitat. The Mary Burn is popular for fishing along its length.

2.2.3 Landscape Description

2.2.3.2 Land types and units

To provide a basis for landscape classification the Canterbury region has been divided into land types, after Lynn (1993)³. Maryburn falls within three of those land types:

- H3 Glacial and Fluvial Basin Floor Land Type – includes glacial and fluvial basin landforms, extensive ablation and terminal moraine, and associated meltwater channels, outwash terraces, minor lakes, fans, meandering floodplains, and glacial moulded hills and mountains under 1300m
- H3 Basin Floor Outwash Plains Land Type – includes basin floor fluvio-glacial outwash plains, terraces, piedmont fans, braided and meandering floodplains and associated low hard rock ranges, and
- H7 Isolated Mountain Range Land Type – are steep to very steep, dissected, isolated mountain blocks up to 1830m, nested within the glacial and fluvial valley floor or basin land types

2.2.3.3 Property Level Landscape Description

In order to describe the visual landscape, land types have been subdivided into landscape units. Landscape units are visually distinct areas able to be set apart from each other on the basis of landform, vegetation patterns, and cultural patterns. Three landscape units can be recognised on the property: (See attached Landscape Map)

1 *Maryburn Flats*

This large triangular shaped area is located between the Tekapo River and the Mary Burn. A small portion of these flats are located west of SH8, adjacent to the Mary Burn valley. It is comprised of mixed greywacke fluvio-glacial gravels and more recent alluvial floodplain, and drains south into the Mary Burn and Tekapo River. This area is characteristically very flat, open and visually simple with a cover of degraded Fescue tussock grassland. Intertussock cover is dominated by a mixture of indigenous and exotic herbs, grasses, localised shrubs,

³ Extracted from Land Types of the Canterbury Region by Ian Lynn in the Canterbury Regional Landscape Study, Boffa Miskell and Lucas Associates 1993

mosses and lichens. The vegetation patterns mirror landform patterns, reflecting soil depth and moisture availability. A distinctive braided mound-and-hollow micro-topography typifies much of the surface, and is related to past water flow and wind erosion, accentuated by vegetation distribution.

The area is divided into several extensive grazing blocks for sheep and cattle. The subdividing fences, vehicle tracks and the pylons at the southern end are relatively minor cultural features in this vast natural-looking landscape.

2 *Mary Range*

This range has previously been described in some detail in section 2.1 (i). It lacks the rugged character typical of Canterbury's greywacke ranges. Its vegetation is dominated by short tussock grassland, with a green turf of mainly exotic herbs and grasses being prominent in many places. There are also extensive patches of grey scrub and sweet briar, probably stimulated by OSTD. Dark grey mounds of porcupine shrub are prominent on knobs and drier aspects. Aspect differences are emphasised by more shrub cover on north faces and dense grass cover on south faces. The range is extensively grazed and is divided into several blocks. Apart from the occasional stock fence there are no other obvious cultural features and that part of the range within the lease appears visually intact and natural.

3 *Pukaki Moraine*

This large area of strongly rolling to hummocky moraine lies between the Mary Range and Lake Pukaki. It is a very small part of the extensive moraine landscape adjacent to Lake Pukaki. The Maryburn landforms are representative of the wider morainic landforms including lateral moraine and terminal moraine loops. The moraines run north-south in parallel bands, separated by a dry fluvio-glacial valley with well-defined scarps. The valley has gradually widens towards the south, eventually merging with outwash plain above the Pukaki River beyond the property. Glacial erratics are a feature of these moraines – many large angular boulders are strewn over the landscape, often in groups.

The vegetation cover is dominated by degraded fescue tussock grassland, with scattered native shrubs and mat species. Wetlands occur in depressions and the valley floor, while grey scrub is common along stream beds and scarps. Shrubs, spaniards and *Muehlenbeckia* are prominent around the erratics, and sweet briar is also widespread, especially on the youngest terminal moraine face. Wilding pines are present, including those killed by felling or spraying.

The area is extensively grazed and is divided into several grazing blocks. A pylon line crosses the youngest moraine and several 4WD tracks wind through the area. Overall the area retains a high degree of naturalness and intactness, with the landform association being clearly comprehended from elevated viewpoints.

2.2.4. 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.

2.2.4.1 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 eg. (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.

The Maryburn Flats and the Pukaki moraine areas are of significant inherent visual value.

The Maryburn Flats appear as a highly natural landscape with large, intact and well defined landforms. From elevated viewpoints, the repeated sinuous patterns of wind-induced mound and hollow and braided drainage channels is clearly visible. Although there is a strong element of exotic flora, the overall impression is of a vast short tussock grassland. This creates a natural landscape of a scale, openness and horizontal emphasis not experienced anywhere else in Canterbury, except perhaps Kaitorete Spit. The ability to see great distances to distant ranges is a special visual quality, and emphasises the basin structure. The vast outwash plains are one of the iconic elements of the Mackenzie Basin and are fundamental to its special character and outstanding natural landscape status. The Mary Burn with its clear waters and the raupo swamp at the southern tip of the plains are notable natural visual features of the Maryburn Flats.

The Pukaki moraine's visual value is best appreciated from elevated viewpoints, where the whole array of inter-related glacial landforms on the west side of the Mary Range can be seen together and interpreted. The landscape has a highly natural appearance and is "legible", with the moraine loops and fluvio-glacial valley being clearly recognisable. The area is visually coherent with very few discordant elements (power pylons, tracking and heavy machinery damage to some erratics). From internal viewpoints the landscape it is not distinctive, apart from the larger erratics which are notable visual features.

2.2.4.2 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. *The property is highly visible from public viewpoints, except for parts of the Pukaki moraine and depressions within the plains.*

1 Mary Range

This is the most widely viewed part of the property. It can be seen in the distance from SH8 as far away as Dog Kennel Corner in the NE, and the Lake Ohau turnoff in the south west. Distant views are also gained from shingle roads on the east side of the basin where there are unbroken views across the basin floor. The west side of the range is clearly visible from SH80 between the Pukaki Scientific Reserve and Boundary Stream, and thereafter more distantly to Mt Cook National Park. The lower south end of the range is less prominent in more distant views. Closer views are gained from parts of SH8 at the south end of Lake Pukaki, and from Irishman Creek Station to the Tekapo-Pukaki Canal junction. Much closer views are gained from the canal to Simons Pass, and at intervals between Simons Pass and Lake Pukaki. Close views are also gained from the canal road west of SH8.

Its isolation and the openness and steepness of its slopes makes it a highly visible part of the landscape. It forms a natural landform skyline in many views, with cultural modifications such as tracks, fences and the TV transmitter being insignificant. The vegetation appears as a moderately natural grassland with shrublands. The south part of the range lacks the visual character of higher or more rugged ranges, but it is visually significant because of its visual prominence.

2 *Maryburn Flats*

These are viewed at close range where SH8 passes through or by them. The far side of the basin can be seen across the flats, this being one of the classic views of the Mackenzie Basin. The land 40m east of the highway is defined as "scenic viewing area" in the Proposed Mackenzie District Plan (1999), the objective being to retain the views across by limiting structures and tree planting there. On the west side of the highway, the flats allow an uninterrupted view to the hummocky moraine of The Wolds.

Because of their flatness views across the plains are very oblique, and surface details are therefore only apparent close by. Most landuse changes would be readily noticeable on these flats could easily detract from its special visual qualities.

3. *Pukaki Moraines*

These are partly visible from SH8 at the south end of Lake Pukaki, and between Dover Pass and Simons Pass, and distantly from SH80. At close range they can be seen from the SW end of the canal road, and near Dover Pass. The moraine in these views is natural looking but unremarkable, with briar, wilding pines and pylons on the skyline being visually detracting elements. Despite this, the area is part of the landscape context for Lake Pukaki and retention of a natural appearance is desirable. East from Dover Pass there are a series of views into the moraines ranging from those close by to longer valley views. This more enclosed part of the highway corridor contrasts with the vast open spaces more commonly seen and adds to the natural diversity of landscape experiences.

The moraines have a high degree of apparent naturalness and are largely intact and coherent, with wildings, two fencelines and pylons being detractors in some areas. The erratics are a significant visual feature, especially where they are large or clustered.

2.2 **Climate**

The Mackenzie Basin has a continental like climate with hot summers and cold winters and annual, diurnal and extreme ranges in temperature. In addition to the marked diurnal range in temperature, there is clearly defined contrast between summer and lower winter temperatures, unlike lowland areas in Canterbury.

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. On average, snow falls on 6-12 days each year, the months May through to September having more than one day of snow per month. However, snow may fall during any month (NZ Met. Service, 1983).

The basin enjoys high sunshine hours, averaging 2000-2300 per year (cf. Christchurch which averages 1950). There is no season which may be called frost free, and the months of April to November have, on average, more than 10 days with frost.

2.3 Vegetation

The property consists of three blocks. The largest is on the fluvio-glacial outwash plain between State Highway 8 and Tekapo River. It supports indigenous grassland of fescue tussock with some indigenous shrubs, and special indigenous plants in relict outwash channels. There is a wetland containing sedges, rushes and raupo at the southern end of the block. A Mackenzie Basin Grazing Trial (MBGT) site is also located in this block. A contiguous but much smaller block lies west of State Highway 8. It includes a stretch of the Mary Burn and its terraces, matagouri shrubland and two small wetlands. The third block of land lies between Lake Pukaki and the south end of the Mary Range. It is vegetated with a mosaic of fescue tussock, shrubland and pasture grasses and has been oversown and topdressed (OSTD). Indigenous speargrasses (*Aciphylla* spp.) and scabweeds are found on the range crest and terrace risers.

These three areas are described in more detail in the following sections:

2.4.1 Maryburn flats (east of State Highway 8)

These extensive flats contain a flight of terraces and floodplains. The highest and oldest terrace supports a mosaic of fescue tussock (*Festuca novae-zelandiae*) grassland. Shrubs include scattered matagouri (*Discaria toumatou*), porcupine shrub (*Melicytus alpinus*), tauhinu (*Ozothamnus leptophyllus*), common broom (*Carmichaelia petriei*) and shrub daisy (*Olearia odorata*). Other prominent indigenous plants are scabweeds (mainly *Raoulia australis* and *R. parkii*) and dwarf shrubs (particularly *Leucopogon fraseri* and *Coprosma petriei*). *Raoulia parkii* is a threatened species. Exotic plants are common, especially mouse-ear hawkweed (*Hieracium pilosella*), browntop (*Agrostis capillaris*) and sheep's sorrel (*Rumex acetosella*).

Low-growing turfy vegetation in former outwash channels includes scabweeds, dwarf shrubs and exotic herbs such as sheep's sorrel, whitlow grass (*Erophila verna*) and spring speedwell (*Veronica verna*). Of special interest is the presence of several threatened or uncommon plants, which are adapted to places where water occasionally collects. They include NZ mousetail (*Myosurus minimus* var. *novae-zelandiae*), *Leptinella* "Clutha" (a button daisy previously known only from Pisa Flat in Otago), and *Galium* "Clutha" (previously known only from Pisa Flat, the Maniototo and Kaitorete Spit).

On the intermediate terrace a similar vegetation mosaic occurs, though the soils are not so deep and the fescue tussock and shrubs are less dominant in relation to exotic plants. Scabweeds and hawkweed are common. The outwash channels are more shallow here and lack the threatened plants. The gravelly channels of Irishman Creek support scabweeds, the prostrate creeper *Muehlenbeckia axillaris*, various other indigenous herbs, silver tussock (*Poa cita*) and several weeds including broom (*Cytisus scoparius*), sweet brier and stonecrop (*Sedum acre*).

The prominent terrace riser between the intermediate terrace and the lowest terrace supports several scattered threatened or uncommon plants. They include the native cress *Lepidium sisymbrioides* subsp. *sisymbrioides*, the dwarf broom *Carmichaelia vexillata*, and the spring annual *Convolvulus verecundus*.

The lowest terrace has shallow soils and is quite stony. It supports patches of fescue tussock, localised dense browntop and scattered shrubs, especially matagouri, porcupine shrub and sweet brier. Otherwise there is a variable low turf of scabweeds, mosses, sheep's sorrel, hawkweed and other small indigenous and exotic herbs and grasses. The threatened indigenous cress *Lepidium sisymbrioides* subsp. *sisymbrioides* occurs in places, as does

Convolvulus verecundus and the native daphnes *Pimelea oreophila*, *P. prostrata* and *P. pulvinaris*. The woolly moss *Racomitrium pruinosum* is common among floodplain stones. A ribbon of silver tussock, sedges and matagouri extends along the banks of Irishman Creek, which flows across the terrace. There are also former water channels on the terrace with low turfs containing *Leptinella* "Clutha" and *Galium* "Clutha", and NZ mousetail may be present. In the central part of the terrace, springs emerge from the terrace riser feeding water channels which support sedges, rushes, shrubs, mosses and aquatic herbs. These eventually flow into Irishman Creek further south.

A narrow wetland follows a stream at the southern end of the block, extending for several hundred metres. It is dominated by tussock sedge (*Schoenus pauciflorus*), with *Carex coriacea*, silver tussock and rushes. The southern tip of the wetland is dominated by raupo (*Typha orientalis*), which is unusual in the Mackenzie Basin, and small numbers of the threatened *Carex tenuiculmis* are present. The wetland vegetation is affected by sheep and cattle grazing.

2.4.2 Mary Burn (central block, west of State Highway 8)

Matagouri (some taller than 2m) dominates riparian shrubland next to the Mary Burn, with other shrubs being *Olearia odorata*, *Hebe odora*, *Coprosma intertexta*, tauhinu, sweet brier and gooseberry. Silver tussock and exotic grasses are common, while sedge tussock and *Carex secta* dominate moist areas near the stream. Several willows occur at the northern end. Adjacent low terraces of the Mary Burn are dominated by exotic grasses and herbs, with some fescue tussock, silver tussock and matagouri.

The two wetlands in this block were previously identified as SSWI's for birds. The eastern one is the largest and is found at the base of a terrace riser, where it is fed by a spring. It contains some open water and the vegetation is dominated by sedge tussock, *Carex secta*, and other sedges and rushes. The wetland has been modified by cattle. The second wetland is part of the Mary Burn, and is found immediately adjacent to the highway. It has similar vegetation, but is more degraded as it is in a bull paddock.

The higher eastern terrace riser is stony and dominated by exotic grasses and herbs, especially mouse-ear hawkweed. Indigenous plants include at least three species of *Raoulia*, dwarf brooms (*Carmichaelia nana* and *C. vexillata*) and daphnes. The terrace is dominated by fescue tussock, mouse-ear hawkweed and exotic grasses, with some small matagouri. The small area of moraine at the north end of the block supports similar vegetation, but with more shrubs. Species present include common broom (*Carmichaelia petriei*), porcupine bush, *Olearia odorata*, and the speargrasses *Aciphylla aurea* and *A. subflabellata*.

West of the stream the terraces are border-dyked and planted in shelterbelts, and grazed more intensively.

2.4.3 Lake Pukaki to Mary Range (western block)

The land between the shoreline of Lake Pukaki and the Mary Range is hummocky moraine country, crossed by two streams. Most of the land supports sparse grassland of exotic grasses, fescue tussock and mouse-ear hawkweed. Scattered shrubs or patches of shrubland include matagouri, porcupine shrub, sweet brier, *Coprosma* spp., tauhinu, common broom, *Olearia odorata* and *Muehlenbeckia complexa*. Golden spaniard (*Aciphylla aurea*) occurs in rocky places. Wilding pines are numerous, though they are being controlled in some places.

The streams support riparian matagouri shrublands with scattered *Coprosma intertexta*. Small wetlands in old water channels support dense areas of rushes, sedges and grasses. The high terrace between the eastern stream and the range has been OSTD, and supports unusually healthy fescue tussocks and exotic pasture plants.

The flanks of the Mary Range have been OSTD and support a mosaic of exotic pasture, fescue tussock and shrublands dominated by matagouri. Other shrub species include sweet brier, porcupine shrub, *Coprosma* spp., common broom, *Olearia odorata* and *Muehlenbeckia complexa*. Mouse-ear hawkweed is very common, and silver tussock, blue tussock (*Poa colensoi*) and mountain oat grass (*Deyeuxia avenoides*) are present. Rocky areas support golden speargrass and shrubs, especially porcupine bush and common broom. The heavily grazed range crest support porcupine shrubs low-growing indigenous species such as *Raoulia australis*, *R. parkii*, *Coprosma petriei*, *Scleranthus uniflorus* and *Carmichaelia vexillata*.

2.5 Fauna

2.5.1 Birds

A total of forty-one bird species have been recorded on Maryburn over the past twelve years comprising six endemic species, 18 indigenous species and 17 introduced species (see Appendix 1). The five main wetland habitats on the property are described below:

1 *Maryburn Stream*

Maryburn Stream is a moderately fast flowing stream with a gravelly bottom that is adjoined by associated wetlands (Woolshed Wetland, Maryburn Station Swamp). This valuable riparian habitat is part of the Tekapo River system, a Site of Special Wildlife Interest (SSWI). It passes through modified short tussock grassland. Maryburn Stream provides valuable habitat for black-fronted tern (Category B species), banded dotterel (Category C species) and a wide range of other wetland birds. Black stilt (Category A species) have used this habitat historically.

2 *Woolshed Wetland and Maryburn Swamp*

Both these wetlands were identified as SSWI's. Both are *Carex* swamps that have been modified by grazing use. Both have provided habitat for black stilt and are likely to in future, given the success of the black stilt breeding programme and recent releases in the Tekapo area. Marsh crake and bittern have also used these wetlands.

3 *Southern wetland*

This *Carex* wetland is at the southern tip of the property. It provides black stilt, marsh crake and bittern breeding habitat, and habitat for a range of other wetland birds.

4 *Irishman Stream*

Irishman Stream is a moderately fast flowing stream with a gravel bottom, which is degraded by extensive introduced weeds. Despite this, it provides valuable habitat for black-fronted tern (Category B species), banded dotterel (Category C species) and a wide range of other wetland birds. Black stilt (Category A species) have also used this habitat historically and are likely to again.

5 Tekapo River terrace wetlands

There are a series of seeps and small *Carex* wetlands along a terrace parallel to the Tekapo River. This habitat is suitable for a range of wetland birds. Marsh crake and bittern probably use this habitat, and it is also suitable for black stilt breeding.

2.5.2 Fish

Freshwater fish were identified in the Mary Burn stream and Irishman Creek. Additional information came from the NIWA national freshwater fish database. A total of 6 endemic and 2 introduced species are present on this property. The fish and their habitats are outlined below:

- Long finned eel (*Anguilla dieffenbachii*). This species has only been recorded from the Mary Burn. Individuals located today are typically large females over 50 years old, as juveniles can't reach the population because of hydro dams on the lower Waitaki River.
- Alpine galaxiid (*Galaxias paucispondylus*). This species has only been recorded from the Mary Burn. It is not very common here, probably due to limited braiding in this river and high numbers of trout.
- Koaro (*Galaxias brevipinnis*). This species has only been recorded from the Mary Burn. It is probably not very common due to high numbers of trout. This species has a category C ranking for conservation.
- Canterbury galaxiid (*Galaxias vulgaris*). This species is common in the Mary Burn and Irishman creek.
- Common bully (*Gobiomorphus cotidianus*). This species is in the Mary Burn and Irishman creek. It does not appear to be as common here as the Upland bully.
- Upland bully (*Gobiomorphus breviceps*). This is the most common species of endemic fish in both waterways.
- Brown trout (*Salmo trutta*). This introduced fish is common in both waterways and is an important recreational fishing resource. The Mary Burn is an important spawning river for this species.
- Rainbow trout (*Oncorhynchus mykiss*). This introduced fish is found in both waterways, but does not appear to be as common as brown trout. The Mary Burn is an important spawning ground for this species.

2.5.3 Reptiles

Three species of endemic reptiles have been recorded from the property, all of them being typical for this type of habitat. Additional species are likely to occur on the stony terraces that border the Tekapo River. These three species and their habitats are outlined below:

- McCanns skink (*Oligosoma maccanni*). Found throughout the property mainly in dry stony areas.
- Common skink (*Oligosoma nigriplantare polychroma*). Found throughout the property, in more densely vegetated grasslands and shrublands.
- Common gecko (*Hoplodactylus maculatus* sp. Southern Alps). Found in stony/bouldery places, especially around terraces that border the Tekapo River.

2.5.4 Invertebrates

To maximise the diversity of invertebrates collected, a range of sampling techniques were used during the inspection of this property. These included pitfall traps, pan traps, sweeping, hand searching and foliage beating. More than 200 specimens were collected from a wide range of terrestrial and aquatic habitats during the two days available for the inspection. Of particular interest was the collection of a number of short-horned grasshopper species,

which included *Brachaspis robustus* and *Sigauss minutus*. *Brachaspis robustus* was found on terraces above the Tekapo River floodplain. This species is endemic to the Mackenzie ecological region and is nationally endangered (Molloy et al 2001, and Hitchmough 2001). The threatened grasshopper *Sigauss minutus* is widespread on outwash and floodplain surfaces. It is endemic to the ecological region and Central Otago and is in gradual decline (Molloy et al 2001, and Hitchmough 2001).

The Mackenzie district is also known to be important habitat for a range of threatened moths. Moths collected during the inspection of the natural floodplains and terraces on this property were representative of the Mackenzie district. The collection of the 'plains-jumper' moth (*Kiwaia* 'n.sp.') which is restricted in distribution and in its ability to disperse as the female moths are flightless, is significant. They are usually associated with flora such as mosses, sheep's sorrel and mat forming plants like *Raoulia*. Their habitats are threatened by stock disturbance and competition from exotic grasses. Patrick and Dugdale (2000) assigned this moth the highest conservation priority.

A wide diversity of Tachinidae flies were also collected. These flies are not well studied in New Zealand but are known to be parasitic on beetle and fly larvae. Flightless ground beetles belonging to the Carabidae family were also collected. Many of these beetles are restricted in their distribution and are of high conservation value. A number of aquatic species, which form an important part of the diet of native fish and birds, were collected from Maryburn during this inspection. These included Mayflies and Caddisflies as well as aquatic diving beetles (Dytiscidae). Also collected were a number of freshwater mussels (*Hydriella* sp.) which are more typically found in lakes but have been heavily impacted by predators.

Six species of freshwater molluscs were recorded from the Mary Burn and three from Irishman creek. They are typical for this area and include flatworms, snails and fingernail clams. A number of additional aquatic invertebrate species have been recorded from Mary Burn. Among them was the freshwater mussel *Hydriella* sp, which is of some conservation significance as their distribution has become restricted through predation and harvesting.

This station appears to provide an excellent habitat for invertebrates. Although the property has been extensively modified by the presence of grazing sheep and cattle, there is an abundance of relatively intact habitat remaining in places. Maryburn Flats are of particular value for invertebrates as are the wetland areas. The Maryburn flats provide a range of different aged floodplains and terraces which are important as they provide an important history of invertebrate-habitat associations. They also support a range of plants such as *Olearia odorata*, *Raoulia australis*, which are important host plants for a number of invertebrates.

2.6 Public Recreation

2.6.1 Physical characteristics

The majority of Maryburn is flat and physically easily accessible, especially the larger eastern block. The western block has more variety with areas of moraine, river terraces and a section of the Mary Range. Altitude varies from the lake at about 540m to 880m along the Mary Range. According to DOC's recreation opportunity descriptors Maryburn has the primary characteristics of a back-country environment. This means that the property is a modified environment but one that is generally dominated by natural vegetation or landscapes and is natural looking. It is accessible to all terrain vehicles and is traversed mainly by ungravelled roads, or 4 x 4 access. Obvious elements of modification include roads and areas of farming or forestry.

According to the **FMC** guidelines Maryburn would be mainly within an "open space" recreational experience zoning. For open space the descriptors are semi-natural grasslands under extensive grazing, accessible by roads, off-road vehicles and foot tracks.

2.6.2 Legal Access

Legal access to the property is available along the Tekapo Twizel Road (State Highway 8), Tekapo River Road and Hayman Road. A legal road through the middle of Simons Hill freehold provides legal access between the two pieces of Maryburn. A legal road, following approximately the line of the old Bullock track, cuts across the lower section of Maryburn pastoral lease between the Tekapo River and the Mary Burn.

2.6.3 Activities

The large block of fluvio-glacial outwash terraces east of SH8 has potential for walking, mountain biking, horse trekking, botanising, photography and painting. The main east-west 4WD track alongside the middle fence would provide good access between the State Highway and Tekapo River. Horse riding is probably incompatible beyond this track due to likely damage of sensitive turf vegetation containing threatened plants. Unless the bikes stay on 4 w.d. tracks, mountain biking may be similarly incompatible for the same reason. Other potential routes for a mountain bike track are the historic Bullock Track from Dog Kennel Corner to the Pukaki River, and then onto Twizel and Lake Ohau. It is hard to find, but crosses the property around the line of the legal road on the southern section of the property and goes through Simons Pass. Another alternative is the 4 w.d. track under the power lines, which is easier to follow.

Trampers often traverse the Mary Range, but permission is a problem as it involves four properties. Fishermen are frequent users of the Tekapo River Road and the 4 w.d. track to the Mary Burn alongside the pylons.

PART 3

OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

Meetings were held on 25 September 2001 in Christchurch and 26 September in Timaru with representatives from Federated Mountain Clubs, New Zealand Deer Stalkers Association, Peninsula Tramping Club, Canterbury Conservation Board, New Zealand Mountain Bike Association, Forest and Bird Society, Canterbury University Tramping Club, Opus Consultants, Mount Cheeseman Ski Club, Environment Canterbury, Friends of Lewis Pass, QEII, Pegasus Pig Hunting Club, as well as Public Access New Zealand, Fish and Game Council, QV Valuations, Knight Frank Ltd, Geraldine Tramping Club, 4 WD Club, Temuka Tramping Club, and Environment Canterbury in Timaru.

The main issues brought up in the meeting were:

- The need for transparency over the identification of marginal strips i.e. they should be identified early on in the preliminary proposal so the public know where they are going to be.
- An area of prostrate kowhai is known to be on the side of the hill near where the Maryburn and the Tekapo River meet (This is actually on Simons Hill pastoral lease).
- Access to the Tekapo River needs to be provided.

- There was some question about the fence on the Tekapo River and whether this was Crown Land taken for public works and administered by the Commissioner, or whether it was still pastoral lease.
- Maryburn Stream has vegetation along its banks of high quality and this should be maintained.
- There was a suggestion that there was possibility for access up Mount Mary through the southern area so access from one end of the Range to the other is important.

Since the meeting the South Canterbury Branch of the NZ Deerstalkers Association have written a letter requesting that marginal strips be set aside on all creeks and streams on the properties under review.

The South Canterbury Tramping Club and Temuka Tramping Club have also submitted their views expressing their primary concern being to maintain legal access for recreational usage including access over marginal strips and easements along formed access tracks for pedestrian and non-motorised use as of right, and motorised used by agreement. They would also like to see off-road parking made available; all legal roads (whether formed or unformed) as shown on cadastral maps remain as such, and to protect areas of significant inherent and natural values including those already recognised in PNA surveys. Specifically to Maryburn they requested that access on marginal strips be aside up all creeks and the Tekapo River and to protect wetland areas.

3.3 District Plans

Maryburn pastoral lease lies within the Mackenzie District. Their proposed plan, as amended by Council decisions, was notified in September 1999.

Under this plan Maryburn is zoned Rural. The plan identifies a number of scenic viewing areas (SV 12, 13, 14) and three sites of natural significance on Maryburn – site 41a (Maryburn Station swamp), 41b (Maryburn Woolshed) and 50 (Maryburn Flats). Woolshed wetland and Maryburn Station Swamp are sites of special wildlife interest (SSWIs) used by waterfowl and waders, including black stilt. The Maryburn Flats is a RAP (Pukaki 14).

The District Plan contains a number of rules that apply to sites of natural significance, riparian areas⁴ and high altitude areas (areas above 900m).

3.3 Conservation Management Strategies

Maryburn 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

⁴ within 50m of wetlands and lakes, 75m of listed lakes, 10m of a bank of a river, and within 20m of listed rivers.

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

Appendix 1 Bird species of the Maryburn Leasehold property

Endemic species

Kaki (Black stilt)	<i>Himantopus novaezealandiae</i>
Black billed gull	<i>Larus bulleri</i>
Black fronted tern	<i>Sterna albostrata</i>
Banded dotterel	<i>Charadrius bicinctus</i>
Paradise shelduck	<i>Tadorna variegata</i>
Grey warbler	<i>Gerygone igata</i>

Native species:

Australasian harrier	<i>Circus approximans</i>
Spur winged plover	<i>Vanellus miles novaehollandiae</i>
White faced heron	<i>Ardea novaehollandiae</i>
Welcome swallow	<i>Hirundo tahitica neoxena</i>
Pied stilt	<i>Himantopus himantopus leucocephalus</i>
Grey teal	<i>Anas gibberifrons gracilis</i>
Australasian shoveler	<i>Anas rhynchotis</i>
Grey duck	<i>Anas superciliosa</i>
Black shag	<i>Phalacrocorax carbo</i>
Little shag	<i>Phalacrocorax melanoleucos</i>
Black backed gull	<i>Larus dominicanus</i>
Pied fantail	<i>Rhipidura fuliginosa</i>
Silvereye	<i>Zosterops lateralis lateralis</i>
Pipit	<i>Anthus novaeseelandiae</i>
Pied oystercatcher	<i>Haematopus ostralegus finschi</i>
Marsh crake	<i>Porzana pusilla affinis</i>
Australasian bittern	<i>Botaurus poiciloptilus</i>

Introduced species

House sparrow	<i>Passer domesticus</i>
Hedge sparrow	<i>Prunella modularis</i>
Blackbird	<i>Turdus merula</i>
Songthrush	<i>Turdus philomelos</i>
Starling	<i>Sturnus vulgaris</i>
Chaffinch	<i>Fringilla coelebs</i>
Goldfinch	<i>Carduelis carduelis</i>

Greenfinch
Californian quail
Redpoll
Yellow hammer
Skylark
White backed magpie
Mallard duck
Rock Pigeon
Black swan
Canada goose

Carduelis chloris
Callipepla californica
Carduelis flammea
Emberiza citrinella
Alauda arvensis
Gymnorhina tibicen hypoleuca
Anas platyrhynchos
Columba livia
Cygnus atratus
Branta canadensis

Appendix 2: List of insect families collected and curated on Maryburn Station for this report

Order					
	Diptera	Coleoptera	Hemiptera	Hymenoptera	Orthoptera
Family	Agromyzidae	Carabidae	Lygaeidae	Formicidae	Acrididae
	Caliphoridae	Carabidae <i>Mecodema</i> sp.			Acrididae <i>Brachaspis robustus</i>
	Caliphoridae <i>Lucilia sericata</i>	Coccinellidae		Halictidae Halictinae	Gryllidae
	Cecidomyiidae	Curculionidae		Ichneumonidae	
	Chironomidae	Dermestidae			
	Dolichopodidae	Dytiscidae <i>Rhantus pulverosus</i>			
	Empididae Empidinae	Histeridae			
	Muscidae	Mycetophagidae			
	Phoridae	Staphylinidae			
	Sciaridae	Staphylinidae <i>Creophilus oculatus</i>			
	Sciomyzidae	Scarabaeidae			
	Tachinidae	Tenebrionidae			
	Tephritidae				
	Therevidae				
	Tipulidae				

Addendum

The following invertebrates were also collected from the Maryburn Station, but have been identified since the table above was compiled.

Spiders - Araneae

Dolomedes minor (Nursery Web Spider).

Grasshoppers and Wetas - Orthoptera

Phaulacridium marginale, *Brachaspis robustus* and *Sigaus minutus*.

Also plenty of habitat for *Hemiandrus* species of Tekapo ground weta.

Sigaus campestris. The grasshopper/Kawhitiwhiti *Sigaus campestris* is found only in the bottom two-thirds of the South Island and its distribution is scattered.

True Bugs - Hemiptera

Lygaeidae – juvenile specimens unable to be identified further.

Moths - Lepidoptera

Capua semifera (Tortricidae)

Eurythecta zelaea (Tortricidae)

Found in open areas on or in leaf litter.

Kiwaia cheradias (Gelechiidae) & *Kiwaia 'n.sp.'* (Gelechiidae)

Diasemia grammalis (Crambidae) & *Orocrambus corruptus* (Crambidae)

Arctesthes catapyrrha (Geometridae)

Of particular interest is the moth *Kiwaia 'n.sp'* commonly known as the Plains Jumper. This species is of known conservation value and has become restricted in its distribution in Canterbury. The moth is also found at Macleans Island and at Kaiforete Spit. The female moths are flightless which limits their dispersal ability.

Aquatic Invertebrates

Damsel fly - Odonata

Xanthocnemis zealandica (Redcoat) in wet areas near Maryburn stream.

Caddis fly – Trichoptera

Hudsonema amabile & *Confluens olingoides* common and widely distributed.

Bivalve: Freshwater mussels *Hydriella* sp. Found in the Maryburn stream. These have some conservation value and used to be common in the area. Predation and harvesting in the past have restricted their distribution.

Flys – Diptera: Tipulidae

Zelandotipula larvae – widely distributed in Canterbury.

Simuliidae larve – *Austrosimulium* spp.

May flies: Ephemeroptera

The mayfly *Deleatidium* one of the more abundant aquatic species found in the Maryburn stream.

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4.2 Illustrative Maps

4.2.1 Topo/Cadastral

4.2.2 Values