

Crown Pastoral Land Tenure Review

Lease name : BALMORAL

Lease number : PT 021

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.

They are released under the Official information Act 1982.

April 04

DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF BALMORAL PASTORAL LEASE

**PART 1
INTRODUCTION**

Balmoral Station consists of 9358 ha of land in the middle of the Mackenzie Basin between Lakes Pukaki and Tekapo. The property is dominated by the Old Man Range, and moraines and outwash to the southeast, north and west of the range. Fork Stream forms the north-east boundary, while Braemar Road, a minor shingle service road, forms most of the north boundary.

Balmoral Station adjoins the pastoral leases of Tasman Downs to the west and Irishman Creek to the south. In the north-west the land is designated for military training purposes, and in the northeast it is land mapped as being part of Balmoral, but designated to go to Defence Department reducing the size of the original property to approximately 6500 ha.

Balmoral lies predominantly in the Tekapo Ecological District, with a very small portion at the south-eastern end of the property in the Pukaki Ecological District. 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.

Both ecological districts are in Mackenzie Ecological Region which was surveyed as part of the Protected Natural Areas Programme in 1982/83. Three Recommended Areas for Protection (RAPs) were identified on the property – Tekapo 9 (Balmoral fescue and red tussock grassland), Tekapo 10 (Old Man Range swampland) and Tekapo 11 (Tekapo Military Camp Tussock).

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

2.1 Landforms & Geology

The Balmoral Pastoral Lease is located in the middle of the Mackenzie Basin, a large structural depression or inter-montane basin. The depression has been partly infilled by gravels, firstly by piedmont gravels coming off the hills formed around the basin and later by moraine and outwash associated with Pleistocene glaciers. Four main types of landform are represented on Balmoral - block mountain range, moraine, outwash and alluvial surfaces

These four broad landform types can be subdivided into 6 geomorphic units:

- (a) Old Man Range
- (b) Wolds Moraine
- (c) Balmoral Moraine

- (d) Balmoral Outwash
- (e) Mt John Outwash
- (f) Recent Alluvial Landforms

The boundaries and extent of these landforms are mapped on Map 1 - Landforms.

Block Mountain Range

- (a) *Old Man Range*

The Old Man Range is a well-defined, large, tilt block mountain range 8-9km in length rising to 1050m and upthrust along the south side of the Irishman Creek Fault. The range is divided into two by the downcutting of Irishman Creek.

The range comprises thick layers of old weathered gravels, thought to have been laid down on a basin floor in Pliocene times. These original Pliocene gravels form the surface geology over most of the east block and the eastern end of the west block. However ice from the Wolds and Balmoral ice advances rode over the east and west ends of the range and deposited a veneer of till to form moraine. There is a subtle difference in topography between the two landforms. Areas underlain by gravels have smoother more undulating topography and a large plateau surface in the eastern block, whereas the moraine has more uneven rolling topography.

The range has high steep scarps facing northwest, north and northeast. These scarps have been re-shaped by ice into planar surfaces, which probably include lateral moraine remnants. Slumping has occurred on sections of some of the scarps, giving an upper slope concavity and a broadly convex, hummocky landform over the mid and lower slope. The origins of the distinctive boulderfields associated with the north-facing scarp on both blocks are unclear, though they are probably glacially derived.

This range landform is unique in this part of the Basin. The Range is a distinctive and prominent landform rising above the relatively flat and open Basin floor. The eastern block is a good example of a tilt block, which is able to be very easily seen from SH8 and the Braemar Road. The boulderfields are visually striking and curious features, as yet unexplained in origin.

Moraines

- (b) *Wolds Moraine*

The Wolds moraine consists of till from the oldest (Wolds) glacial advance. It is found on the SE slopes of the eastern block of the Old Man Range. It has a north-south orientation and comprises two main ridges that descend southwards from high points of 875 and 820m asl. A wide shallow stream valley separates the moraine from the Old Man Range to the west, and a large basin containing wetlands and two ephemeral tarns separate the two landforms to the north.

This area is considered to be the best example of the oldest glacial deposit (Wolds) in the Mackenzie basin and represents 20-25% of the total area of moraine from that ice advance. The tarns are among the southernmost tarns in moraine between Tekapo and Pukaki.

(c) *Balmoral Moraine*

There are four different areas of moraine from the Balmoral ice advance (a later glacial event than the Wolds) that are located on the property:

- (i) Along the western margin of the property is an area of rolling to hummocky “knob-and-kettle” moraine with erratics² strewn over the surface. Along its eastern edge is a major moraine ridge. A kame terrace exists in the southern half of the area, and extends beyond the property.
- (ii) East of this area is a large block of more subdued rolling moraine with few erratics. This area is probably older with greater weathering. It generally slopes northwest to southeast and merges with the adjacent flat floodplain of Irishman Creek. Several small drainage channels regularly spaced along the eastern margin drain eastwards into Irishman Creek. An old terrace of Balmoral age around 300-400m wide forms the eastern margin. In the very northern part of this area is a large ephemeral tarn, Swan Lagoon.
- (iii) An area of very subdued undulating moraine to the north of the Old Man Range (east block). It extends east to the Fork Stream, which has formed a high scarp along the eastern margin.
- (iv) East of the Old Man Range, and south of the Mackenzie Golf Course is a small area of moraine. It has a smooth but strongly rolling topography, several small ephemeral tarns and no erratics. It merges with the adjacent outwash surfaces in the south.

Separating the first two areas of moraine ((i) and (ii)) is a distinctive, wide, shallow, flat-floored valley comprising outwash gravels of Balmoral age. It runs north-south from the Braemar Road to the Old Man Range where it turns abruptly east to flow down into Irishman Creek.

Outwash

(d) *Balmoral Outwash*

There are two areas of Balmoral outwash:

- (i) An area of gently sloping plain on the true left of,² and slightly elevated above, the modern floodplain of Irishman Creek. A small north-south drainage channel separates this area of outwash from an area of Balmoral moraine to the east (described in 2 (iii) above)
- (ii) The large outwash plain east of SH8 and the Wolds moraine. A scarp separates it clearly from the Wolds moraine. Topography is gently undulating and slopes evenly north-south from around 800m asl to 720m asl at the south boundary. Fluvio-glacial action associated with the more recent Mt John advance has cut a high, steep, continuous scarp to form the eastern margin of this area, almost 2km long.

(e) *Mt John Outwash Surface*

This small triangular shaped area is comprised of outwash gravels from the Mt John advance. It lies between the Balmoral outwash surface and Fork Stream, and is part of the much larger outwash areas east of Fork Stream and the Tekapo river. It appears very flat with the characteristic sinuous mound and swale pattern attributable to wind deflation and

² An erratic is a boulder transported by ice and dumped as the ice retreats. They occur as isolated individuals and in groups, and are very variable in size.

surface drainage in braided channels. The whole surface slopes evenly to the south and is around 700-720m asl.

Recent Alluvial Landforms

These include:

- (i) The Irishman Creek floodplain. Upstream of the Gorge is a wide flat recent gravel floodplain with one main channel and several smaller channels. The Creek flows more swiftly where it cuts through the Old Man Range.
- (ii) The Old Man Range Wetland – This wetland is about 4kms long and 200-300m wide, lying in a depression on the NW margins of the Old Man Range. Its small, slow-moving and meandering stream appears to have its origins in the north, where Fork Stream exits from its mountain valley. It eventually joins with Irishman Creek in a large tussock wetland just above the Irishman Creek Gorge. It has a low steep scarp to the north, but its southern side is less well-defined. There is a distinctive circular boulderfield at the head of the wetland.
- (iii) Fork Stream – Two small portions of the Fork Stream floodplain adjacent to the NE side of the Old Man Range and south of the golf course. The stream is deeply incised into outwash gravels in the south, and has large terrace risers.

2.2 Landscape

2.2.2 Landscape context

Balmoral is situated in the north-central part of the Mackenzie Basin, one of the most extensive outstanding natural landscapes in the Canterbury Region. It is also “one of the most investigated, painted, written about, visited, eulogised and argued over landscapes in New Zealand” (BMP and LA 1993¹)

This 1993 study and a 1992 study by Boffa Miskell Partners² on landscape change in the Mackenzie Basin assessed the its landscape values (primarily visual values) and identified a range of key attributes to support its outstanding status making particular note of the variety, the huge scale and clear expression of landforms as well as the basin’s visual character particularly its openness, vastness, and strong horizontal emphasis. Other distinctive characteristics were general absence of trees, overwhelming dominance of landform, high apparent naturalness, tussockland character, and overall unity, simplicity and coherence of the landscape. Other attributes described in the study include the way the Basin is so clearly recognisable as a large basin, due to the strongly defined enclosing ranges, and the ability to see right across the basin floor, particularly in clear light conditions. The absence of features across the plains gives the impression of vast open space and distance.

Most of the Basin is seen as a highly “natural” landscape. From an ecological perspective, much of it is in fact considerably modified, with hieracium 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 which still retains 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 is able to be viewed from the highway, along with views

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

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

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 Mackenzie and Hakataramea Pass and the Braemar road which forms the northern property boundary. The Basin is also moderately to highly vulnerable to visual change through development particularly forestry and cultivation.

Significance of the Balmoral Landscape in the Mackenzie Basin

The Balmoral landscape occupies a prominent position, and is an integral and important part of the Mackenzie Basin landscape. It contributes significantly to the wider qualities of the Basin.

The most significant part is the Old Man Range, which is a distinctive and unique feature in this part of the Basin. Its isolated form rises above the moraines and outwash of the Basin floor, and its proximity to SH8 gives it a high visual value. It is an important landmark in the Basin, and it imparts a strong local “sense of place”, especially in association with the Tekapo Military Camp. The range appears as a natural entity with virtually no visible cultural modification, except for some exotic trees which are being removed.

Irishman Creek gorge is a visually striking feature which bisects the range. When travelling through the Basin on SH8, a shifting vista of alpine peaks is visible through the gorge, including Aoraki.

The range is the visual watershed between the outwash plain in the south and east, and the moraine to the west and north (BMP 1992).

Nearly all of Balmoral is comprised of glacial and fluvio-glacial landforms. The different aged moraines come from a number of glacial advances. The most graphic example is the band of moraine and kame terrace along the western margin of the property.

Parts of the property form the SH8 road corridor and some are also clearly visible from sections of the Tekapo-Pukaki Canal Road (Tekapo-Pukaki C road). The Old Man Range often forms a prominent skyline or intermediate horizon landform and is a natural visual focus. Balmoral Station comprises all the landscape south of Braemar road, which provides a “remote, back-country” experience in the Basin. Visual significance is examined in more detail in Section 5.

Balmoral also contains some hidden surprises, such as the curious boulderfields, the elongated wetland at the base of the north scarp of the Old Man Range, the red tussock wetland and the tarn on the southeast side of the Range.

2.2.3 Landscape Description

2.2.3.1 Regional and District Level Landscapes

Balmoral can be divided into two landscape compartments, the Old Man Range being a visual watershed between the two.

The *Mackenzie Landscape Compartment* (SE of the Range) is an expansive and imposing basin, dominated by a large fluvio-glacial outwash plain bisected by the Tekapo river. It is dominated by degraded short tussock grassland, although shelter belts are changing this in places. Homesteads are few and far between.

The moraines north and west of the Old Man Range are part of the large *Tekapo Downs Landscape Compartment*, which is dominated by rolling to hummocky moraines. Short and

red tussock grassland dominates this landscape, and there is a marked absence of development here.

2.2.3.1.2 Land Types

Most of the property is within Lynn's *Glacial and Fluvial Basin Floor Land Type*, (H3) which is composed of glacial and fluvio-glacial landforms. The most eastern part of Balmoral is part of the *Basin Floor Outwash Plains Land Type*, (H4) which is dominated fluvio-glacial outwash plains, terraces, piedmont fans and floodplains. These land type boundaries broadly coincide with Ecological District boundaries.

2.2.3.2 Property Level Landscape Description

The property was divided into 13 landscape units (Map 2 – landscape), which are briefly summarised below.

1. Old Man Range

This hill range runs southwest-northeast and rises to 1050m asl. It is subdivided into two parts by the u-shaped gorge of Irishman Creek. Degraded fescue tussock and red tussock are the dominant vegetation types, though shrubland is dominant on some of the scarp faces. The red tussock was formerly more extensive but is now restricted to remnant patches. The range is extensively grazed and is very natural in appearance with wire stock fences and a few 4WD tracks being the only visible human modifications.

2. Wolds Moraine

This is a large area of gently to strongly rolling old moraine from the Wolds advance between SH8 and the Old Man Range. It includes a shallow valley and basin which contains two tarns and a red tussock wetland. Degraded Fescue tussock grassland is the dominant vegetation type, with remnant red tussock in smaller patches. Golden Spaniard is locally prominent, its colour contrasting with the pale grey-brown of the grassland. Matagouri and Olearia shrubs are also present. The area has a high degree of naturalness and intactness, with the highway being the only significant cultural intrusion.

3. Balmoral Moraine

This area of moraine lies north of the western block of the Old Man Range and west of the Irishman Creek floodplain. The moraine contains several small wetlands and the large ephemeral tarn of Swan Lagoon adjacent to Braemar road. The vegetation is dominated by degraded Fescue tussock grassland. Numerous 4WD tracks cross the area, as it has used for Army exercises in the past. The area generally retains a high degree of naturalness and intactness. Consent to plant Douglas Fir and pine forest has been granted for most of this area, and planting has begun.

4. Mary Burn Moraine

This band of moraine runs north-south along the western margin of the property. Moraine is the main topographical element but drumlins and a kame terrace are also present. Glacial rocks (erratics) are extensive. Vegetation is dominated by degraded Fescue tussock grassland, with red tussock only occurring as remnant patches in moist areas. The area retains a high degree of naturalness and intactness, with one wire stock fence and a barely discernible 4WD track being the only cultural features.

5. Inter-Moraine Valley

This clearly defined, shallow valley separates the Balmoral and Mary Burn moraines. It narrows to the south, and turns abruptly eastward at the Old Man Range where it becomes much deeper and narrower. This portion contains linear boulderfields. Vegetation cover is dominated by grassland with some Fescue tussock. The valley floor is well vegetated in contrast to other floodplains. Naturalness and intactness are high, despite the exotic grasses.

6. *Irishman Creek Floodplain*

This wide floodplain of recent alluvium runs north-south and contains one main channel and several smaller ones meandering in narrow gravel beds. Old channels appear as sinuous patterns over the surface. Vegetation includes successional plants typical of floodplains, with some fescue tussock, red tussock and wetland plants in damper areas, especially in the south. The floodplain is highly natural and intact in appearance, as there are only a few stock fences present.

7. *Irishman Creek Gorge*

This short but deep u-shaped gorge bisects the Old Man Range. Several narrow terraces are present representing former outwash and recent alluvium, and there is a large slip on the true right. The creek is overhung with *Schoenus* tussocks, while the floodplain is sparsely vegetated with Fescue tussock and successional riverbed plants. There are dense patches of grey scrub on the terraces. The area is highly natural and intact with little evidence of modification.

8. *Old Man Range Wetland*

This elongated wetland is contained in a narrow valley between the Old Man Range and adjacent outwash and moraines to the north. It includes a gently meandering, slow moving stream and several ponds. Boulderfields occur along the base of the Old Man Range, and at the head of the wetland adjacent to Braemar Road. Wetland vegetation is dominated by sedges and scattered red tussock. This wetland has a high degree of naturalness, apart from the cultivated paddocks adjacent to its upper reaches. A fence running through the wetland, a pumphouse by Braemar Road are the only obvious cultural modifications.

9. *Fork Stream Valley*

This comprises the upper section and a portion below the Golf Course and SH8. The upper section includes open gravel floodplain and a clear stream in a well-defined winding channel, with several braids. Channel is lined with Fescue tussocks, *Schoenus*, matagouri and several willows. Gravel extraction has occurred here in the past, and a wetland here has partly been developed into deer paddocks. A shingle road runs up the floodplain, a power line also crosses it.

Downstream, the Mt John outwash has been downcut forming a steep-sided, terraced valley with a flat boulder floor. Vegetation cover is sparse with sweet briar, hieracium and *Raoulia*, porcupine shrub and matagouri being widespread. Willows are dotted along the stream and there are numerous wilding pines. While the valley has a natural appearance and well-defined landforms, exotic trees and other plants are obvious and the valley lacks any special qualities.

10. *Mt John Outwash Surface*

This is an area of outwash gravels forming a simple undulating plain. It is typical of the distinctive Mackenzie Basin outwash surfaces, with its degraded cover fescue tussock grassland and characteristic braided surface. A fence cuts across the top end, and extensive tree planting trials detract from its natural form.

11. *Balmoral Outwash*

This is an area of subdued moraine and outwash plain below the Military Camp and the Golf Course. The older higher surface is separated from lower younger outwash surface by a steep scarp. The area has largely been developed into large cultivated paddocks and pine coniferous plantations. Little of the original fescue tussock grassland remains except for a small area northwest of SH8.

12. *Golf Course Moraine*

This is a small area of rolling moraine adjacent to Fork Stream below the Golf Course. There are several turfy ephemeral tarns. The vegetation is dominated by degraded fescue tussock grassland, which appears to have been OSTD. Some wilding pines and sweet briar are also present. The presence of exotics is obvious and the area is surrounded by a modified landscape. It lacks any distinctive or special character.

13. *Braemar Road Paddocks*

This is an area of very subdued undulating moraine and outwash plain north-west of the Old Man Range and wetland. The homestead is located in this area. Most of the area is divided into paddocks lined with evergreen shelterbelts. A large ephemeral tarn is present in one of the paddocks next to Braemar Road. The area is highly modified and of little natural landscape value.

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.

Much of the *Balmoral* landscape is of moderate to high visual quality, as indicated in the landscape unit descriptions. This reflects the high degree of apparent naturalness and

intactness, high legibility of landforms, and the particularly high inherent visual qualities of some areas.

The eastern part of the Old Man Range

The eastern part of the Old Man Range, and its central tussock basin, is the main area of significant inherent visual value.

The broad rounded summit and expansive plateau area are impressive for their large scale, uniformity and simplicity. The smooth surface contrasts with distant rugged ranges and the adjacent erratic-strewn moraines, accentuated by the subtle interplay of light and shade. It has a highly natural appearance and no significant intrusive cultural elements. The large central basin has a high degree of naturalness and intactness despite the presence of fences, exotic trees and the Military Camp. Topographical subtleties are again highlighted by interplay of shade and light. There is a degree of coherence with red tussock in the basin floor and depressions, and grey scrub in gullies and on fans.

The north scarp of the range is equally striking as it rears abruptly from the basin floor. It has a high degree of naturalness and intactness with extensive areas of mixed "grey scrub", often associated with very old lichen-covered talus, forming a striking visual image.

The remainder of Balmoral

On the remainder of the property, there are several natural landscape elements that are interesting and unusual visual features or are good examples of their type:

- (i) The boulderfields are intriguing and unusual features. They include sinuous linear examples adjacent to the north side of the Old Man Range, and a rounded one next to the Braemar Road at the head of the Old Man Range wetland.
- (ii) There are several tarns on the property. They include those on the Old Man Range, Swan Lagoon on moraine next to the Braemar road and several others scattered across moraines.
- (iii) The Old Man Range wetland and its meandering stream are natural looking and intact, but lack visual distinctiveness. The wetland is however, visually impressive for its size and continuity, and it forms distinctive images such as where it contrasts with adjoining boulderfields and shrublands.
- (iv) The inter-moraine valley is distinctive with its grassy floor and sharp western scarp.
- (v) The scarps formed by Fork Stream cutting into outwash surfaces are large, well developed, visually striking natural landforms typical of terrace scarps in the Basin.

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 generally visible from public viewpoints except for some moraines and valleys in the north-west and adjacent to the Old Man Range, some basins, and outwash surfaces next to Fork Stream.

2.2.4.2.1 Views from SH8

The Old Man Range is the most visually prominent part of the lease. Distant views can be seen from parts of SH8 as far away as Lake Pukaki and Whiskey Cutting, and from roads on

the east side of the Basin. In these views, the Old Man Range is one of the middle distance “layers” set against the distant mountains of the Ben Ohau Range.

Many middle distance views are seen from SH8 between Simons Pass and the Tekapo Military Camp. Travelling north, the views of the Range from SH8 become more impressive from the junction with Tekapo-Pukaki Canal road. The range appears as a distinct landform entity, and Irishman Creek Gorge attracts visual attention with its framing of peaks to the north.

The most impressive view of the Range is gained where SH8 crosses the Tekapo-Pukaki Canal, where it is slightly elevated. In this distinctive view, the Old Man Range is visually integral with the rolling moraine and outwash on neighbouring Irishman Creek Station, and the whole forms a large natural landscape.

Further north on the highway, the range forms a gently undulating skyline, contrasting with the rugged forms of other ranges in the Basin. The drifts of golden-orange spaniard are a distinctive feature of this view.

Travelling south, the high steep scarp on the north-east side of the Range is a clear skyline element in direct view from SH8 between Tekapo and the Military Camp. The long terrace scarp above Fork Stream is also clearly visible from here. This is one of the classic views in the Basin - across an expanse of flat outwash plain to the distant ranges on the east side of the Basin, contributing to the impression of vast space and flatness.

2.2.4.2.2 Views from SH80 (Pukaki to Mt Cook)

These views are not particularly significant, as the western moraines are hard to distinguish from the wider moraine landscape, and the Old Man Range is a low bulge on the horizon.

2.2.4.2.3 Views from the Tekapo-Pukaki Canal Road

The south side of the Old Man Range is also visible from parts of the Tekapo-Pukaki Canal road. The views are similar to those from SH8 but slightly more elevated, including the spectacular view through the Irishman Creek Gorge.

2.2.4.2.4 Views from the Braemar Road

Extensive views of the landscape between the Old Man Range and Braemar Road are visible from the Braemar Road. The northeast scarp of the Old Man Range is seen in detail as the road passes along its base. Around the corner, there are clear views of the steep northwest scarp of the Range, with its “grey scrub” and the two slumps. The Range forms the skyline in views to the south, and there is a long distance view to the Irishman Creek Gorge. Swan Lagoon, a permanent tarn, is a significant landscape feature very close to the road. The inter-moraine valley is a notable feature extending through the moraine to the Old Man Range. The circular boulder field at the head of the Old Man Range wetland is an unusual visual feature next to the road.

2.2.4.2.5 Aerial Perspective

Scenic aerial flights add another dimension to the visual perception of the property and its wider landscape context. The coherence and legibility of the landscape between the Ben Ohau Range and the Two Thumb Range are high on a broad scale.

2.3 Climate

The Mackenzie Basin has a continental like climate with hot summers and cold winters annual, diurnal 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. 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.

2.4 Vegetation

The predominant vegetation over most of the property is degraded short tussock grassland with much hawkweed (*Hieracium pilosella* and *H. praealtum*). Pockets of shrubland occur on terrace risers and scarp faces, particularly on screes or gravel slopes. Red tussock occurs along water courses or hollows near Irishman Creek, Old Man Range wetland, amongst moraine hollows and in a broad basin south of the Old Man Range crest. At the foot of the Old Man Range scarp is an elongated wetland, connected to further wetlands along the floodplain of Irishman Creek

The fertile flats to the north of the Old Man Range and to the east of State Highway 8 have been largely developed to produce exotic pasture with shelter belts and occasional tree plantations. In more detail the vegetation consists of:

1. South-eastern flats (east of State Highway 8)

Much of these flats, which occupy at least three terrace levels, have been developed into exotic pasture, with some exotic tree plantations. There is a small damp hollow in the south, that supports a cover of fescue tussock (*Festuca novae-zelandiae*), sedges and low matagouri (*Discaria toumatou*). Between it and the highway is rough pasture with fescue tussock, various native shrubs and golden spaniard (*Aciphylla aurea*). More extensive and better quality examples occur to the west of the highway.

Nearer the golf course, the land is more undulating and has a cover of exotic pasture, wilding pines, *Festuca* tussock and native shrubs (matagouri, porcupine shrub *Melicytus alpinus*, and common broom *Carmichaelia petriei*).

The lower terraces are stony and arid, and have a sparse cover dominated by hawkweeds, with small exotic and native plants. The community in the meanders represents pre-European grassland.

Fork Stream has a braided gravel floodplain. Exotic plants (willows, Russel lupin, pasture grasses and broom *Cytisus scoparius*) are prominent. Native plants include scattered *Raoulia australis* and *Epilobium melanocaulon*, and there are several small wetlands supporting native sedges in former channels and seeps. Sweet brier (*Rosa rubiginosa*) broom and wilding pines dominate shrublands on terrace risers. They have few native species.

2. Northern flats (between Fork Stream and Irishman Creek)

The flats are developed into exotic pasture, with shelterbelts of pine trees and are subdivided into a series of paddocks. Native plants only persist in a few damp or rocky places.

3. Southern Old Man Range (from the range crest south)

The crest of the range and much of the sloping hill country to the south is covered in a mosaic of degraded vegetation, particularly *Fescue* short tussock and red tussock grassland. This is largely induced from red tussock (*Chionochloa rubra*) which only remains as scattered remnants. There is considerable bare ground and abundant hawkweed (especially *Hieracium pilosella*). Other low vegetation is composed of exotic grasses (mainly browntop) and native plants such as *Leucopogon fraseri* and *Coprosma petriei*. Low matagouri shrubs are scattered throughout. Despite its degraded nature, this grassland retains a high diversity of native species.

Within the basin, red tussock grassland is more continuous and narrow-leaved snow tussock (*Chionochloa rigida*) occurs sporadically. There are extensive shrublands in places, dominated by matagouri where drier and by *Olearia bullata*, tauhinu *Ozothamnus leptophyllus*, *Hebe odora* and *Coprosma intertexta* on damp ground. There are small wetlands supporting large sedges (*Schoenus pauciflorus*, *Carex coriacea* and *C. sinclairii*), swamp speargrass (*Aciphylla subflabellata*) and comb sedge (*Oreobolus pectinatus*).

Two ephemeral tarns are found in the basin, each with low turf vegetation. The dominant plants in the turf are tiny natives: *Galium perpusillum*, *Crassula sinclairii*, *Limosella lineata*, *Leptinella maniototo*, *Pratia perpusilla*, *Epilobium angustum* and small sedges. It is possible that the threatened endemic lily *Iphigenia novae-zelandiae* may be present. Above the turf is a fringe of moss mounds, red tussock, silver tussock (*Poa cita*) and the exotic *Juncus effusus*.

On gentle slopes south of the tarns, there is a mosaic of *Fescue* tussock, some red tussock, shrubs, exotic grasses and hawkweed. The native vegetation is in better condition here, and it is more shrubby with matagouri and native brooms (common broom *Carmichaelia petriei*, coral broom *C. crassicaule* and the threatened dwarf broom *C. vexillata*). Golden spaniard is abundant, and red tussock is healthy and producing progeny. Scattered wilding pines are being removed.

4. Fork Stream scarp

The vegetation on this east-facing steep face is mostly sparse exotic grasses, hawkweed, scattered *Fescue* tussock and shrublands associated with drainage lines. Matagouri, sweet brier and porcupine shrub are dominant, along with *Coprosma intertexta*, *C. propinqua*, common broom, *Muehlenbeckia complexa* and bracken. There are small areas of red tussock at the top.

5. Old Man Range scarp

Substantial shrublands on the scarp are associated with screes and boulderfields. Matagouri, porcupine shrub and *Coprosma propinqua* are widespread, together with shrub daisy (*Olearia odorata*) *Coprosma intertexta* and common broom. Prostrate kowhai and korokio (*Corokia cotoneaster*) is present in the shrubland behind the homestead, with sweet brier, silver tussock, native bluegrass (*Elymus solandri*) and speargrass.

Elsewhere, there is a sparse cover of *Fescue* tussock, hawkweed, exotic grasses and small native plants such as *Leucopogon fraseri*, *Coprosma petriei*, *Raoulia* spp., *Pimelea* spp. and occasional *Carmichaelia vexillata*. The rocks of the screes and boulderfields support a considerable diversity of lichens.

6. Old Man Range Wetland and Irishman Creek

At the very head of Old Man Range wetland, alongside Braemar Road, is an ancient boulderfield about 2ha in area. There are many lichens and small mosses on the boulders, and a fringe of low matagouri shrubland. Some of the lichens are rare (Molloy et al, Botany Division DSIR report, 1976).

The Old Man Range wetland is relatively intact, despite headwater drains. It contains habitats including quaking bogs, cushion herbfields, standing water, tall sedgelands and tussock grasslands. Dominant plants are *Carex sinclairii*, *C. coriacea* and *Schoenus pauciflorus*, with lesser amounts of *Carex secta*, *C. buchananii*, and the exotic rushes *Juncus effusus* and *J. articulatus*. There are mounds *Sphagnum* and other mosses, and among cushion herbfields of comb sedge there are small native herbs such as the buttercups *Ranunculus gracilipes* and *R. cheesemanii*, sundew (*Drosera arcturi*) and *Euchiton mackayi*. Red tussock is scattered through the wetland, and silver tussock and swamp speargrass are present on the margins. The threatened *Galium "Clutha"* occurs in a few drier microsites on the wetland margins.

The Old Man Range wetland merges with the Irishman Creek wetland. The Irishman Creek wetland includes a braided gravel floodplain with dry and wet channels, bogs and ponds. Boggy channels and damp hollows support similar vegetation to that of the Old Man Range wetland. Matagouri and porcupine shrub grows on stream banks, and on gravel flats there are numerous lichens and at least five *Raoulia* species. Other native plants include *Muehlenbeckia axillaris*, *Epilobium melanocaulon*, *Acaena inermis*, *Pimelea oreophila* and *Carmichaelia vexillata*.

There are flights of dry terraces where Irishman Creek cuts through the Old Man Range. Most of the floodplain supports *Fescue* tussock, silver tussock and browntop, with occasional shrubs (including coral broom) and swamp speargrass. Patches of shrubland contain matagouri, porcupine bush, *Coprosma intertexta*, *C. propinqua*, common broom and sweet brier. Seeps are dominated by *Carex coriacea*, *Schoenus pauciflorus* with *Carex buchananii*. In one small ephemeral wet hollow *Galium "Clutha"* was found in the turf. A small peculiar upwelling of highly mineralised water and mud was also found. It is probably associated with the fault line that runs along the Old Man Range scarp. The only vegetation in the upwelling appeared to be red and green algae.

7. Western moraine country

The vegetation is similar to that on the Old Man Range. There is a mosaic of extensive *Fescue* tussock interspersed with enclaves of red tussock and shrublands (matagouri, *Olearia odorata*, common broom, coral broom, tauhinu and *Dracophyllum uniflorum* associated with rocks and hollows). Golden spaniard and hawkweeds are common, along with bare ground. Other low vegetation is composed of exotic grasses (mainly browntop), *Leucopogon fraseri*, *Coprosma petriei*, *Carmichaelia vexillata*, *Pimelea oreophila*, *Pernettya nana*, *Celmisia angustifolia*, *C. lyallii* and *Raoulia* spp.

Swan Lagoon is an ephemeral tarn with well-zoned vegetation. On the muddy central flat there is a low turf of *Galium perpusillum*, *Limosella lineata* and *Crassula sinclairii*. This is surrounded by a fringe of short sedges such as *Isolepis aucklandica*, and higher up a zone of silver tussock and red tussock. The turf vegetation may contain the threatened endemic lily *Iphigenia novae-zelandiae*.

There are two elongated boulderfields in an old meltwater channel draining into Irishman Creek. They support diverse lichen and moss communities, and shrublands of matagouri, porcupine shrub and common broom.

There are several damp areas west of Irishman Creek. Exotic trees have recently been planted on this rolling land.

2.5 Fauna

2.5.1 Birds

A total of thirty-nine bird species have been recorded on Balmoral Station over the past twelve years including 8 endemic species and 15 native species (see Appendix 1). The secretive marsh crane and Australasian bittern are probably present as favorable habitat exists, and these native wetland birds are relatively common in the upper Waitaki Basin.

Important wetland habitats on the property are Irishman Creek, the Old Man Range Wetland, Fork Stream and two tarns amongst tussock grasslands south of the Old Man Range.

1. Irishman Creek

Irishman Creek is a moderately fast flowing stream with a gravelly bottom and several braids, and adjacent associated wetlands. This valuable habitat is rich in native biodiversity and part of the Tekapo River system. The Tekapo River is a Site of Special Wildlife Interest (SSWI), a Recommended Area for Protection (RAP) and a Site of Natural Significance (SONS) under the Draft Mackenzie District Plan]. Irishman Creek passes through red tussock/short tussock grassland, and native shrublands are present along stretches of the stream. It provides valuable feeding and breeding habitat for black-fronted tern (Category B species), banded dotterel (Category C), and a wide range of other wetland birds including paradise shelduck, black shag, Little shag and pied oystercatcher.

2. Old Man Range Wetland

The Old Man Range Wetland is rich in native biodiversity, and is a Wetland of Ecological and Representative Importance (WERI), a SSWI, and a RAP. A slow-flowing stream meanders through the wetland, and other components are red tussock/short tussock grassland and some areas of pastoral development. The stream flows into Irishman Creek. Black stilt have bred here in the past, and are likely to do so in the future. Other species known to use the wetland are black fronted tern, paradise shelduck, pied stilt and pied oystercatcher. Marsh crane and Australasian bittern may also be present.

3. Fork Stream

Fork Stream is a moderately fast flowing stream with a gravelly bottom and considerable areas of exposed gravels. This valuable stream, which is rich in native biodiversity, passes through pastoral and short tussock grassland. It is part of the Tekapo River system (a SSWI). Fork Stream provides valuable feeding and breeding habitat for black-fronted tern (Category B), banded dotterel (Category C), and a wide range of other wetland birds including paradise shelduck, pied stilt, Black shag, Little shag and Pied oystercatcher. Forks Stream wetland (a SSWI and RAP) is located on a braided part of the floodplain at the far north-eastern end of the property includes a swampy Carex river flat, and adjacent gravel beds. It provides feeding and breeding habitat for a number of waders and invertebrates.

4. Balmoral Tarns

These two ephemeral tarns are part of a red tussock/short tussock wetland complex that is a SSWI of outstanding importance (Mackenzie Golf Club tarns) and a RAP. They provide valuable feeding and breeding habitat for banded dotterel (Category C), black stilt (Category A) and a wide range of other wetland birds including Black billed gull, paradise shelduck,

wrybill (category B), pied stilt, grey teal and Australasian shoveler (see Appendix 1 for a further list).

2.5.2 Freshwater Fish

Data on freshwater fish in Forks Stream was accessed from the national freshwater fish database (NIWA). Several fish species have been found in the past within the numerous streams in and around Balmoral between 1979 and 2002, including alpine galaxias (*Galaxias paucispondylus*), Canterbury galaxias (*G. vulgaris*), upland bully (*Gobiomorphus breviceps*), common bully (*G. cotidianus*), longfin eel (*Anguilla dieffenbachii*) a fish in gradual decline, and two exotics brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*).

Irishman Creek has clear water that flows constantly over a gravelly substrate, its waters originating as springs and seepage's that drain the southern portion of the Gammack Range. The flow has an average width of around 4 meters and is about 600mm deep. The portion of Irishman Creek that runs through Balmoral has excellent in-stream values with runs, riffles and quiet backwaters. These features provide a variety of freshwater fish habitat, which is enhanced by indigenous riparian vegetation. The freshwater fish observed in this Creek are representative of high country waterways and include the Canterbury galaxiid (*Galaxias vulgaris*), common bully (*Gobiomorphus cotidianus*), and the upland bully (*Gobiomorphus breviceps*). Both rainbow and brown trout are also present.

2.5.3 Invertebrates

Specimens of snails, spiders, moths and butterflies, flies, bees and grasshoppers were collected on Balmoral focussing on the Old Man Range. A freshwater crustacean was provided to the Department of Conservation (DOC) for identification. A list of invertebrates collected and identified appears in Appendix 2.

The general pasture sweep amongst golden speargrass resulted in the collection of the blowfly *Calliphora quadrimaculata* (Calliphoridae) and specimens of flies belonging to the families; Tachinidae (parasitoid flies), Dolichopodidae (green legged flies), Chironomidae (midges), Tipulidae (craneflies), Calliphoridae (blowfly). Grasshoppers (Acrididae), weevils (Curculionidae) and aphids (Aphididae) were also collected.

Under stones on the lakeshore dwell the beetles (Carabidae), Weevils (Curculionidae) and true bugs (Hemiptera). Sweeping along the shoreline resulted in the collection of – houseflies (Muscidae), parasitoid flies (Tachinidae), blowflies (Calliphoridae), pasture flies (Ephydriidae), green legged flies (Dolichopodidae), dung flies (Sphaeroceridae) and one unidentified species of fly. One scarab beetle species was also collected.

Beside the dried out lake midges and parasitoid flies were collected by sweeping. Pan trapping resulted in native wasps (Ichneumonidae), scuttle flies (Phoridae), dance flies (Empididae), leafminers (Agromyzidae), parasitoid flies (Tachinidae), halictid bees (Halictidae), houseflies (Muscidae), blowflies (Calliphoridae), hover flies (Syrphidae), gall midges (Cecidomyiidae), fungus gnats (Sciaridae) as well as three unidentified fly species and the flea-beetle (Chrysomelidae) species.

Sweeping red tussock resulted in several fly species (midges, blowflies, parasitoid flies, fruit flies, hoverflies, pasture flies). Boulders in the middle of the red tussock stand harbour flies parasitoid flies (Tachinidae), houseflies (Muscidae), blowflies (Calliphoridae), hoverflies (Syrphidae), native wasps, ants, ichneumonid wasps, hunting wasps (Formicidae, Ichneumonidae, Pompilidae) and the beetle family Carabidae.

Along the north face of Old Man Range beating *Coprosma propinqua* resulted in True Bug (Hemiptera), Weevil (Curculionidae) and Beetle (Coleoptera) species. General sweeping resulted in flies parasitoid flies Tachinidae, houseflies Muscidae, blowflies (Calliphoridae), hoverflies (Syrphidae) fungus gnats (Mycetophilidae), craneflies (Tipulidae), looper moths (Geometridae), scarab beetles (Scarabaeidae) and native wasps (Ichneumonidae). One species of Forficulidae from the beetle family of earwigs (Dermaptera) was found underneath stones. Geckos and skinks are abundant in the environment composed of rocks and dense scrub patches.

Ponds of the Old Man Range Wetland are inhabited by water beetles from the Dytiscidae family (diving beetles) - *Rhantus pulverosus*, *Antiporus strigosulus*, *Liodessus plicatus* and *Limnoxenus zealandicus* (Hydrophilidae or scavenging water beetles). Other insects associated with aquatic environments included *Anisops wakefieldi* (Notonectidae or backswimmers) and a waterboatman *Sigara* sp. (Corixidae). Found above the pond surface were several houseflies (Muscidae) and green-legged flies (Dolichopodidae).

2.6 Public Recreation

2.6.1 Physical characteristics

Balmoral is a flat to gently rolling landscape, easily accessible by foot from State Highway 8 and the Braemar Road. According to the FMC guidelines Balmoral 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.

According to DOC’s recreation opportunity descriptors Balmoral has the primary characteristics of a back-country environment – primarily “4 x 4 drive in”. 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.

2.6.2 Legal Access

Balmoral is accessible on three sides by legal formed roads – SH 8 (Tekapo-Twizel Road) bisects the property in the south-east, and the Braemar Road forms the boundary in the north-east and north, although along half of this northern boundary it does not follow the legal road.

2.6.3 Activities

The Old Man Range has been used in the past for tramping, mountain biking and horse riding and has considerable potential for increased use. The views are really superb from the top of the Range. There is also potential for walking, botanical interest, photography, painting and just enjoying the view from the top.

The tarn area is interesting recreationally for botanical studies, photography, painting, walking and picnicking. With access links to the top of the range tramping and mountain biking would be a popular additional activity.

With regard to the block of country west of Irishman Creek, which is being developed for forestry there is some future recreation potential once the forest has grown, such as ski touring around forestry tracks, possible orienteering, mountain bike riding and horse riding.

The geological aspect is quite interesting with rock outcrops and boulders left by the glaciers along the crest of the ridges.

PART 3 OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

An Early warning NGO 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 for provision of access to any reserves created and for access up the Forks River – as long as permission is first gained from the Army to check whether there is any live firing happening. Forest and Bird talked about the fact that there were red tussocklands on Balmoral which should have been preserved a long time ago and that wetlands should be looked at, as well as making note of a gentian that needs to be looked at, which seems to be a local species.

Since the NGO meeting Federated Mountain Clubs have prepared a 9-page submission on Balmoral recommending areas for protection and public access (Dennis, 2002). The key outcomes they seek are summarised as:

- Restoration to full crown ownership and control of the major part of the Old Man Range and areas to the south along with the Old Man Range Wetland and (depending on its current status) (the area north of the Braemar Road between Irishman Creek and the Mary Burn;) — where?
- Year round public foot access to the Old Man Range from the points identified as (a) the bridge over Fork Stream on the Braemar Road, (b) From SH 8 around the southern and western boundary of the Tekapo Military Camp; and (c) From the Braemar Road via Irishman Creek marginal strips as well as public access through the Old Man Range Wetland, and along the margins of Irishman Creek and Fork Stream. Foot and mountain bike access along the Mary Burn north of the Braemar Road.
- The removal of the recent plantation of Douglas fir near the western boundary of the lease or at the very least a landscape covenant over this area to ensure there is no wilding spread from this plantation. Adequate conditions to ensure control of wilding spread from other exotic conifers on the property.

Also since the NGO 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 and that legal motorised access be provided up the Forks Stream.

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 Balmoral they requested that access on marginal strips be aside up all creeks and to protect wetland areas. ,

3.3 District Plans

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

Under this plan Balmoral is zoned Rural. The plan identifies a geopreservation site (G14) and three sites of natural significance on its maps and schedules on Balmoral pastoral lease – site 34 which is divided into two parts, site 31 and site 35. The Geopreservation site G14 is described as Braemar Road Rock Glacier – “Classified as extremely well defined landforms of scientific/educational value”. Site 34 is described in the appendix as Old Man Range – and is listed as including the RAPs of Old Man Range swampland (Tekapo 10), Tekapo Military Camp Tussock (Tekapo 11) and a WERI site Old Man Range wetland. The Site 34 as mapped is smaller than the original RAPs and the extended RAPs which were recommended by FRI (see comment below on this). Site 31 is the Forks Wetland, a RAP (Tekapo 13), a SSWI and a WERI. Site 35 Balmoral boulder field is RAP Tekapo 12, Balmoral Relic boulder field and may be the same as what is described as Geopreservation site 14 even though they have been mapped in two different locations.

The District Plan contains a number of rules that apply to sites of natural significance, riparian areas⁴ and high altitude areas (areas above 900m). These are detailed in Appendix 4.

3.4 Conservation Management Strategies

Balmoral 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

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

of Category A and B species, including predator control, fencing and habitat protection. The species listed as priority include black stilt, wrybill, black-fronted tern and banded dotterel.

PART 4
MAPS ETC.

4.1 Additional Information

Appendix 1 Bird species present on the Balmoral Leasehold property

Endemic species

Kaki	<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>
New Zealand falcon	<i>Falco novaeseelandiae</i>
Wrybill	<i>Anarhynchus frontalis</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 Supercilliosa</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>

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	<i>Carduelis chloris</i>
Redpoll	<i>Carduelis flammea</i>
Yellow hammer	<i>Emberiza citrinella</i>

Skylark	<i>Alauda arvensis</i>
White backed magpie	<i>Gymnorhina tibicen hypoleuca</i>
Mallard duck	<i>Anas platyrhynchos</i>
Rock Pigeon	<i>Columba livia</i>
Black swan	<i>Cygnus atratus</i>
Canada goose	<i>Branta canadensis</i>

Appendix 2: List of insect families found on Balmoral Station and identified for this report

		Order					
	Diptera	Coleoptera	Hemiptera	Hymenoptera	Lepidoptera	Dermaptera	
	Agromyzidae	Carabidae	Aphididae	Formicidae	Geometridae	Forficulidae	
	Caliphoridae	Chrysomelidae	Corixidae	Halictidae			
		Alticini	<i>Sigara</i> sp.				
	Caliphoridae	Curculionidae	Notonectidae	Ichneumonidae			
	<i>Calliphora quadrimaculata</i>		<i>Anisops wakefieldi</i>				
	Cecidomyiidae	Dytiscidae	Saldidae	Pompilidae			
		<i>Antiporus strigosulus</i>					
	Chironomidae	Dytiscidae					
		<i>Liodessus plicatus</i>					
	Dolichopodidae	Dytiscidae					
		<i>Rhantus pulverosus</i>					
Family	Empididae	Hydrophilidae					
	Empidinae	<i>Limnoxenus zealandicus</i>					
	Ephydriidae	Scarabaeidae					
	Muscidae						
	Mycetophilidae						
	Phoridae						
	Sciaridae						
	Sphaeroceridae						
	Syrphidae						
	Tachinidae						
	Tephritidae						
	Tipulidae						

Appendix 3: District Plan Rules

For sites of natural significance, riparian areas⁴ and high altitude areas (areas above 900m) the District Plan contains a number of rules:

- Clearance of indigenous vegetation exceeding 100m² per hectare in any continuous period of 5 years in sites of natural significance and in high altitude areas is a Discretionary Activity, except for the clearance of declared weed pests and for the purpose of track maintenance. An exemption for protective mechanisms under statute also applies (see below);
- Clearance of more than 10% of the total area of indigenous vegetation cover present on any site of natural significance is a Non-complying Activity;

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

- Clearance of vegetation exceeding 100m² per hectare in any continuous period of 5 years within the riparian margins is a Discretionary Activity, except for the clearance of declared weed pests or for the purpose of track or habitat maintenance. An exemption for protective mechanisms under statute also applies (see below);
- Earthworks in sites of natural significance, geopreservation areas or high altitude areas exceeding 20m³ (volume) or 50m² (area) per hectare in any continuous period of 5 years is a Discretionary Activity, except for the purpose of track maintenance. An exemption for protective mechanisms under statute also applies (see below);
- Earthworks on any land in a lake, river or wetland or within the riparian margins exceeding 20m³ (volume) or 50m² (area) per hectare in any continuous period of 5 years is a Discretionary Activity, except for the purpose of track maintenance. An exemption for protective mechanisms under statute also applies (see below);
- Pastoral intensification exceeding 5% of any site of natural significance is a Non-complying Activity. An exemption for protective mechanisms under statute applies (see below);
- Forestry within 100m of a lake, 20m of a bank of a river or 50m of a wetland is a Restricted Discretionary Activity. An exemption for protective mechanisms under statute applies (see below);
- Tree planting in high altitude areas is a Discretionary Activity. Forestry in wetlands and tree planting (other than restoration of native plantings) in sites of natural significance is a Non-complying Activity. An exemption for protective mechanisms under statute applies (see below);

The exemption for protective mechanisms under statute states the standard shall not apply to the activity if it is provided for in any one of the following mechanisms:

- Section 76 Reserves Act 1977 Declaration;
- Section 77 Reserves Act 1977 Conservation Covenant;
- Section 27 Conservation Act 1987 Covenant;
- Section 29 Conservation Act 1987 Management Agreement;
- Queen Elizabeth II National Trust Act 1977 Covenant (this statute does not apply to an exemption for pastoral intensification)

Provided that such mechanism:

- Protects the significant natural values, and
- Remains current for the duration of the activity, and
- The terms of the mechanism have not been breached, and
- Has been lodged with the Council.

4.2 Illustrative Maps

4.2.1 Topo/Cadastral

4.2.2 Values