

Balmoral Station
Integrated Farm Management Plan
July 2020 – June 2025



Balmoral Station Ltd.
Lake Tekapo

Updated 18 August 2020

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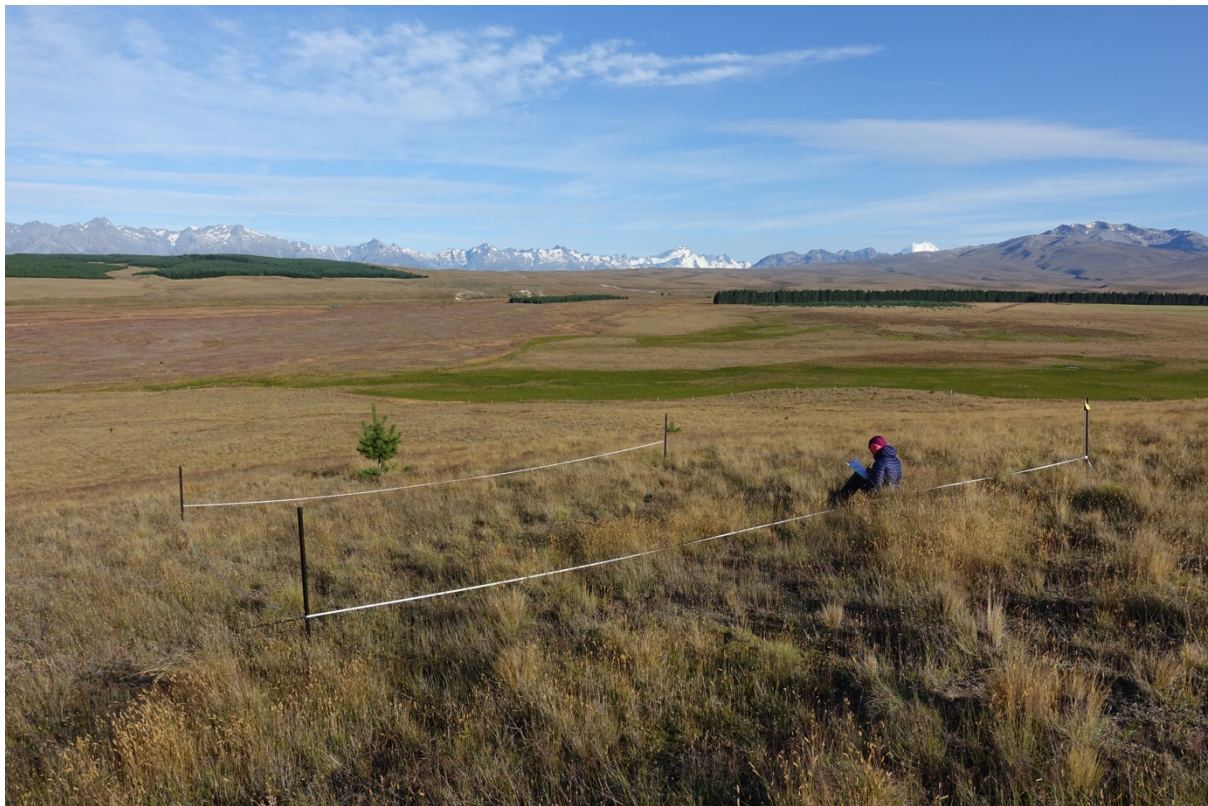
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Abbreviation used in plan

AOSTD – Aerial over-sowing and top-dressing
CPLA – Crown Pastoral Land Act 1998
DOC – Department of Conservation
ECan – Environment Canterbury (Canterbury Regional Council)
ETS – Emissions Trading Scheme
H&S – Health and safety
LINZ – Land Information New Zealand
LMU – Land management unit
MDC – Mackenzie District Council
MDP – Mackenzie District Plan
MOD – Ministry of Defence
PCL – Public conservation land (managed by DOC)
PSP – Permanent sample plot (forestry)
RHD – Rabbit haemorrhagic disease
RWS – Responsible Wool Standard
SCION – Forest Research Institute
SH – State highway
SNS – Site of Natural Significance
SWOT – Strengths, weaknesses, opportunities, threats



SECTION 1: INTRODUCTION

In this section, a brief introduction to Balmoral Station is presented providing a general overview of the property and the reasons for producing this integrated management plan.

1.1 Introduction

Balmoral Station (9,111 ha; Figure 1) is located in the Mackenzie Basin, South Canterbury, and lies to the west of Lake Tekapo. The property extends approximately 15 km east to west and 8 km north to south and ranges in elevation from 700 m adjacent to the Tekapo Canal to 1031 m on Mt John and 1046 m on the Old Man Range. However, the majority of the property lies between 700 and 850 m. The land that now forms Balmoral was first stocked in the late 1850s to early 1860s and has been farmed continuously since then. The property is bounded by Lake Tekapo in the east, New Zealand Defence Forces land in the north, Guide Hill Station to the west, and public conservation land (arising from the Irishman Creek tenure review) and land owned by Air Safaris in the south (Figure 1). The modern Balmoral Station comprises the Balmoral pastoral lease (PT021 Run 344, 6,486 ha) and the freehold Mt John Station (2,625 ha) and has been farmed by the Simpson family since 1975 (with Mt Hay until 1989, and then on its own).

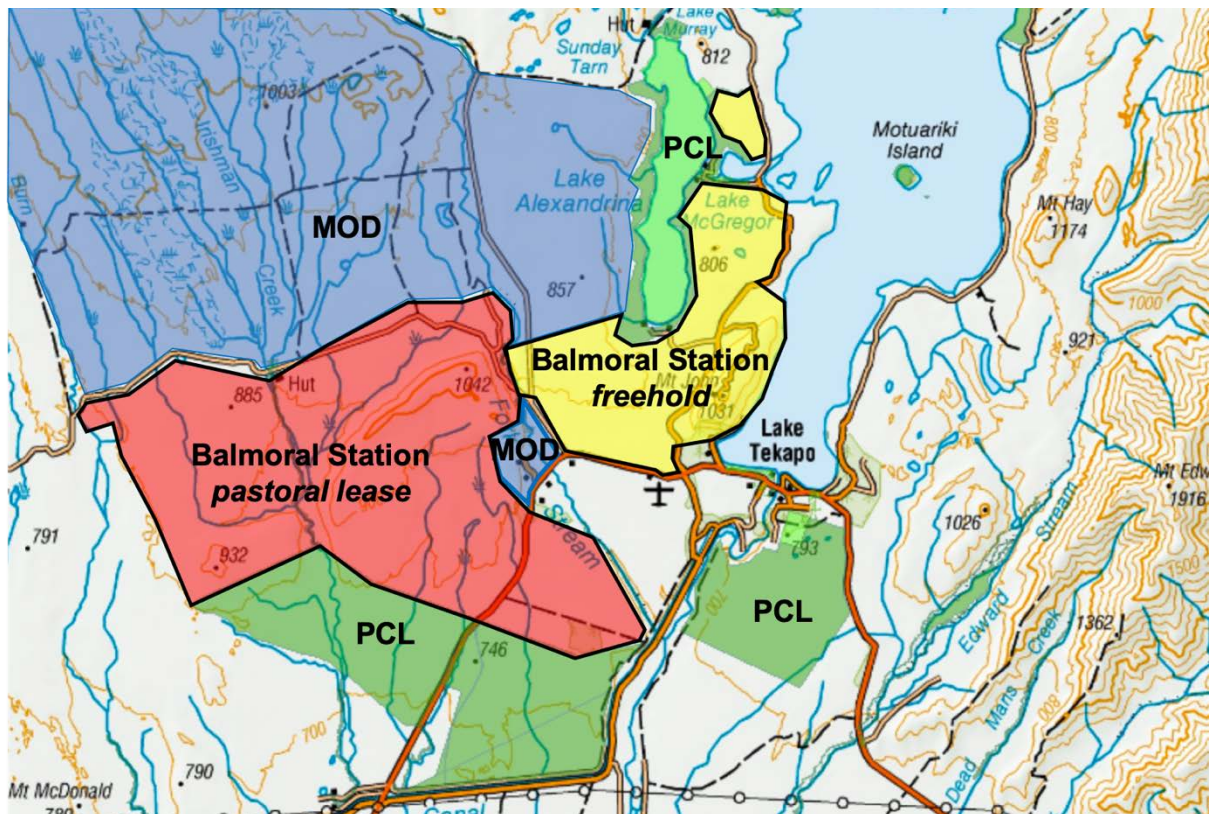


Figure 1. Balmoral Station, with pastoral lease (red) and freehold (yellow) and adjacent land tenures. PCL, public conservation land managed by DOC. MOD, military training land managed by the Ministry of Defence. Other adjacent land is a mix of private (freehold and pastoral lease) and MDC leasehold land.

The Simpson family are committed to farming Balmoral Station in a sustainable manner that recognises and promotes the diverse range of values present on the property. Their primary goal is to produce high quality products (Merino fibre, lambs, cattle, timber, tourist experience) in a manner that sustains both the underlying resources (soil, vegetation, water) and the significant inherent values (ecology, landscape, recreation) of the property. This management plan has been written to assist in meeting this objective and provides an overview of the approach that will be taken to property management and covers farming as well as non-farming activities. This plan outlines the principles that underlie the management of Balmoral Station, 10-year goals and management priorities for the next 5-years.

The Balmoral Station Integrated Farm Management Plan is based on a number of key assumptions:

- The promotion of ecological sustainability and protection of significant inherent values is not possible without the security of a financially viable farming operation, and both depend on having clearly identified management goals.
- Management actions need to be undertaken in a planned and staged manner. This is necessary both to ensure that management actions build on a solid base and to spread the resource requirements of management over achievable time frames.
- The management of significant inherent values is an integral part of farm management and is of value to Balmoral Station in itself and through its value for marketing the products derived from the property (fibre, meat, tourism).

This management plan has been produced by the Simpson family for five main reasons:

1. As a “stock-take” of current farm management.
2. As a means to plan for the future development of the property.
3. For guidance on day-to-day farming practices.
4. To provide documentation and guidance to assist meeting environmental and animal welfare certification and auditing requirements associated with the marketing of our farm products (e.g. through the Responsible Wool Standard and New Zealand Farm Assurance Programme).
5. To assist in meeting regulatory requirements, including the resource consent process through Regional and District Plans and consents from LINZ, by showing how the full range of values across the property are being managed.

SECTION 2: VISION AND OPPORTUNITIES/CONSTRAINTS

In this section the vision for Balmoral Station is described, followed by a summary of the factors that either present opportunities for the sustainable management of Balmoral Station or represent constraints to achieving the vision for the property.

2.1 Vision and outcome statements

This vision and outcome statement outlines how Balmoral Station might be in 30 years' time. The vision is a general statement about how we would like the property and the business to look at this time and the outcome statements summarise the key issues that need to be addressed through management to achieve this vision.

Our vision for Balmoral Station is:

“To create an environmentally and economically diverse business for the benefit of future generations of the Simpson family and for our community. Balmoral Station as an exemplar of a resilient farm and business in which native biodiversity flourishes, soils are healthy, water is clean, livestock are respected, visitors’ value what we have and what we are doing, and the needs of our family today and in the future are being met.”

This vision is founded on the assumption that to successfully manage Balmoral Station the values the property has must be sustained, and where appropriate enhanced, and the property and business be resilient against external perturbations (social and environmental).

In order to achieve this vision, several outcomes need to be met:

- Balmoral Station is a diverse and economically viable business including farming, forestry and tourism that provides for the needs of current and future generations of the family.
- The farm winters 10,000 stock units comprising a mix of Merino sheep and Angus cattle.
- Animal welfare is a central consideration in farm management.
- Balmoral Station continues to be carbon positive.
- Native biodiversity and landscape values are enhanced and soil and water values sustained.
- Appropriate public use of Balmoral Station is facilitated.
- Management activities are monitored and regularly reviewed.

2.2 Opportunities and constraints

A number of attributes of the property present opportunities for sustainable land management, while some other factors are important constraints that need to be addressed through management. We believe that consideration of these factors is important as a basis for developing our management goals. Opportunities and constraints are considered in terms of those that are intrinsic (of the property) and extrinsic (external to the property).

Intrinsic opportunities

A number of factors associated with Balmoral Station are conducive to a sustainable and resilient farm and business and include:

Profitable and diverse business: Balmoral Station is becoming through investment a diverse farming enterprise with fine wool, lamb finishing and beef operations. A substantial plantation forestry resource complements this and there is considerable potential to expand tourism across the property.

Balance: The property now has good ‘balance’ from a farming perspective, with a mix of cultivated and irrigated paddocks together with AOSTD and ‘native’ blocks across a range of aspects and slopes. Balance is important because it allows the whole property to be managed in an environmentally sustainable manner without the need to over-use some parts of the property, allowing a diverse range of values to be sustained within the property.

Water rights: Existing water rights and irrigation are an important opportunity as they allow the farming business to be buffered against adverse weather events, especially droughts, to add value to farm products, especially by providing sufficient feed to finish livestock before sale, and to better align lamb and beef sales to market needs through being able to provide animals in the shoulder season.

Infrastructure: The property is well serviced by public roads (SH8, Braemar Road, Godley Peaks Road, Mt John Road) and internal tracks, allowing for generally easy access to all parts of the property.

Scale: The large size of the property allows for considerable flexibility in farm management, forestry and tourism. Less developed AOSTD blocks and ‘native’ blocks complement the cultivated and irrigated paddocks, allowing for summer grazing and winter feed production. The size of the property allows for tourism operations to be undertaken without conflicting with farming and allowing visitors to appreciate the special qualities of the Mackenzie Basin.

Good vegetation cover: Balmoral Station has been conservatively managed and as a result, vegetation cover is good across most of the property both in terms of native plant communities and in areas that have been developed as improved pasture.

Extensive areas with high natural values: Natural biodiversity values and landscape values occur widely across the property from the shores of Lake Tekapo to the open vistas of the Old Man Range and Round Hill, and provide good opportunities for nature conservation and tourism/recreation.

Te Manahuna Aoraki Project: This project which is being funded through the NEXT Foundation with support from a range of groups including iwi, DOC and local farmers, aims to make the area bounded by Lake Tekapo, Lake Pukaki, the Tekapo-Pukaki canal and the main divide in Aoraki-Mt Cook National Park free of the majority of animal pests and key plant pests. This represents a huge opportunity for Balmoral Station which lies totally within the Te Manahuna Aoraki Project area.

Open skies: Balmoral Station lies in the centre of the Aoraki Mackenzie International Dark Sky Reserve and includes the internationally renowned Mt John astronomical observatory. The clear skies and open vistas make Balmoral Station unique, whether through visiting the Mt John Observatory or being camped out the back of the property.

Location: Balmoral Station is located in the heart of the Mackenzie Basin and epitomizes the key values of this area – wide open landscapes, extensive tussock grasslands and clear skies. However, this can be seen as both an opportunity and a constraint.

Committed owners: The Simpson family are committed to environmentally sustainable management, including ecological, social, cultural and financial sustainability.

Intrinsic constraints

Despite having a number of factors that promote sustainable management at Balmoral Station, there are also other aspects of the property that constrain this and consideration of these needs to be built into management.

Gross farm income: Being able to operate a financially profitable business is a core requirement and hence a potential constraint on the ability of the farm to be able to undertake all of the work programmes outlined in this management plan. Gross farm income is itself influenced by the full range of intrinsic and extrinsic factors discussed here.

Rainfall: The Tekapo area is relatively dry (ca. 600 mm annual rainfall) with summer droughts.

Limited growing season: The relatively high altitude of the property (700-1000 m) means that the growing season is short and as a result feeding out for most livestock occurs from May-October.

Extreme events: Extreme weather events, especially heavy winter snowfalls and summer droughts, are a feature of this environment. Such events can have a serious impact on farm operations, especially in terms of providing sufficient feed to animals.

Animal pests: A range of animal pests threaten biodiversity and farming values on Balmoral Station. Rabbits have been and continue to be the most significant although rabbit numbers are currently low due to rabbit haemorrhagic disease (RHD, also known as rabbit calicivirus disease). The recent release of the K5 strain of RHD will hopefully keep rabbits in check for the next few years. Hares are also widespread. Ungulate herbivores and possums are a minor issue on the property, although the property borders the Bennetts wallaby containment area and wallabies are seen from time-to-time. A range of carnivores (mice, rats, mustelids, hedgehogs, feral cats) are also present and impact biodiversity values, especially birds and lizards.

Plant pests: Plant pests do have the potential to threaten production and biodiversity values. Mouse-ear hawkweed is widespread through all of the uncultivated parts of the property and wilding conifers also occur widely over the property, although they are actively controlled. While sweet briar is also widespread it rarely forms dense stands (except on the slopes of Mt John). European broom is a minor issue on the property. Pasture weeds such as horehound and sheep's bur can be locally problematic (e.g. on Mt John).

Location: The location of Balmoral Station adjacent to Lake Tekapo township, with three public roads traversing it and with public access through the property to the Mt John observatory (car and foot) and along the shores of Lake Tekapo means that the property is readily open to public view which can generate misinformed adverse comment. People

pressure for access and from waste is an increasing issue for the property. But at the same time, location is also an important opportunity for Balmoral Station.

Extrinsic opportunities

Factors operating beyond the property can also present opportunities for sustainable land management.

Public/market desire for environmental sustainability: There is increasing demand from both markets (for livestock products and tourism) and from the general public for greater sustainability in farm management. This is a positive pressure to enhance sustainable land management practices in that it provides a positive environment and economic rationale for the practices being undertaken at Balmoral Station.

Market perceptions: Domestic and particularly international markets are increasingly demanding that the production of meat and wool fibre meet a range of environmental and animal welfare standards. When the market perceives that these standards are achieved, an opportunity is created that enables Balmoral Station to capitalise on high value supply opportunities.

Location: The location of Balmoral Station close to Lake Tekapo township provides real opportunities for tourism and recreation. With the burgeoning tourism sector and over-crowding of many public facilities, there are increasing opportunities for alternative tourism and recreational experiences which Balmoral Station is in a unique position to capitalise on.

Extrinsic constraints

A number of factors external to the property can have an adverse impact on sustainable land management and need to be considered in farm management planning.

Fluctuating externalities: Fluctuating commodity prices are a major limiting factor for farm operations, especially during periods of low wool prices when little excess cash is available. Fluctuating (or increasing) fuel and fertiliser prices are also a major constraint for farm operations. The current Covid-19 pandemic is also having a major impact on both markets and the cost of farm inputs.

Market perceptions: Countering the positive side of market perceptions, market pressure can also increase the cost of farm management and ultimately result in an inability to sell farm produce. In addition, shifting market perceptions (e.g. from natural to artificial meat) can alter the prices available and demand for Balmoral Station products.

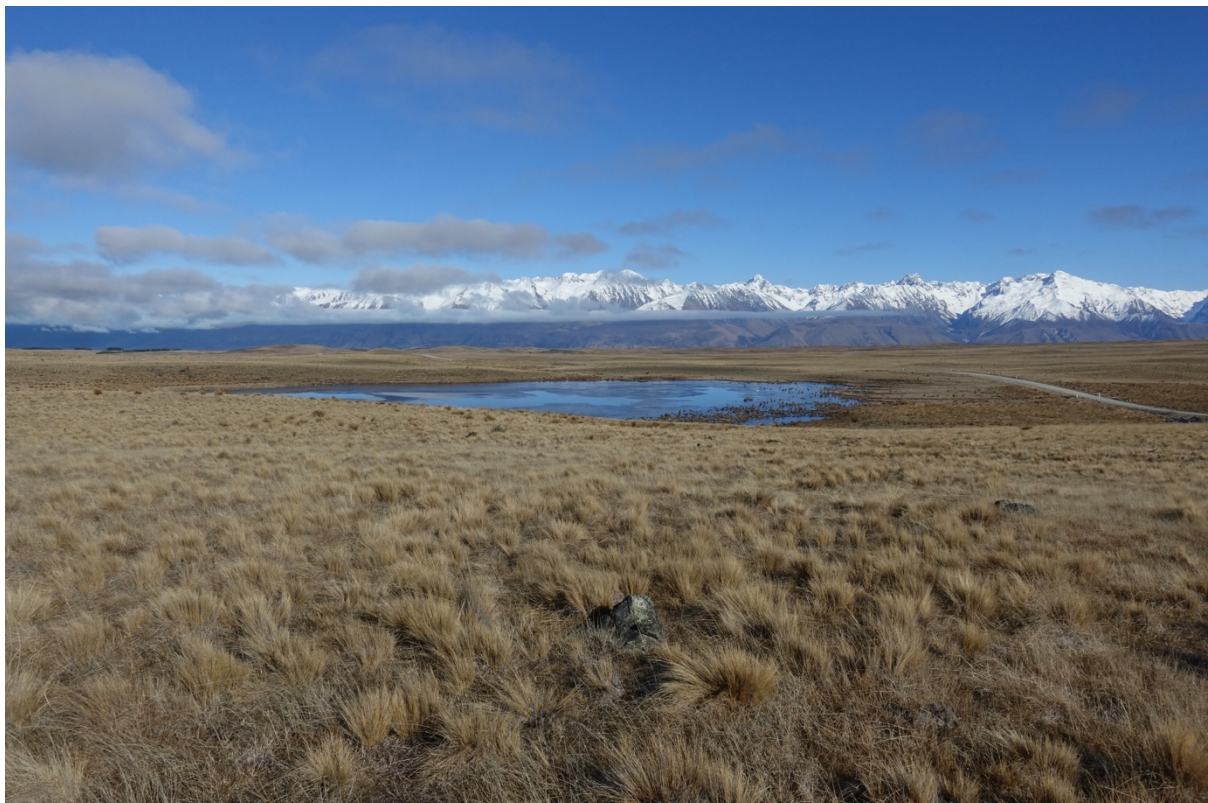
Local and central government regulations: Central and local government regulations impose a number of constraints on farm operations especially associated with managing water and biodiversity values and in meeting the Governments carbon emission reduction targets.

Adjacent land tenure: Balmoral Station is largely surrounded by public land, both public conservation land managed by DOC and MOD land. A number of potential threats to economic and biodiversity values on Balmoral Station occur on this surrounding land (e.g. wilding conifers) and there is no guarantee that there will be sufficient funds available for DOC or MOD to adequately manage these and other threats.

Diseases: Several existing livestock diseases have the potential to impact farming practices and productivity. Footrot has been an ongoing issue in the South Island high country and while not a major problem at Balmoral Station still requires vigilance. Mycoplasma bovis is affecting some beef and dairy farming operations in New Zealand and while it is not present at Balmoral Station, introduction of the disease is an ever-present threat either through stock movements or through people inadvertently bringing the disease onto the property.

Public interest in property: As a highly visible high-country property, the broader public has a strong interest in Balmoral Station and as such has an interest in the management of the property. This interest can be positive through people supporting the management values outlined in this plan but can also be a constraint when people desire outcomes for the property that are incompatible with a sustainable viable farming operation.

Climate change: While the specific consequences of climate change for Balmoral Station are unknown, climate modelling suggests that the west coast of the South Island will become wetter and the east coast drier, and the incidence of extreme events (e.g. ex-tropical cyclones) will increase. It is unclear how Balmoral Station will be affected by changing rainfall distributions, but extreme events (e.g. high or low rainfall and heavy snowfalls) need to be factored into property management.



SECTION 3: PROPERTY CONTEXT

The four parts of this section provide context for the management of Balmoral Station. The first describes what is known about the cultural context of the property from a Ngāi Tahu perspective. In the second, the local, regional and national regulatory environment within which farming and other land uses on the property needs to work is reviewed. Next, the ecological attributes of Balmoral Station, particular native biodiversity, are briefly summarised. Finally, a brief summary of the farming approach is presented and the property is divided into 23 unique land management units which are then used as the basis for management planning. More detailed information is provided in appendices.

3.1 Iwi context

Ngāi Tahu are the iwi who hold mana whenua over the Mackenzie Basin including the land that now comprises Balmoral Station. This area is important to Ngāi Tahu both spiritually and practically with mountains, lakes and other geographical features part of Māori creation stories, while numerous sites were important for seasonal mahinga kai opportunities. Many species found in the high country are also taonga species which are specifically listed in the Ngāi Tahu Claims Settlement Act 1998. Māori also travelled through the area and the pathways followed are well known and named.

Te Rūnanga o Ngāi Tahu submitted on the 2018 ‘Enduring Stewardship of Crown Pastoral Lease Lands’ discussion document and supported in principle the proposal to require leaseholders to complete farm management plans. In their submission Ngāi Tahu expressed a desire for a strong relationship with leaseholders reflecting their interest in ensuring sustainable management of natural resources, and protecting taonga species and mahinga kai resources for future generations.

Kā Huru Manu (the Ngāi Tahu Cultural Mapping Project) is dedicated to recording and mapping the traditional Māori place names and associated histories in the Ngāi Tahu rohe (tribal area). The Ngāi Tahu Atlas (www.kahurumanu.co.nz/atlas) provides an on-line reference to place names and was used to locate information relevant to Balmoral Station (Appendix 1). Many of the taonga species listed in the Ngāi Tahu Claims Settlement Act occur on Balmoral Station including both common species (e.g. Pihoihoi/pipit, Putakitaki/paradise shelduck, Taramea/Spaniard and Patotara/dwarf mingimingi) and rare species (e.g. Kaki/black stilt and Karearea/falcon). The full list of taonga species at Balmoral is provided in Appendix 2.

3.2 Regulatory context

From a regulatory perspective, controls on the land management activities that are possible on Balmoral Station occur at two levels:

1. For the pastoral lease portion of the property (west of Braemar Road) the Crown Pastoral Lands Act (1993) and Government’s proposed revisions outline the processes that need to be followed in terms of how this part of the property is managed and the consents required for different management activities.
2. For the whole property, the various rules in Environment Canterbury’s Land and Water Plan and in the Mackenzie District Plan (especially through Plan Changes 13 and 18) control the activities that can occur on the property.

Crown Pastoral Land Act

The CPLA only applies to the pastoral lease portion of the property (excluding Little Mt John, Scott, Mt John Forest, Mt John, Mt John Paddocks and McGregor LMUs). Recent (2019 & 2020) Government announcements have indicated that there will be changes in the way that pastoral leases are managed including a greater scrutiny of discretionary consent applications in terms of their impacts on significant inherent values including native biodiversity and value important to Ngāi Tahu. It seems likely that a management plan with monitoring of indigenous biodiversity values is going to be useful for assisting with meeting the requirements of these changes. But because Balmoral Station is already subject to the tight rules associated with the Mackenzie District Plan, meeting this may also be sufficient to meet any future LINZ requirements. Existing consents from LINZ are listed in Appendix 3. Any revisions to the CPLA will not be enacted until after the 2020 General Election.

Environment Canterbury Land and Water Plan and Regional Policy Statement

Section 5 (Region-wide Rules) and Section 15B (Waitaki) contain rules that relate specifically to farm management activities on Balmoral Station. In Section 5, rules cover a range of activities that are a routine part of farming including pest control and agrichemicals, offal and farm rubbish pits, stock holding areas, silage pits, fertiliser use, and stock exclusion areas. Most of the rules are straightforward and the majority of farm management activities are likely to be either permitted or discretionary activities that can be covered by a Farm Environment Plan (see below). Two sets of rules within this section are important because they impact on biodiversity management on the farm:

- Rules 5.65-5.67 specify that fertiliser should not be spread when soil moisture exceeds field capacity or within 10 m of the bed of a permanently flowing river, lake, wetland or any site of natural significance as identified in the Mackenzie District Plan.
- Rules 5.68-5.71 seek to minimise the impact of livestock on lakes, rivers (including streams) and wetlands. The use of these sites by stock is permitted so long as there is no pugging or de-vegetation exposing bare earth in the bed or banks, or change in colour or clarity of the stream, lake or wetland as a result of livestock.

Section 15B of the Land and Water Regional Plan relates to water permits for the Haldon sub-catchment of the Upper Waitaki Freshwater Management Unit in which Balmoral Station is located. This sets out the specific requirements for both water use (irrigation) and nutrient discharge. Balmoral Station has consent (CRC157070) for both of these activities and as part of this has a Farm Environment Plan (FEP) which is a requirement of the Land and Water Regional Plan (Appendix 4). The contents of the FEP are outlined in Schedule 7 of the Land and Water Regional Plan and should cover nutrients, irrigation, cultivation and soil structure, animal effluent and solid animal waste, waterbodies, point source discharges and water use (excluding irrigation) and the farm is regularly audited against the FEP.

The Canterbury Regional Policy Statement outlines how ecological significance should be determined and is referred to in the Mackenzie District Plan. This issue is discussed further below under Ecological Context.

Mackenzie District Plan

The Mackenzie District Plan outlines the way in which the land can be managed and in particular focuses on the effects of different activities on the land, the visual landscape and on native biodiversity. These rules have a major influence on the types of activities that can be undertaken at Balmoral including farming, forestry and tourism. Section 7 (Rural) is the key

part of the plan that affects Balmoral Station and depending on the activity (building, earthworks, plantation forestry, pastoral intensification, tourism development), different parts within this section will apply which specify whether the activity is permitted, discretionary or requires a resource consent. Section 7 has been updated as part of Plan Change 13 which places a much stronger emphasis on visual (landscape) effects than previously, while Plan Change 18 directly affects pastoral intensification and vegetation clearance. Although not yet incorporated into Section 7, Plant Change 18 has legal effect.

The rules in Section 7 (and PC18) impact Balmoral Station in two ways:

- Through identifying specific areas (shown on the planning maps) with high values – Sites of Natural Significance (SNS), Scenic Viewing Areas (SVA), Scenic Grasslands (SG) and Lakeside protection Areas (LPA). In addition, GeoPreservation Sites are also identified on planning maps but are of lesser extent (Figure 2; www.mackenzie.govt.nz/Site/Documents_and_policy/key_documents/district_plan.aspx)
- Through more general rules that restrict activities outside these areas.

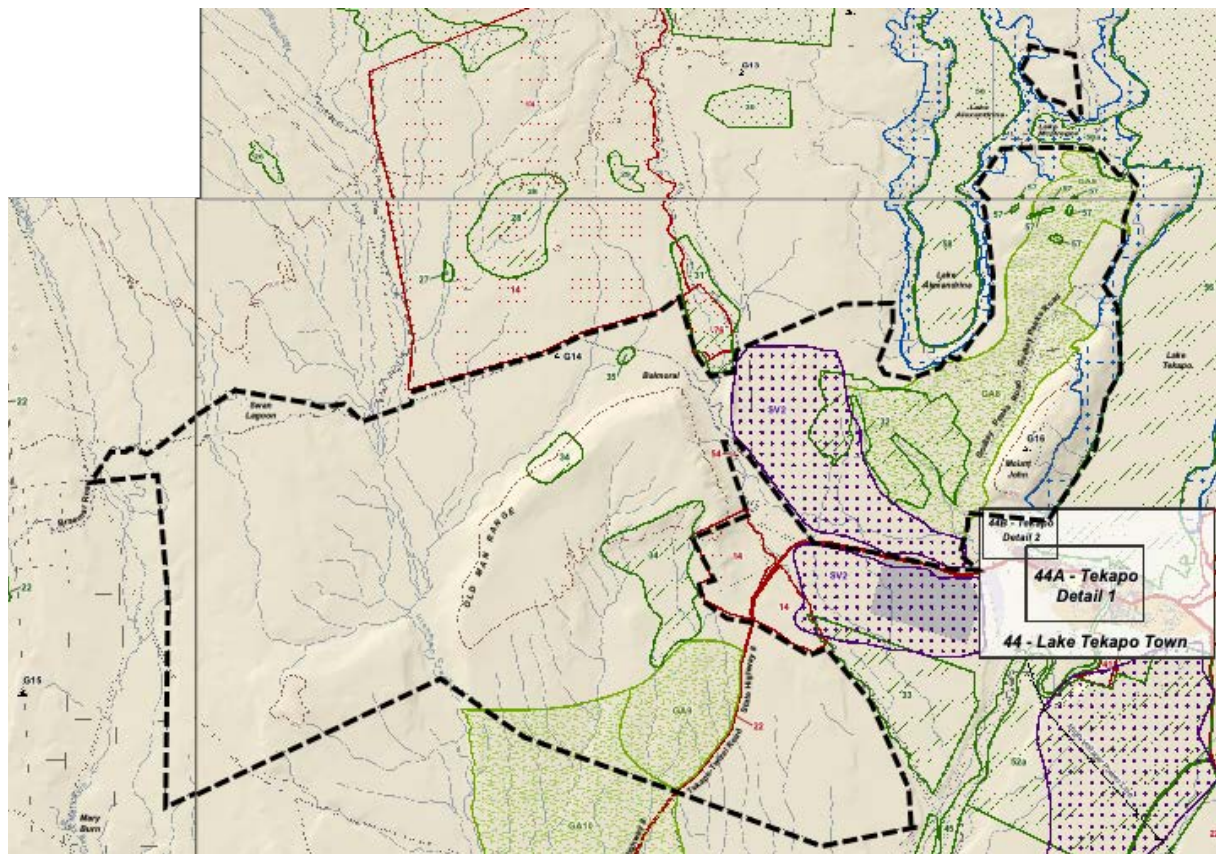


Figure 2. Low resolution image of MDC planning maps showing various designations (green, blue and purple shading) in relationship to the approximate boundary of Balmoral Station (dotted black line).

The major activities that are restricted and are likely to be relevant to Balmoral Station include buildings (and other infrastructure), earthworks, pastoral intensification, vegetation clearance, plantation establishment and commercial activities.

It seems unlikely that consents for any of these activities will be granted in areas mapped as SNS, SVA, SG and LPA. These areas dominate the Mt John, McGregor, Scott, Little Mount

John and Old Man South LMUs. However, it may be that some tourist activities are appropriate and especially in the Scott LMU which lies in a Scenic Grassland but clearly does not have the scenic grassland values.

This integrated management plan for Balmoral Station is designed to meet one specific requirement of the Mackenzie District Plan, where under Plan Change 18 there is a requirement for the production of farm biodiversity plans for obtaining consent for various activities on the property. A biodiversity plan should include:

- A description of the property and its features.
- Description of existing ecological values.
- Development areas and activities (historic, current and proposed land management).
- Management methods to achieve protection of indigenous biodiversity values.
- Monitoring and reporting.

It is intended that this plan will also meet any future requirements for management planning that come out of the proposed review of the CPLA for the pastoral lease part of the property. A more detailed assessment of the implications of Plan Change 18 for Balmoral Station is provided in Appendix 5.

Government has recently released a discussion paper and proposed wording for a National Policy Statement (NPS) on Indigenous Biodiversity. Should this become law, which is likely before the 2020 general election, then all Councils will be required to adopt the standards in the NPS in their plans. The content of the proposed NPS is similar to what is currently in the Mackenzie District Plan although some clarification is provided on existing use activities (Appendix 6).

Current resource consents held by Balmoral Station are listed in Appendix 7.

3.3 Ecological context

The native biodiversity values at Balmoral are high reflecting the conservative management that the property has experienced over many decades. The key components of native biodiversity include extensive hard tussock and red tussock grasslands, including some of the most extensive red tussock grasslands in the Mackenzie Basin, remnant shrubland communities and wetland vegetation including turf communities. The diversity of native flora and fauna is high and includes a number of 'Nationally Threatened' and 'At Risk' plant and animal species (Appendix 8). In addition, the property contains an outstanding sequence of glacial landforms associated with several different periods of glacial advance and includes moraine and outwash plains, as well as alluvium, landforms that are considered significant because they are part of originally rare ecosystems.

Detailed reports have been prepared on the pastoral lease part of the property as part of the tenure review process (DOC 2013 Conservation Resources Report) and more recently as part of an Environment Canterbury process looking at the influence of different methods for assessing ecological significance in the Mackenzie Basin (Hooson 2016, Hutchison et al. 2016¹). The details in these reports are not repeated here but summaries of the specific

¹ Hooson S 2016. Balmoral pastoral lease assessment of indigenous biodiversity. Boffa Miskell, unpublished report. Hutchison M et al. 2016. Ecological assessment of pastoral lease land Balmoral Station, Tekapo, Canterbury. Wildland Consultants unpublished report.

biodiversity values associated with each land management unit are included in Section 5 of this management plan.

Ten ecological significance criteria, grouped in four categories, are included in the Canterbury Regional Policy Statement (2013) for determining significant areas of indigenous vegetation and significant habitat for indigenous fauna in Canterbury including the Mackenzie Basin (Appendix 9). Based on these, most of the property can be considered as ecologically significant. The major exceptions to this are areas that have been cultivated, are under exotic conifer forest, met the definition of improved pasture (as defined in the Mackenzie District Plan) and some small areas that are otherwise highly modified. A detailed assessment of significance for the pastoral lease portion of the property is included in the reports prepared by Hooson (2016) and Hutchison et al. (2016) and is not repeated here. However, a summary assessment of significance is provided for each land management unit, including for the freehold part of the property, in Section 5 of this management plan. The proposed National Policy Statement criteria, which when passed by Parliament will have legal precedence over the existing ECan and MDC significance criteria and are summarised in Appendix 9.

Balmoral Station bounds two areas of public conservation land (Figure 1). The freehold part of the farm lies adjacent to Lake Alexandrina Scenic Reserve in the north, while the pastoral lease boarder's Irishman Creek Scenic Reserve and Irishman Creek Conservation Area to the southwest. Lake Alexandrina and Lake McGregor have particularly high biodiversity values associated with the avifauna present (e.g. Australasian crested grebe and kaki), while Irishman Creek Scenic Reserve and Conservation Area contain extensive areas of red tussock grassland similar to those present on Balmoral Station. Marginal strips are also present along Irishman Creek and Fork Stream where they flow through Balmoral Station.

3.4 Farming stocktake and land management units

Farming at Balmoral Station is a mix of traditional and modern farming styles with Merino sheep, Angus and Angus x cattle, and irrigated crops. Sheep and cattle are rotated around the property, with lambing and calving on better quality pastures, summer grazing on 'native' blocks for sheep, and wintering on paddocks where feed crops are present or feeding out is possible. Cattle are a recent addition to the property and a small red deer herd has traditionally been farmed but is now (2020) being phased out. Three pivot irrigators (280 ha) allow for production of additional feed resources and the finishing of lambs and calves. Plantation forestry is an important part of Balmoral Station, with the property pioneering the use of hybrid pines in the Mackenzie Basin. Hybrid pines are better adapted to the climate and less spread-prone than other plantation conifer species. Further details on farming practices are provided in the management principles section below, while stocking patterns and management inputs are detailed in the sections for each land management unit.

As well as its use for farming and high biodiversity values, Balmoral Station also has high recreation and tourism values, particularly associated with Mt John. The University of Canterbury astronomical observatory and associated café and viewing areas is surrounded by Balmoral Station land, and foot access both to Mt John and along the shores of Lake Tekapo is over Balmoral Station.

For management purposes Balmoral Station has been divided in to 23 land management units (LMUs), excluding areas adjacent to Lake Tekapo township that are not part of the farm.

LMUs are based on a combination of underlying abiotic environment overlain by management inputs with each LMU defined by having the same fundamental management regime. The LMUs have been ordered in terms of the intensity of management inputs.

- Unit 1 – Benchmark Area (201 ha, northwest of SH8 within the Old Man South LMU and west of the Tekapo Military Camp).
- Unit 2 – Old Man Wetland (70 ha, at base of hill north of Old Man Range draining into Irishman Creek)
- Unit 3 – Old Man Sunny Faces (236 ha, steep northwest facing slopes of the Old Man Range.)
- Unit 4 – Old Man South (1651 ha, slopes of Old Man Range to SH8).
- Unit 5 – Round Hill (1825 ha, west of Irishman Creek excluding plantation forest).
- Unit 6 – Little Mount John (1247 ha, north of SH8 between Braemar Road and Mt John Road, extending north to Lake Alexandrina).
- Unit 7 – Bottom Terrace (198 ha, the lowest terrace on the property adjacent to and west of Fork Stream).
- Unit 8 – Old Man West Face (173 ha, steep west facing slopes of the Old Man Range above Fork Stream.)
- Unit 9 – Old Man East Face (106 ha, steep east facing slopes of the Old Man Range above Irishman Creek.)
- Unit 10 – McGregor (707 ha, paddocks between Godley Peaks Road and Lake Alexandrina around Trig N and the 600 Acre block north of Lake McGregor).
- Unit 11 – Mount John (367 ha, all of Mount John except for the cultivated paddocks (McGregor paddocks LMU) and the wilding conifer forest on the south face (Mount John Forest LMU)).
- Unit 12 – Deer Farm (112 ha, deer fenced area between the Braemar Road and MOD land).
- Unit 13 – Improved Flats (167 ha, downs and flats east of SH8 and north of pivots, plus a small area between the southern pivot and the SCION forestry trial plots).
- Unit 14 – Irishman Paddocks (395 ha, paddocks on both side of Braemar Road).
- Unit 15 – Plantation Forests (648 ha, six blocks, including in Round Hill LMU, behind the homestead, both sides of SH8 adjacent to the Tekapo Military Camp and Tekapo Helicopters base, a block north of the pivots and the SCION trial site southeast of the pivots).
- Unit 16 – Mount John Forest (43 ha, steep southern faces of Mt John above the hot pools complex).
- Unit 17 – Shelterbelts (10 ha, located within the Irishman Paddocks and Dryland Paddocks LMUs).
- Unit 18 – Dryland Paddocks (358 ha, 12 paddocks adjacent to Old Man Range Wetland).
- Unit 19 – Cultivated Paddocks (95 ha, paddocks adjacent to pivots).
- Unit 20 – Mount John Paddocks (114 ha, paddocks to the west and east of Godley Peaks Road).
- Unit 21 – Homestead Paddocks (28 ha, paddocks surrounding woolshed and yards).
- Unit 22 – Pivots (280 ha, three pivots east of SH8).
- Unit 23 – Scott (120 ha, the David Scott/AgResearch trial area and adjacent paddock on the Godley Peaks Road).

SECTION 4: MANAGEMENT PRINCIPLES

This section outlines the approach that is taken to management at Balmoral Station. For each management activity the overall principles and approach to management are outlined and ten-year management goals identified. In Section 5, specific management objectives are discussed for each land management unit on the farm focusing on the next five years.

4.1 Health, safety and wellbeing

Health and safety in the workplace is an important issue on farms, with a number of different farm management activities presenting potential hazards. The legislative requirements for health and safety issues are covered by the Health and Safety at Work Act 2015. Under this Act *“Farmers must ensure that work areas on the farm are safe, and don’t pose a risk to the health and safety of any person. Farmers must also ensure that farm buildings and immediate surrounding areas are safe for any person, including visitors. All entrances, exits and anything arising from the buildings, must not put visitors’ health and safety at risk. Farmers are not responsible for the safety of people crossing a farm in non-work areas and away from farm buildings. However, they must ensure that work carried out as part of the business (at any location on the farm), doesn’t put others at risk. If risks exist from work previously carried out (e.g. spraying of hazardous substances), then the farmer would need to reasonably manage these risks for visitors. People visiting a farm have a responsibility to take reasonable care that their actions (or lack of action) do not put themselves or others at risk. They must also comply with any reasonable instruction given by the farmer, as far as they’re able to.”* (from worksafe.govt.nz).

Under the Health and Safety at Work Act there are a number of obligations on Balmoral Station including to:

- Provide and maintain a healthy and safe working environment.
- Ensure the hazard identification, assessment and management process is actively undertaken, with employee participation, for the control of all known and potential hazards or injury factors.
- Ensure training and instructions in occupational health and safety and hazard reduction matters are undertaken.
- Ensure suitable safety devices and protective equipment, and appropriate information to ensure safe working practice, are provided.
- Promote occupational health and safety standards.
- Encourage regular consultation and participation by staff in monitoring, improvement and promotion programmes established to enhance health and safety standards.
- Ensure that all staff are trained in health and safety management.

As well as addressing Health and Safety issues as defined by the Health and Safety at Work Act, Balmoral Station are also committed to the overall wellbeing of their staff. This includes ensuring that all staff are happy in their work, are not under any mental or physical duress, and feel safe in their workplace. Wellbeing is about providing an environment in which staff can express themselves and that management can put in place appropriate actions to support staff as required. This can include training and development, help with accessing support services, and freedom to provide comment and feedback on management. Wellbeing also requires ongoing investment in people capacity in order to be able to manage a farm business of this scale and thus provide for the wellbeing of current employees (ie through not over-working them).

Balmoral Station sees the following principles underpinning their approach to health, safety and wellbeing:

- Happy and engaged employees are the basis of a successful business.
- The health and wellbeing of all employees is provided for (come to work healthy, go home healthy and feel safe at all times).
- Training and professional development opportunities are provided to all employees.
- Employees have ownership and understanding of the vision for the business, understand the management goals in this plan, and feel free to comment and provide feedback on these.
- Appropriate recognition is provided for good health, safety and wellbeing practices.
- All regulatory responsibilities are met.

Ten-year goal: *Balmoral Station is seen as exemplary within the sector for its proactive approach to health, safety and wellbeing. Being proactive refers to both the regulatory environment and what is considered best practice in the sector and in society more generally.*

4.2 Financial

Balmoral Station needs to be financially viable if the management goals outlined in this plan are to be achieved. Financial viability is both the result of and essential for environmental sustainability. Underpinning financial viability is the need to service debt at a level that allows the business to continue to grow. While unpredictable external factors such as weather events and commodity prices can easily influence financial goals, financial viability is critical to environmental sustainability. Investing in the farm (e.g. fertiliser application, fencing, disease management, weed control, monitoring) is essential if the long-term vision of environmental sustainability is to be achieved. While being financially viable, it is also essential to plan for the needs of future generations of the Simpson family.

The following principles underpin the financial viability of Balmoral Station:

- Gross farm income (GFI) primarily arises from sales of wool, lambs, beef animals and forestry products, and from tourism, less any livestock purchases.
- Management costs should be 55-60% of gross farm income.
- Debt servicing should be no more than 15% of gross farm income.
- The annual surplus should be 10% of gross farm income.

Ten-year goal: *To continue to be a financially viable farm that continues to grow the business, meet its environmental goals and provide for the future needs of the Simpson family.*

4.3 Infrastructure and plant

Transitioning from a breeding/store property to a more intensive breeding/finishing property, and meeting the strategic goal of wintering 10,000 capital stock units, requires additional investment in infrastructure. Short term, the focus is on maximising existing projects by completing current development plans including installation of a further consented 100 ha of irrigation in the Bottom Terrace LMU. In order to support the increasing stock units on the property, additional facilities including stock handling facilities, multipurpose building (including implement shed, workshop, shearing and perhaps single-men's quarters), a new set

of multi-species stock yards and accommodation for a married couple are required. Longer-term, people capability will be required.

At the same time, maintenance of existing infrastructure needs to be ongoing. Infrastructure includes fences, pivots, buildings, yards and tracks, while plant includes machinery such as vehicles, tractors, cultivators etc. Maintenance includes regular fence checks and repairs (e.g. after snow damage), maintenance of tracks, regular painting, maintenance of buildings and yards, servicing of pivots and other irrigation structures etc. Maintaining an asset register for buildings, fences, pivots, tracks etc is important as it can be used to track asset condition and for planning for future replacement. Maintenance is usually undertaken as a regular part of farm management work, although some jobs might require employment of contractors. Having well maintained and fit-for-purpose plant (tractors, drills, balers, cultivators, vehicles, etc) is also essential for supporting a financially viable farming operation, as well as meeting the health, safety and wellbeing goals for the property.

The following principles underpin infrastructure and plant management:

- New infrastructure and plant should not be purchased at the expense of regular maintenance, which is essential to reduce future liabilities.
- New infrastructure and plant that supports the strategic goal of wintering 10,000 capital stock units should be prioritised for investment.
- All new infrastructure and plant should be subject to appropriate due diligence, including detailed cost/benefit analysis.
- Plant should be replaced on a regular basis, considering depreciation and the cost of replacement versus the cost of maintenance.
- Infrastructure and plant should be of a quality and/or in a condition that does not affect the health, safety and wellbeing of employees or impact on the environment.

Ten-year goal: *Have well maintained and appropriate infrastructure and plant that supports the strategic goal of wintering 10,000 capital stock units, including an up-to-date asset register.*

Ten-year goal: *Complete installation of additional consented pivot irrigators and associated infrastructure (including water reservoir).*

4.4 Pasture and soils

Good pasture and soil management are critical for the goal of wintering 10,000 capital stock units on Balmoral Station in an environmentally sustainable manner. With the majority of the property located between 700 and 900 m elevation, the growing season is relatively short with both winter cold and summer moisture deficits limiting pasture growth. The irrigated paddocks are the engine room of the farm and allow for the finishing of lambs and calves. Ensuring that pasture composition and growth rates are optimal in this LMU is essential for the success of the farm business. Coupled with this is the need to maintain pasture renewal. Regular pasture renewal is a priority as good pasture is required to support livestock, supply winter feed and balance any potential impacts that stock may have on native vegetation. Renewing a paddock of old pasture usually takes 3 years in which time annual crops (usually ryecorn/moata ryegrass and turnips) are sown. These crops serve not only to reduce weeds and allow thatch breakdown, but they also provide a vital crop for silage and winter feed. When the paddock is ready it is then sown in permanent pasture. The grass and herb species

and cultivars are carefully selected with a focus on a legume rich plant mix in both dryland and irrigated paddocks.

Pasture productivity is enhanced through fertiliser application. However, fertiliser is an expensive input and there is some debate about just how sustainable fertiliser sources are, especially phosphorus. However, with grazing removing nutrients from pasture, fertiliser is an important tool to maintain pasture productivity. Notwithstanding this, there is increasing evidence that in general, fertiliser application often exceeds what pastures require on many New Zealand farms, with excess nutrients lost through leaching. The key to better matching fertiliser application rates to pasture productivity is to monitor pasture productivity rather than soil nutrient levels themselves. Fertiliser spread will be kept away from streams and wetlands and Sites of Natural Significance meeting all regulatory requirements.

Making and storing winter feed is a crucial part of the farming operation, although the development of irrigated pastures has given much better control over pasture production both in terms of winter feed production and being able to finish lambs and cattle, hence adding value and contributing to the goal of Balmoral Station being a resilient economically viable farming operation. Notwithstanding this, the balance of pasture utilization between stock and making winter feed is crucial, which includes having sufficient “native” country to allow for spelling and winter feed production on more developed parts of the farm. A typical feed out period in the winter at Balmoral is 150 days. Therefore around 2500 bales of hay and baleage are made each year, as well as having 50 ha of brassica’s available to provide winter feed. Obviously, the amount of supplementary feed made is directly related to how good the season is, but is significantly buffered on Balmoral Station by having a substantial area of irrigation. However, pasture management is critical to ensure enough feed is made to get through the winter and have some spare (i.e. in case of a large snow fall).

Good pasture and soil management is essential for being carbon positive and in ensuring the biodiversity values, especially in native grasslands, are managed in a sustainable manner. Tussock grasslands are an important part of the forage base of Balmoral Station. These grasslands are uncultivated and some have been subject to regular fertiliser and seed application for many decades. While native tussocks are often physiognomically dominant, the inter-tussock sward can include a range of exotic forage species such as white clover and various grasses that are important livestock feed. The tussocks themselves are also important as shelter, especially for lambing ewes. These grasslands have, however, been degraded by historic rabbit plagues and hawkweeds which have impacted both inter-tussock species and tussocks. Over-grazing can also cause degradation of these grasslands. The key for management is to maintain both tussock cover and the cover of inter-tussock species including livestock forage. This requires careful balancing of grazing regimes and fertiliser application (where used), against both the density and vigour of tussocks and the abundance of native inter-tussock species.

Enhancing soil carbon is a part of achieving the goal for Balmoral Station to be carbon positive and complements ongoing carbon-sequestration through the growth of trees. Soil carbon can be maintained and enhanced through appropriate management including maintenance of good ground cover, having more diverse pastures and avoiding soil compaction.

The following principles underpin soil and pasture management:

- Healthy soils support good pasture growth.

- Enhanced soil carbon is critical for healthy soils and is promoted by:
 - Maintaining good ground cover.
 - Using direct drilling in preference to other cultivation methods.
 - Avoiding soil compaction.
- Optimising fertiliser application in terms of pasture growth rather than the amount applied.
- Fertiliser will not be spread within 10 m of waterbodies or Sites of Natural Significance.
- Maintaining N fixers in all pastures.
- Maintaining the feed value of native LMUs through ongoing fertiliser and seed application where appropriate.
- Undertaking regular soil and pasture monitoring and directly linking this to farm management through feed budgets.
- Undertake regular vegetation monitoring in native LMUs to better manage the relationship between grazing and fertiliser/seed application and native biodiversity.

Ten-year goal: *Increase productivity of all non-native LMUs through optimising pasture composition and better use of fertiliser and nitrogen fixing plants.*

Ten-year goal: *Continue with regular programme of fertiliser and seed addition to native LMUs that have had fertiliser and seed applied in the past.*

Ten-year goal: *Maintain high ground cover across all land management units.*

Ten-year goal: *Increase soil carbon levels across whole farm.*

4.5 Livestock management

Red Meat Profit Partnership (RMPP) is a Primary Growth Partnership programme that is working to help the red meat sector increase productivity and profitability. Funded by meat processors, banks, Beef + Lamb New Zealand and the Ministry for Primary Industries, RMPP works with farmers and sector businesses to develop, test and introduce new ideas, new technology solutions and new ways of working. Through a series of projects, RMPP is seeking to help farmers achieve sustainable productivity improvements in order to deliver higher on-farm profitability. A key consideration for Balmoral Station developing this management plan was to ensure continuous improvement across all aspects of the business. Measurement of key performance indicators (KPI) quantifies “Point A” and assists in the decision-making process of qualifying “Point B” and journey or process of getting from “Point A” to “Point B”. KPIs empower the businesses operational performance including environmental, financial, livestock, pasture performance and ultimately profitability and environmental excellence (Figure 3). Ultimately, the main expression of higher on-farm profitability comes through enhanced livestock performance.

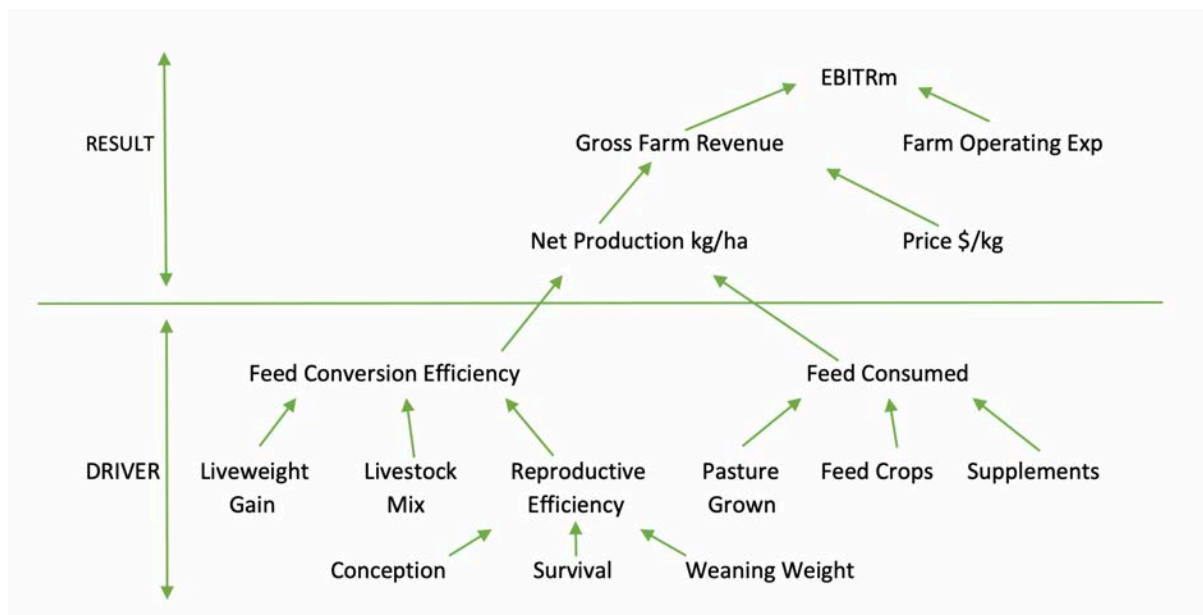


Figure 3. KPIs and their relationship to key functions of farming

The functions of farming that Balmoral Station will measure to qualify the status quo and quantify areas of continuous improvement will include:

- Lambing percentage
- Ewe flock efficiency
- Lambing scanning to weaning loss
- Calving percentage
- Cow herd efficiency
- Gross farm income per effective hectare
- Gross farm income per stock unit
- Farm operating expenditure per effective hectare
- Farm operating expenditure as a percentage of Gross Farm Income
- EBITRm (earnings before interest, tax, rent and any wages paid to a manager (actual or family)) per effective hectare
- Net production per effective hectare
- Liveweight gain – lamb / beef, birth to market
- Liveweight gain – lamb / beef over fixed period of time

The principles that underpin livestock management and that are implicit in meeting various farm assurance standards (as outlined in Appendix 10) include:

- Having a clear strategy and set of protocols to safeguard the welfare of livestock.
- Livestock have access to sufficient feed and water, suited to the animals age and needs, to maintain normal health and to prevent prolonged hunger, thirst, malnutrition or dehydration.
- Livestock are kept in an environment that provides the conditions and facilities needed for health, safety, comfort and normal behavior.
- Having a good understanding and a proactive approach to ensure that the health of livestock is maintained through all stages of life. Animals are free from pain, injury or disease through prevention, rapid diagnosis and treatment.

- Good human-animal relationships are in place that allow the livestock to be in a positive emotional state and express natural behavior.
- It is important livestock are held to empty out before being transported. This helps minimise any potential risk of contamination, animal welfare issues and excessive buildup of effluent on trucks.

Balmoral Station is currently compliant to the following farm assurance standards:

#	Standard	Auditor	Date
1	Farm Environment Plan	Irricon	November 2018
2	New Zealand Farm Assurance Programme	Assure NZ Ltd	October 2018
3	Responsible Wool Standard	Integra	December 2018

Our goals for livestock performance are:

Ten-year goal: *Balmoral Station winters 10,000 capital stock units comprising Merino sheep and Angus and Angus x cattle.*

Ten-year goal: *All relevant farm assurance standards are exceeded.*

4.6 Plantation forestry and shelterbelts

Plantation forestry is important in ensuring that Balmoral Station is a diverse and economically viable business and has been an important management component for many years. In fact, Balmoral Station is a leader in environmentally sustainable high country forestry, both through working closely with SCION and the Farm Forestry Association, and through trialling and planting hybrid pines (e.g. *Pinus radiata* x *Pinus attenuata*). This hybrid is better suited to high country conditions than other exotic conifers and does not have the issues of wilding spread that many other species do. Exotic shelterbelts have been an important part of farming on Balmoral for many decades and help create a sheltered environment for livestock thus enhancing animal welfare. Many shelterbelts are now becoming mature and replacement needs to be considered. The introduction of irrigation requires new shelterbelts, including utilising native species.

The management of plantations and shelterbelts on Balmoral Station is guided by a number of principles including:

- Tree planting and plantation management meets regulatory requirements under regional and district plans, and obligations and responsibilities relating to the Emissions Trading Scheme (ETS).
- Forest management follows best management practice as outlined in the NZFOA Environmental Code of Practice for Plantation Forestry and the National Environmental Standard for Plantation Forestry.
- Plantations are replanted within two years of harvesting with non-spread prone species and all stands are thinned to improve tree form and timber yield.
- Regular remeasurement of PSPs are undertaken.
- Where appropriate, native species are including in shelterbelts.

Ten-year goal: *Continue to expand plantation forest area within the constraints of the forestry resource consent with the aim of being able to harvest 10-15 ha per annum from 2030.*

Ten-year goal: *Establish new shelterbelts associated with pivots and remove spread-prone trees from existing shelterbelts.*

4.7 Plant and animal pests

Plant and animal pests pose a range of threats to both the economic viability of Balmoral Station and to the biodiversity conservation goals for the property. While it is not possible to eliminate all or even most of these pests, through appropriate management and through working with others, it is possible to reduce the threats they pose to acceptable levels.

The management of plant and animal pests on Balmoral Station is guided by a number of principles including:

- Meet all legislative obligations relating to plant and animal pests.
- The importance and benefits of early action in stopping the spread of a new pest species is recognised, rather than delaying and then having to commit to long-term control.
- Where appropriate, plant and animal pest control should be undertaken in collaboration with others (e.g. ECan, MOD, Te Manahuna Aoraki Project).
- All control work is systematic in how it is undertaken and monitored, and best management practice is followed.
- Non-target impacts (especially when using herbicides) are considered.
- Good pastoral management (including appropriate fertiliser application and grazing) are used to control plant pests.
- Animal pest control is undertaken humanely.
- Plantation establishment involves non-spread prone conifers.
- Pests are monitored as appropriate, but recognising that outcome monitoring (of pasture growth, native biodiversity etc) is a better reflection of the success of pest control.

Ten-year goal: *The extent of European broom across the property is less in 2030 than it is in 2020.*

Ten-year goal: *Continue regular control of wilding conifers across the property and contain the Mt John wilding forest within the Mt John Forest LMU.*

Ten-year goal: *Mouse-ear hawkweed does not threaten pastoral production or biodiversity conservation values.*

Ten-year goal: *Rabbits have been maintained at low levels across the property.*

Ten-year goal: *An active working partnership has been developed with the Te Manahuna Aoraki Project that is contributing towards the objective of eradicating a wide range of plant and animal pest species from the project area.*

4.8 Biodiversity and waterways

Balmoral Station has high natural biodiversity values, including the extensive short tussock and red tussock grasslands that occur widely over the undeveloped parts of the properties, and smaller areas of native shrubland and wetland. The property has been conservatively managed and as a result, native vegetation cover is good across most of Balmoral. A diverse range of native plant and animal species are present, including a number of 'Nationally Threatened' and 'At Risk' species. Because of its size, Balmoral Station offers considerable opportunities for biodiversity enhancement.

Balmoral Station wishes to be recognised as an exemplar for its biodiversity management through retaining outstanding examples of shrubland and grassland communities as identified through the Mackenzie District Plan, through excluding cattle from streams and wetlands and for being an active partner in the regional Te Manahuna Aoraki Project.

The management of native biodiversity and waterways on Balmoral Station is guided by a number of principles including:

- Balmoral Station contains regionally significant native biodiversity in both aquatic and dryland environments.
- Pastoral management is undertaken in a manner that does not degrade native biodiversity and waterways including not fertilising within 10 m of water bodies and Sites of National Significance.
- Cattle will be excluded from all ecologically significant water bodies (streams, wetlands, lakes etc).
- Where appropriate, biodiversity conservation and waterway management are undertaken in collaboration with others (e.g. ECan, DOC, Te Manahuna Aoraki Project), and follows best practice principles.
- Native biodiversity conservation is promoted to visitors to Balmoral Station.
- Plant and animal pests are managed to reduce their impacts on native biodiversity and waterways.
- The condition of native biodiversity and waterways is monitored.

Ten-year goal: *Tussock (red and hard) cover is on average at least the same in 2030 as it is in 2020 within Sites of Natural Significance and Scenic Grassland Areas as delineated within the Mackenzie District Plan.*

Ten-year goal: *Extent and cover of shrubland generally across Balmoral Station has not declined and a management programme for the biodiverse shrubland in SNS-34 (Old Man Sunnyb Faces LMU) has been developed.*

Ten-year goal: *Cattle have been excluded from all significant waterways on the property.*

Ten-year goal: *Biodiversity and waterway monitoring has been undertaken regularly across the property and the results from this have been incorporated into farm management decision making.*

4.9 Recreation and tourism

Balmoral Station is located in the heart of the Mackenzie Basin and epitomizes the key values of this area – wide open landscapes, expansive tussock grasslands and clear skies. These values present huge opportunities for recreation and tourism, with Mackenzie Horse Trekking and Silver River Star Gazing and Farm Tours already operating on the property. The Helicopter Line also operate from a hanger on the property. But Balmoral Station is also very much a working farm and recreation and tourism need to be balanced against farming (and forestry) needs. Notwithstanding this, there are a diversity of opportunities to provide experiences for the public on Balmoral Station that help meet the goal of being an economically diverse business (e.g. farm tours, an agricultural demonstration site or Agri-dome, on-farm accommodation, biking/walking tracks, campervan sites etc). If undertaken properly, recreation and tourism can complement farming and can help support the sustainable environmentally sensitive approach to farming that this management plan is based on. The key is to find a balance of recreation and tourism opportunities that can help Balmoral Station meet its 30-year vision.

The management of recreation and tourism on Balmoral Station is guided by a number of principles including:

- Recreation and tourism activities must be environmentally sustainable and not adversely impact on farming or forestry operations.
- Where appropriate, recreation and tourism operations should be used to promote the environmental sustainability principles of farm management.
- Provision of free public access to particular parts of the property is important to Balmoral Stations philosophy of providing benefits to the community.
- Recreation and tourism activities need to help diversify income streams for Balmoral Station.
- Recreation and tourism opportunities on Balmoral Station will be developed to complement those available elsewhere in the Tekapo area and will focus on quality experiences not the quantity of people participating in them.
- Recreation and tourism can contribute to meeting the goals of environmental accreditation schemes.
- Quantifying recreation and tourism use of the property is essential if it is to be managed sustainably.

Ten-year goal: *Continue to provide free public access on the Lakeside and Mt John tracks in the Mt John and Mt John Forest LMUs.*

Ten-year goal: *Have at least one new quality tourism operation running on the property.*

Ten-year goal: *Establish at least one new commercial recreation opportunity on the property.*

4.10 Greenhouse gases/carbon accounting

New Zealand has set the target of being carbon-neutral by 2050 with the passing of the Zero Carbon Bill in November 2019. The exception to this is biogenic methane emissions where the goal is to reduce emissions by 10% below 2017 levels by 2030, and then by 24%-47% by 2050. Government has agreed to work with the farming sector to find practical and cost-

effective ways to measure and price emissions at the farm level and has allowed farmers to be exempt from the emissions trading scheme until 2025.

Balmoral Station has been actively establishing plantation forests to offset its carbon emissions for a number of years and currently sequesters around 10,000 tonnes of CO₂ equivalents per year and emits around 2,000 tonnes of CO₂ equivalents per year (excluding biogenic methane). The long-term goal for the property is to continue to be carbon positive for CO₂ and to actively implement a program based on breeding and use of supplements to reduce biogenic methane emissions in excess of Government targets.

As well as contributing to Balmoral Station being carbon-neutral, forestry can also provide an additional income stream through “carbon farming”. The forestry currently accumulates approx. 10,000 carbon units (credits) annually. Carbon credits currently trade at \$20-25/unit. Carbon units will continue to accrue as existing plantings mature and additional trees are planted. Using status quo assumptions, the forestry is budgeting to accrue 20,000 units annually in 15 years which with a market value of potentially \$50/unit = a total annual value of \$1million.

The management of carbon on Balmoral Station is guided by a number of principles including:

- Continue to be carbon positive for CO₂.
- Follow best practice methods to reduce biogenic methane emissions (e.g. through selective breeding and careful attention to animal diet).
- While not accounted for, follow best practice to enhance soil carbon (e.g. through good ground cover and use of direct drilling).

Ten-year goal: *Use objective carbon accounting methods to quantify all carbon emissions.*

Ten-year goal: *Continue to be carbon positive for CO₂.*

Ten-year goal: *Exceed Governments targets for biogenic methane emission reductions*

Ten-year goal: Potentially become carbon zero accredited

SECTION 5: MANAGEMENT ACTIONS BY LMU

In this section, the values of and management goals for each land management unit are identified. Stocking patterns are summarised across the farm in Appendix 11 and a summary of the ecological significance of each LMU is presented in Appendix 12 and provide a summary of overall spending on different management activities to meet the LMU management goals presented. Threatened species categories are given in Appendix 8.

5.1 Benchmark Area (LMU 1)



Location and area: Northwest of SH8 within the Old Man South LMU and west of the Tekapo Military Camp (201 ha).

Landform: Small section of south facing slopes of Old Man Range together with moraines and fluvio-glacial outwash surfaces to the south of this.

Vegetation cover: A mosaic of red tussock and hard tussock, with red tussock more common in areas with impeded drainage. This LMU includes a large red tussock dominated wetland and an ephemeral tarn in the south. Matagouri dominated shrubland is present in one gully system.

Stocking Policy: Livestock were excluded in 2000, although grazing before that was low and the same as in the Old Man South LMU.

Other Management Inputs: Aside from boundary fence maintenance and weed control (wildings and broom) no further management inputs have occurred in this LMU.

Biodiversity values: High – the site is part of Mackenzie District Plan SNS (34) and the PNAP Rap 11 and has high biodiversity values. The SNS values are associated with the presence of “red tussock in an unbroken continuum from the poorly drained valley floor to well drained slopes. Also contains two shallow tarns [*one in LMU4*] that are part of a complex of important wetlands. These sites provide a breeding, loafing and feeding area for wading birds, including the black stilt.”

The site is important because it contains ‘Chronically Threatened’ and ‘At Risk’ land environments supporting extensive native vegetation, it is part of a much larger area dominated by native ecosystems (red and hard tussock grasslands) which occur through Old Man South LMU, Round Hill LMU and in the wider area (including on adjacent public conservation land), has a substantial area of wetland vegetation including an ephemeral tarn, and provides important habitat for a wide range of native plants and animals species. Several ‘Nationally Threatened’ and ‘At Risk’ species are known to be present including kaki (NC), black-billed gull (NC), wrybill (NV), banded dotterel (NV), cushion pimelea (NV), cushion broom (NV), matagouri (ARD), grassland spaniard (ARD), *Coprosma intertexta* (ARD), coral broom (ARD), dwarf broom (ARD) and willow herb (NU).

The whole of this LMU is ecologically significant in terms of almost all of the criteria listed in the Canterbury Regional Policy Statement.

Recreation, tourism values: Low – access is restricted but could be used for nature interpretation in the future.

Why critical to farm: Non-grazing benchmark for the rest of the property.

Five-year management objectives:

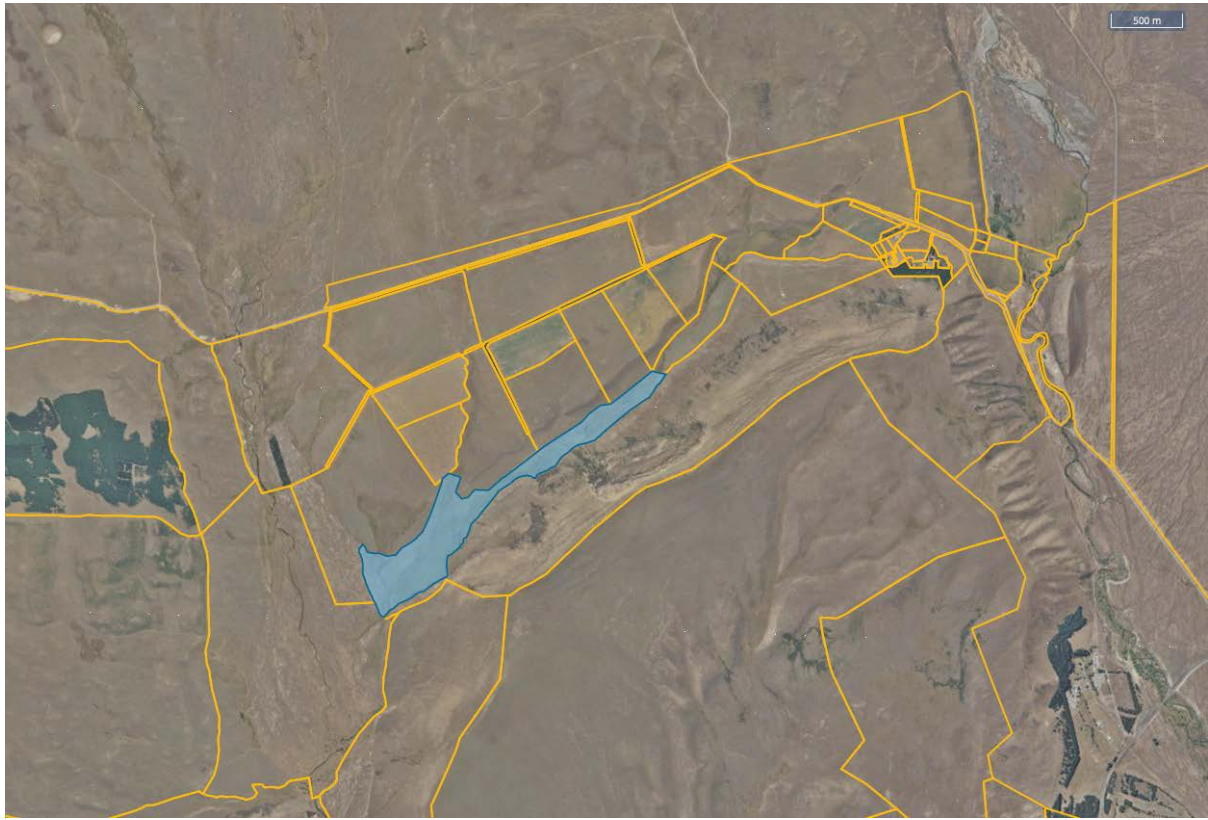
- Continue to exclude all livestock and restrict public access.
- Undertake regular plant and animal pest control focusing on eliminating wildings and European broom, and controlling rabbits and hares to low levels. Also eliminate any wallaby’s that are seen.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (one vegetation plot in this LMU).
- Undertake thin-barked tōtara enrichment plantings in the matagouri shrubland up the main gully under Pt 1006.

5.2 Old Man Wetland (LMU2)

Location and area: At the base of the Old Man Range on the western side. This wetland drains both the Old Man Range and the paddocks to the north (Irishman Paddocks and Dryland Paddocks LMUs) (70 ha).

Landform: Wetland.

Vegetation cover: A diverse wetland that supports a range of vegetation communities including *Carex* sedgeland, bog rush tussockland, red tussock grassland and small areas of comb sedge cushion fields, and shallow open water.



Stocking Policy: Currently only fenced on one side, and then only partially so and open to sheep and cattle grazing. This grazing is managed to have a very low impact, ie cattle hardly ever get put in there.

Other Management Inputs: None.

Biodiversity values: High – a relatively intact wetland that supports a wide range of communities and species, including several ‘Nationally Threatened’ and ‘At Risk’ species, is well connected hydrologically to Irishman’s Creek and provides habitat for a range of ‘Nationally Threatened’ and ‘At Risk’ birds. ‘Nationally Threatened’ and ‘At Risk’ species known to be present include kaki (NC), black-fronted tern (NE), *Ranunculus brevis* (NE), *Charophyllum colensoi* var. *delicatulum* (NE), grassland Spaniard (ARD) and *Leucopogon nanum* (ARD).

The whole of this LMU is ecologically significant in terms of most of the criteria listed in the Canterbury Regional Policy Statement.

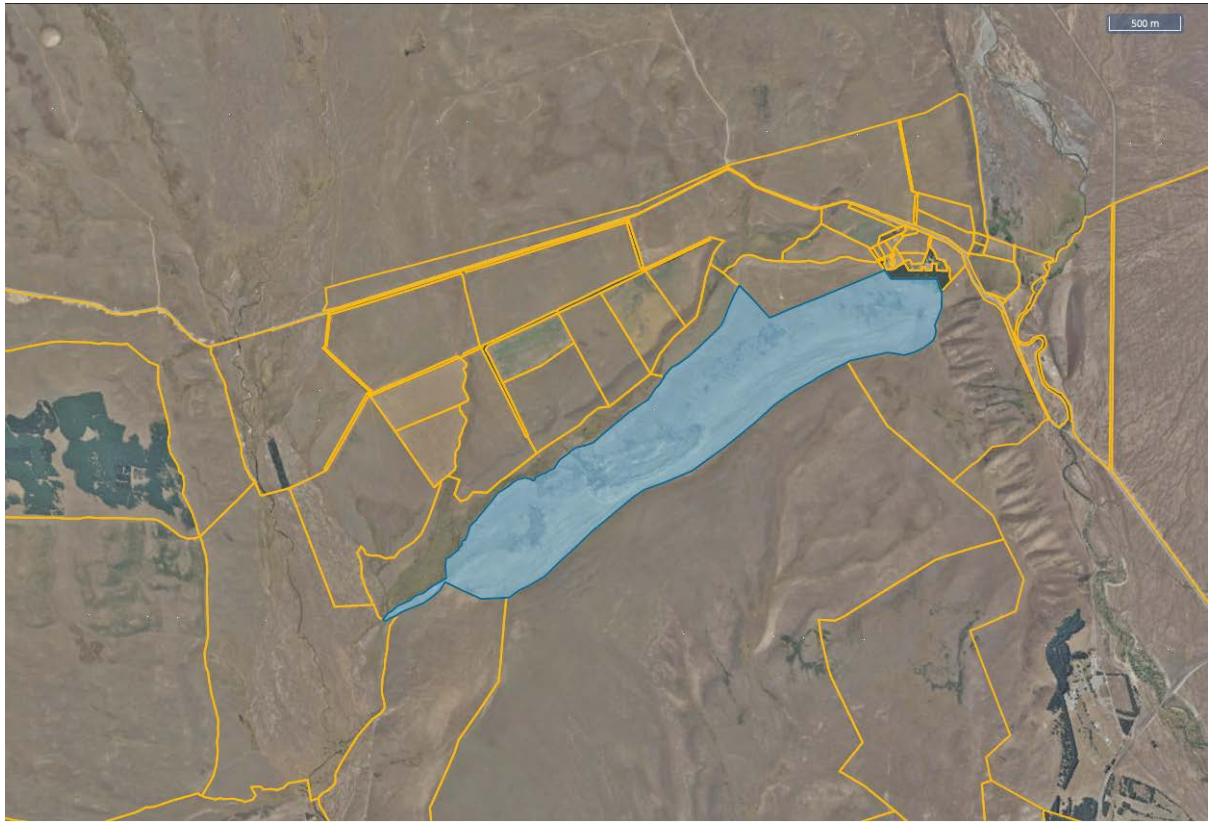
Recreation, tourism values: Low.

Why critical to farm: Not critical for farming but key biodiversity asset. Also important as a filter for any nutrient discharges from the Irishman Paddocks and Dryland Paddocks LMUs.

Five-year management objectives:

- Erect fences to exclude cattle but allow sheep grazing for weed management.
- Establish an appropriate monitoring regime.

5.3 Old Man Sunny Face (LMU3)



Location and area: The steep northwest facing slopes of the Old Man Range ('Old Man Sunny Face' paddock minus Old Man wetland; 236 ha).

Landform: Steep faces of the Old Man Range composed of old glacial deposits including a major slump feature.

Vegetation cover: Outstanding shrubland communities and boulder fields/scree slopes, otherwise the vegetation is depleted hard tussock grassland.

Stocking Policy: No fixed stocking pattern. Used for sheep at any time of year when feed is needed.

Other Management Inputs: Regular AOSTD.

Biodiversity values: High –this LMU contain the most diverse shrubland present on Balmoral Station with matagouri and mingimingi dominant but also including porcupine scrub, scented tree daisy, *Coprosma intertexta* (ARD), mountain wineberry, desert broom, prostrate kowhai (rare in the ecological district) and corokia. The shrubland communities on the old slump feature are part of a Site of National Significance (34). Several 'Nationally Threatened' and 'At Risk' species are also present including cushion broom (NV), cushion pimelea (NV), *Colobanthus brevicaulis* (ARD), dwarf broom (ARD) and *Leucopogon nanum* (ARD). Southern grass skink (ARD) is also present and habitat appears suitable for other lizard species.

Outstanding shrubland communities on old slump feature in Old Man Face) part of a Site of National Significance – 34), otherwise depleted short tussock grassland

Much of this LMU is ecologically significant because of the presence of several ‘Nationally Threatened’ and ‘At Risk’ species, because part of it is a ‘Chronically Threatened’ land environment and because it includes a major slump feature that is rare in the wider areas.

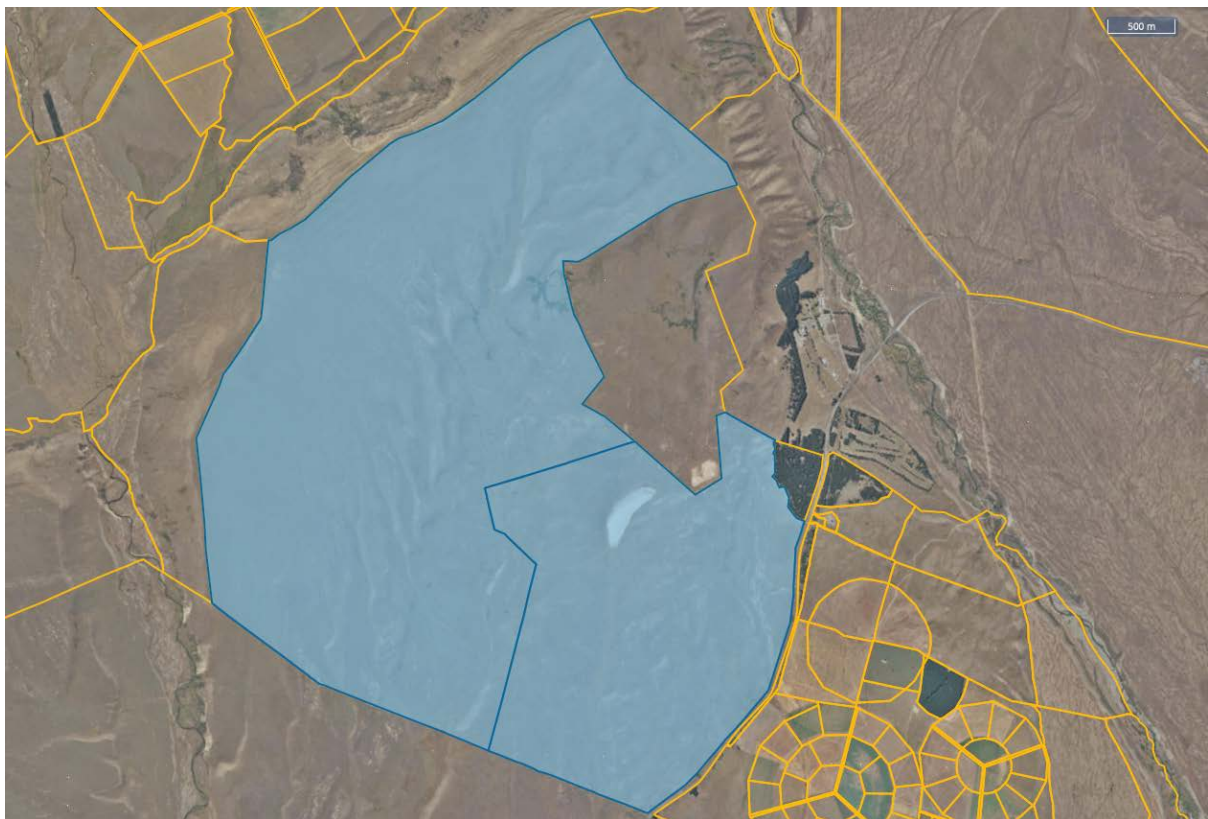
Recreation, tourism values: Low.

Why critical to farm: Not important for farming and goal is to manage for biodiversity conservation with light sheep grazing when required. However, stock need regular access through the bottom of this LMU to connect different parts of the farm.

Five-year management objectives:

- Sustain and enhance shrubland based on a separate ecological assessment and management prescription.
- Continue to use for sheep grazing as required but no cattle.
- Fence off Old Man Wetland to prevent cattle access.
- Undertake weed control to protect the native shrubland values.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (two vegetation plots in this LMU).

5.4 Old Man South (LMU4)



Location and area: Slopes of Old Man Range to SH8 ('Loch Harbour' and 'Long Paddock'; 1651 ha).

Landform: South and east facing slopes of Old Man Range together with extensive moraines and fluvio-glacial outwash surfaces to the south of this. Includes a large tarn and small areas of wetland.

Vegetation cover: A diverse mosaic of red tussock and hard tussock, with red tussock more common in areas with impeded drainage. Small areas of matagouri dominated shrubland occur in gullies on the lower slopes of the Old Man Range. Apart from occasional wilding conifers, the area is remarkably weed free.

Stocking Policy: Sheep three-months February–April (ewes after weaning). Long Paddock (adjacent to SH8) has an extra months grazing in September when feeding out occurs (ewes).

Other Management Inputs: No fertiliser or seed applied (and never has been), but plant and animal pest control is undertaken focusing mainly on wildings

Biodiversity values: High – part of Mackenzie District Plan Site of Natural Significance 34, Mackenzie District Plan Scenic Grasslands 9 & 10 and the PNAP Rap 11 and has high biodiversity values. The SNS values are associated with the presence of “red tussock in an unbroken continuum from the poorly drained valley floor to well drained slopes. Also contains two shallow tarns (one in LMU1) that are part of a complex of important wetlands. These sites provide a breeding, loafing and feeding area for wading birds, including the black stilt.”

The site is important because it contains 'Chronically Threatened' and 'At Risk' land environments supporting extensive native vegetation, it is part of a much larger area dominated by native ecosystems (red and hard tussock grasslands) which occur through Benchmark and Round Hill LMUs, and in the wider area (including on adjacent public conservation land), has a substantial area of wetland vegetation including a permanent tarn, and provides important habitat for a wide range of native plants and animals species. Several 'Nationally Threatened' and 'At Risk' species are known to be present including kaki (NC), black-billed gull (NC), wrybill (NV), banded dotterel (NV), cushion pimelea (NV), cushion broom (NV), matagouri (ARD), grassland spaniard (ARD), *Coprosma intertexta* (ARD), coral broom (ARD), dwarf broom (ARD), pygmy club rush (ARD), hypsela (ARD), *Rytidosperma exiguum* (ARD).and willow herb (NU).

The whole of this LMU is ecologically significant in terms of almost all of the criteria listed in the Canterbury Regional Policy Statement.

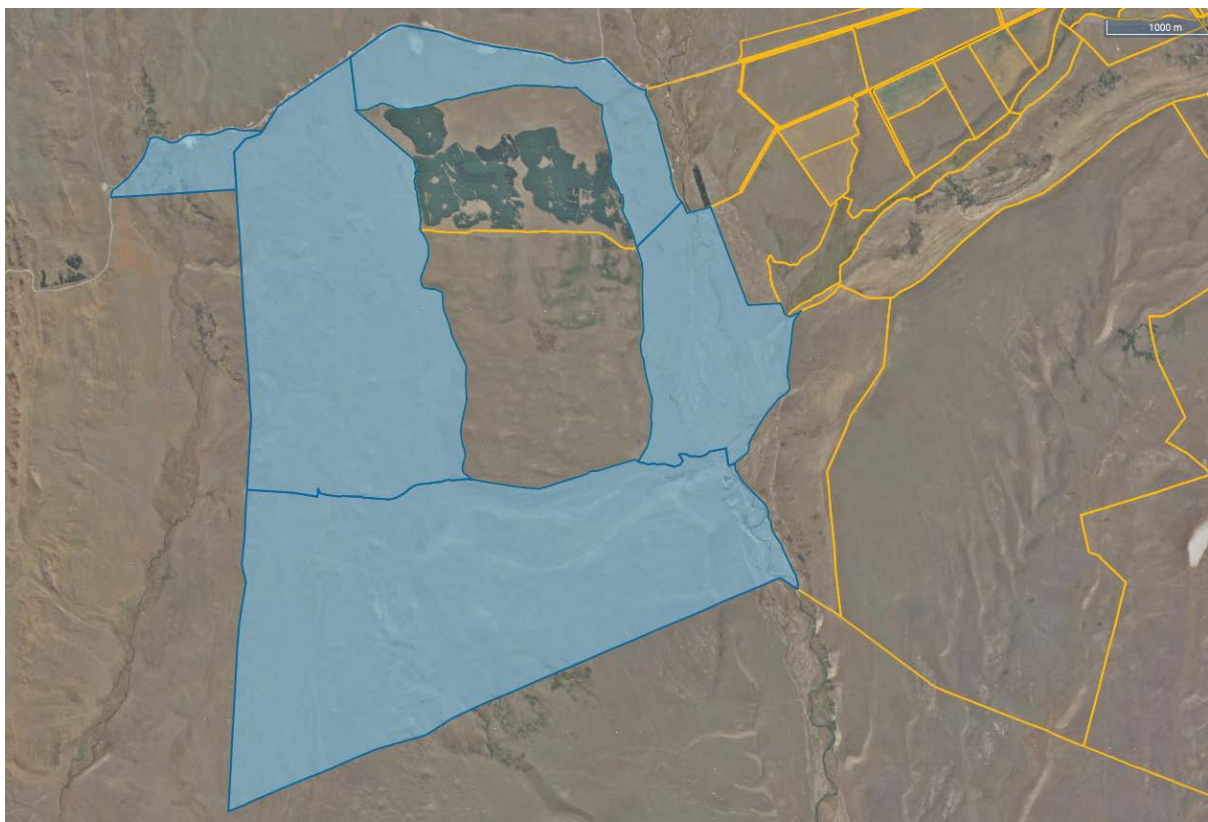
Recreation, tourism values: High – both because of the views it affords from SH8 (hence the Scenic Grasslands designation) and because of the opportunities it provides for recreation and tourism within the LMU (e.g. for star-gazing adjacent to the large tarn and for access to the summit of the Old Man Range).

Why critical to farm: Important post-weaning grazing for ewes which allows other blocks to be spelled at this time. Also valuable for some winter grazing as close to areas where winter feed is stored.

Five-year management objectives:

- Continue with current sheep grazing regime.
- Undertake regular plant and animal pest control focusing on eliminating wildings and European broom, and controlling rabbits and hares to low levels. Also eliminate any wallaby's that are seen.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (ten vegetation plots in this LMU).
- Develop eco-tourism opportunities.
- Explore potential for fencing to enable cattle grazing – ideally would like to be able graze cattle for two three-month blocks (August–November, March–May).

5.5 Round Hill (LMU5)



Location and area: All of the property west of Irishman Creek excluding the plantation forest, although fences lie to the east of Irishman Creek for much of the block ('Maryburn Bridge', 'Roundhill Flat', 'Roundhill'; 1825 ha).

Landform: This area comprises a complex system of lateral moraines including hummocky conical moraine, kame terraces, melt water channels, boulderfields, depressions, ephemeral tarns and numerous erratic boulders.

Vegetation cover: An extensive area of red tussock and hard tussock grassland with numerous other native species. Apart from occasional wilding conifers, the area is remarkably weed free. The area includes several wetlands, most notably Swan Lagoon, and small areas of boulder fields.

Stocking Policy: Sheep only February – April, ewes 800 (also spend time in adjacent forestry block which is not currently fenced off from this LMU).

Other Management Inputs: No fertiliser or seed applied (and never has been), but plant and animal pest control is undertaken focusing mainly on wildings.

Biodiversity values: High – although not mapped as significant in the Mackenzie District Plan the LMU has outstanding natural values including the presence of many ‘Nationally Threatened’ and ‘At Risk’ plant and animal species, as well as being large and bounding other areas with extensive natural values (public conservation land to the south and Ministry of Defense land to the north as well as Balmoral Station to the east. This LMU is regarded as being part of the largest and most intact red tussock grassland system on dry moraines in the Mackenzie Ecological Region. ‘Nationally Threatened’ and ‘At Risk’ species present include kaki (NC), sneezeweed (NE), banded dotterel (NV), bignose galaxias (NV), cushion pimelea (NV), pygmy clubrush (ARD), hypsela (ARD), *Leucopogon nanum* (ARD), coral broom (ARD), dwarf broom (ARD), grassland spaniard (ARD), *Coprosma intertexta* (ARD), *Colobanthus brevicepalus* (ARD), Southern grass skink (ARD) and *Rytidosperma exiguum* (ARD).

The whole of this LMU is ecologically significant in terms of almost all of the criteria listed in the Canterbury Regional Policy Statement.

Recreation, tourism values: High – current recreation and tourism use is limited but has massive potential because of its isolated location and wide night sky, creating potential for various forms of eco-tourism.

Why critical to farm: Important post-weaning grazing for ewes which allows other blocks to be spelled at this time.

Five-year management objectives:

- Maintain grazing at current levels for ewes.
- Establish internal fencing that will enable cattle to graze the forestry block and the area between this and Irishman Creek.
- Fence off Irishmans Creek and Swan Lagoon (ECan have been approached for funding support for this fencing). This development enhances the environmental values of the Round Hill LMU and will also enable the station to winter an additional 100 MA Cows (through being able to utilise the plantation forest for cattle grazing).
- Explore potential to increase ecotourism.
- Undertake regular plant and animal pest control focusing on eliminating wildings and controlling rabbits and hares to low levels. Also eliminate any wallaby’s that are seen.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (eleven vegetation plots in this LMU).

5.6 Little Mount John (LMU6)

Location and area: Large area north of SH8 between Braemar Road and Mt John Road, extending north to Lake Alexandrina (‘Paddock 6’, ‘Viewing Corridor’, ‘Alex Huts’, ‘Alex Huts 1’: 1247 ha).



Landform: Moraines, outwash channels and outwash plain. Includes the small roche moutonnée of Little Mount John.

Vegetation cover: On shallow soils, the vegetation is a depleted herbfield dominated by mouse-ear hawkweed and sparse exotic grasses, with substantial areas of bare ground and stones. Deeper soils support short tussock grassland dominated by hard tussock but still with a significant mouse-ear hawkweed component but with more abundant exotic grasses (mainly browntop and sweet vernal).

Stocking Policy: Autumn runoff for ewes only.

Other Management Inputs: Weed (wildings) and animal pest control as required but no fertilizer or seed has been applied. One area that has strongly wind eroded sandy soils has been fenced to exclude livestock and Russell lupins and some trees planted to try and control the erosion.

Biodiversity values: High – the majority of this LMU is mapped in the Mackenzie District Plan as a Site of National Significance (32), a Scenic Grassland Area (8) and a scenic Viewing Area (2). Although herbfield and depleted hard tussock grassland dominate, a number of ‘Nationally Threatened’ and ‘At Risk’ plant and animal species are present including banded dotterel (NV), cushion broom (NV), cushion pimelea (NV), grassland speargrass (ARD), matagouri (ARD) and *Leucopogon nanum* (ARD). This LMU is also contiguous with the extensive undeveloped grassland on adjacent Ministry of Defense land to the north and borders Lake Alexandrina Scenic Reserve which is another Site of National Significance (58). The moraine and outwash landforms that underlie this LMU are largely mapped as ‘Chronically Threatened’ in the Threatened Environment Classification.

The whole of this LMU is ecologically significant in terms of most of the criteria listed in the Canterbury Regional Policy Statement.

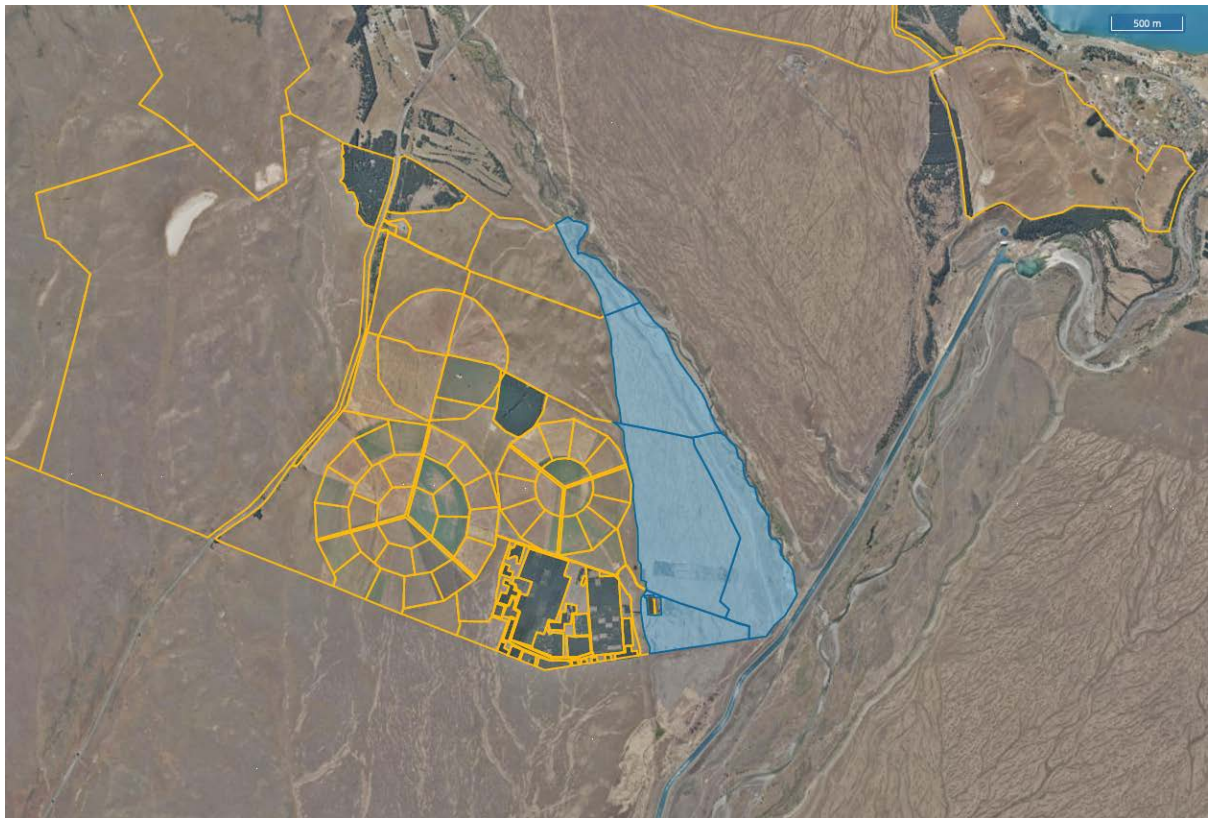
Recreation, tourism values: Moderate to high – scenically spectacular views and currently used for horse trekking and potential for mountain biking and walking tracks.

Why critical to farm: Key access between the Mt John and Balmoral parts of the farm and also important autumn runoff for ewes.

Five-year management objectives:

- This area has considerable potential for the development of a 30MW solar farm in the north where it can be located largely out of sight from public viewing points and due diligence will be undertaken for this.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (six vegetation plots in this LMU).

5.7 Bottom Terrace (LMU7)



Location and area: The lowest terrace on the property adjacent to and west of Fork Stream ('River Block', 'DOC Boundary', 'Stage 2 Pivot Development', and parts of 'Forks River Block' and 'Golf Course': 198 ha).

Landform: Alluvial terrace formed by Fork Stream.

Vegetation cover: Sparse herbfield with mouse-ear hawkweed and sheep's sorrel the dominant plants but with substantial cover of bare ground and stones. Some forestry trials are also present.

Stocking Policy: Limited sheep and cattle grazing at the moment but once the consented irrigation is installed will be a critical to the farm in the same way as the pivots LMU is already.

Other Management Inputs: Weed (wildings) and animal pest control as required but no fertilizer or seed has been applied.

Biodiversity values: Low-moderate – not identified in the Mackenzie District Plan as having significance, although a number of ‘Nationally Threatened’ and ‘At Risk’ species have been recorded from this LMU including robust grasshopper (NE), cushion pimelea (NV), tussock bindweed (NV), *Muehenbeckia ephidroides* (NV), matagouri (ARD), *Colobanthus brevicepalus* (ARD). Black fronted terns (NE) and banded dotterel (NV) utilise the adjacent Fork River bed, part of which lies within the property boundary although below the terraces. The site mapped as a ‘Chronically Threatened’ land environments although the cover of native vegetation is very low.

Eastern edge and lower terraces beside Fork Stream are ecologically significant because of the presence of several ‘Nationally Threatened’ and ‘At Risk’ species and because the river is an important corridor for fish movement and the river bed is important habitat for native birds, although the rest of the site is not.

Recreation, tourism values: Low – access is difficult and planned development will further limit potential.

Why critical to farm: Once the consented irrigation is installed will be critical to the farm in the same way as the Pivots LMU is already – this LMU will be part of the engine room of the farm in terms of growing forage to finish sheep and cattle and for producing balage. This both makes the property economically viable but also allows the rest (majority) of the property to be managed in a conservative manner sustaining the other values present (native biodiversity, landscape, recreation, tourism).

Five-year management objectives:

- Establish consented pivots (109ha). Because this consent was granted by ECan prior to November 2015, vegetation clearance is permitted under the Mackenzie District Plan. This irrigation development will assist in enabling the farm to increase capital stock units to our optimum level of 10,000 stock units.
- Terrace risers and other areas that support ‘Nationally Threatened’ and ‘At Risk’ species will be carefully searched once irrigation development has been completed and livestock excluded where appropriate through fencing, and ecological monitoring established.

5.8 Old Man West Face (LMU8)

Location and area: Steep west facing slopes of the Old Man Range above Irishman Creek (‘Old Man South Face’ paddock: 173 ha).

Landform: Steep faces of the Old Man Range composed of old glacial deposits.

Vegetation cover: Hard tussock grassland with a strong exotic pasture component, but includes small patches of matagouri-mingimingi shrubland.



Stocking Policy: No fixed stocking pattern. Used for sheep and cattle at any time of year when feed is needed.

Other Management Inputs: Regular AOSTD.

Biodiversity values: Low – mainly depleted short tussock grassland, although shrubland patches have higher values because of the presence of a some ‘At Risk’ species including matagouri (ARD) and *Coprosma intertexta* (ARD). *Corokia cotoneaster* is also present in at least one of these patches, an otherwise rare species in the Mackenzie Basin. This LMU is not considered to be ecologically significant.

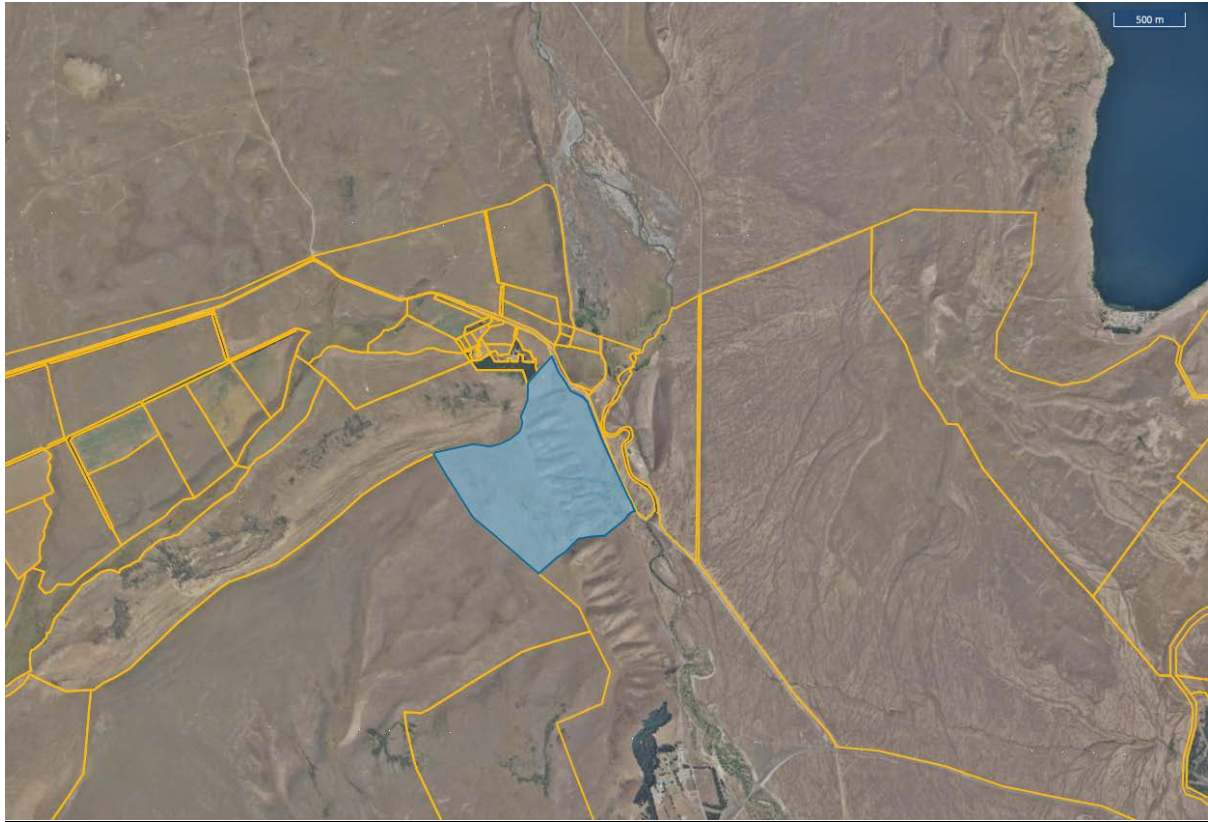
Recreation, tourism values: Low – except perhaps for access to top of Old Man Range from Irishman Creek and Round Hill.

Why critical to farm: Provides sheep and cattle grazing at times when feed is in short supply on other parts of the farm.

Five-year management objectives:

- Fence off Irishman Creek to prevent cattle access.
- Undertake weed control as required.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (one vegetation plot in this LMU).

5.9 Old Man East Face (LMU9)



Location and area: The steep east facing slopes of the Old Man Range adjacent to MOD land ('Old Man Face' paddock; 106 ha).

Landform: Steep faces of the Old Man Range composed of old glacial deposits.

Vegetation cover: Depleted hard tussock grassland but includes some diverse mixed species shrubland.

Stocking Policy: No fixed stocking pattern. Used for sheep and cattle at any time of year when feed is needed. Also used for holding stock for shearing (September).

Other Management Inputs: Regular AOSTD.

Biodiversity values: Low – although shrubland includes matagouri (ARD) and *Coprosma intertexta* (ARD). This LMU is not considered to be ecologically significant.

Recreation, tourism values: Low – except perhaps for access to top of Old Man Range from homestead.

Why critical to farm: Key block for holding sheep prior to shearing.

Five-year management objectives:

- Continue to manage as at present.

5.10 McGregor (LMU10)



Location and area: Paddocks between Godley Peaks Road and Lake Alexandrina around Trig N and the '600 acre' block north of Lake McGregor ('Middle Alex', 'Top Block', 'McGregor Block', '600 Acre', 'Human Poo Parade': 707 ha).

Landform: Rolling moraines with small tarns.

Vegetation cover: Modified short tussock grasslands with a strong exotic pasture component (qualifies as improved pasture in terms of the definitions provided in Section 19, Plan Change 18, in the Mackenzie District Plan), limited shrubland in gullies dominated by matagouri and sweet briar.

Stocking Policy: Currently used for lambing, with ewes and lambs held through until weaning when it is spelled.

Other Management Inputs: Regular aerial fertilizer and seed application (every 2-3 years).

Biodiversity values: This LMU has been described as having high biodiversity values and includes SNS 57 and part of SNS 58A, SGA 8 and part of RAP T-18. Parts of this LMU were also identified as part of a SSWI. SNS 57 is identified as significant because: "*Paradise shelduck and banded dotterel present*". A small part of the LMU (east of Godley Peaks Road) lies in SNS 58A which includes both lake Alexandrina and Lake McGregor and collectively the values are described as: "*Breeding area for one of New Zealand's largest populations of southern crested grebe and New Zealand Scaup. Little shags also nesting.*"

Other waterfowl present, include marsh crake, black stilt and Australian coot. High numbers of native galaxids, bullies and eels occur in lakes. Colony of protected skink L. lineocellatum, and sympatric populations of skinks and geckos occur in the area.” It is unclear how much of this description applies to the small area within Balmoral Station. The bay of Lake Tekapo that abuts this small section of LMU 6 is also one of the few known sites of the Nationally Critical New Zealand fish-guts plant (*Chenopodium detestans*) but it has not been recorded on the property. Matagouri (ARD) is present in this LMU.

Tarns and edge of Lake Tekapo are ecologically significant because of the presence of several ‘Nationally Threatened’ and ‘At Risk’ species, although the rest of the site is not.

Recreation, tourism values: Medium-High – while current recreation and tourism use is low (except for illegal freedom camping on the unfenced part of the property between Godley Peaks Road and Lake Tekapo; ‘Human Poo Parade’), the potential is high because it is easily accessed from Godley Peaks Road and is close to Tekapo township.

Why critical to farm: Key lambing block with good shelter. Also important for cattle grazing both to complement other parts of the farm and to manage the pastures present (but requires fencing first).

Five-year management objectives:

- Continue with current sheep grazing regime.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (four vegetation plots in this LMU).
- Develop eco-tourism opportunities (e.g. extended horse-trekking and camping).
- Construct cattle exclusion fencing around Lake Alexandrina and the five tarns to enable cattle grazing to be introduced.

5.11 Mount John (LMU11)

Location and area: All of Mount John except for the cultivated paddocks (McGregor paddocks LMU) and the wilding conifer forest on the south face (Mount John Forest LMU) (‘Wedding’, ‘Sunny Face’, ‘Mt John Sunny Face’, ‘Mt John’, ‘Horse Run’, ‘Rocky’, ‘Earth & Sky’, ‘Mt John Airstrip’, ‘Earth & Skya’: 367 ha).

Landform: Large roche moutonnée.

Vegetation cover: Modified short tussock grasslands with a strong exotic pasture component (qualifies as improved pasture in terms of the definitions provided in Section 19, Plan Change 18, in the Mackenzie District Plan), limited shrubland in places dominated by matagouri and sweet briar and small areas of boulderfield.

Stocking Policy: Currently sheep only (2-tooth ewes September to January). Ewes have been lambed on this block but it is challenging because of public access (disturbance to lambing ewes and “rescuing” lambs). No cattle grazing as lake margin is unfenced.

Other Management Inputs: Regular aerial fertilizer and seed application (every 2-3 years). Maintenance of tracks that are used for horse trekking, and public walking and mountain biking.



Biodiversity values: Low – the lower slopes on the western side of this LMU are mapped as part of a Scenic Grassland Area (8) and the eastern slopes as a Lakeside Protection Area in the Mackenzie District Plan. While matagouri (ARD), grassland spaniard (ARD) and southern grass skink (ARD) are present, no Nationally Threatened species are known to be present and the vegetation is generally highly modified and can be considered as improved pasture in terms of the definitions provided in Section 19, Plan Change 18, in the Mackenzie District Plan. A small boulder field and bluff system between 960-1000 m on the southern tip of Mt John has a reasonable flora of montane and subalpine plants and may be considered ecologically significant because of its isolated location. Other boulderfields and small bluffs are also present.

This LMU is not considered to be ecologically significant apart from the small boulder field/bluff systems described above which may be.

Recreation, tourism values: High – road access to the Mt John Observatory, lookout and cafe passes through this LMU, while horse trekking, mountain biking and walking occur through the LMU. Two tracks are open to the public and available at no cost, one directly up to the summit of Mt John from the south and the other around the shores of Lake Tekapo and then up to Mt John from the north.

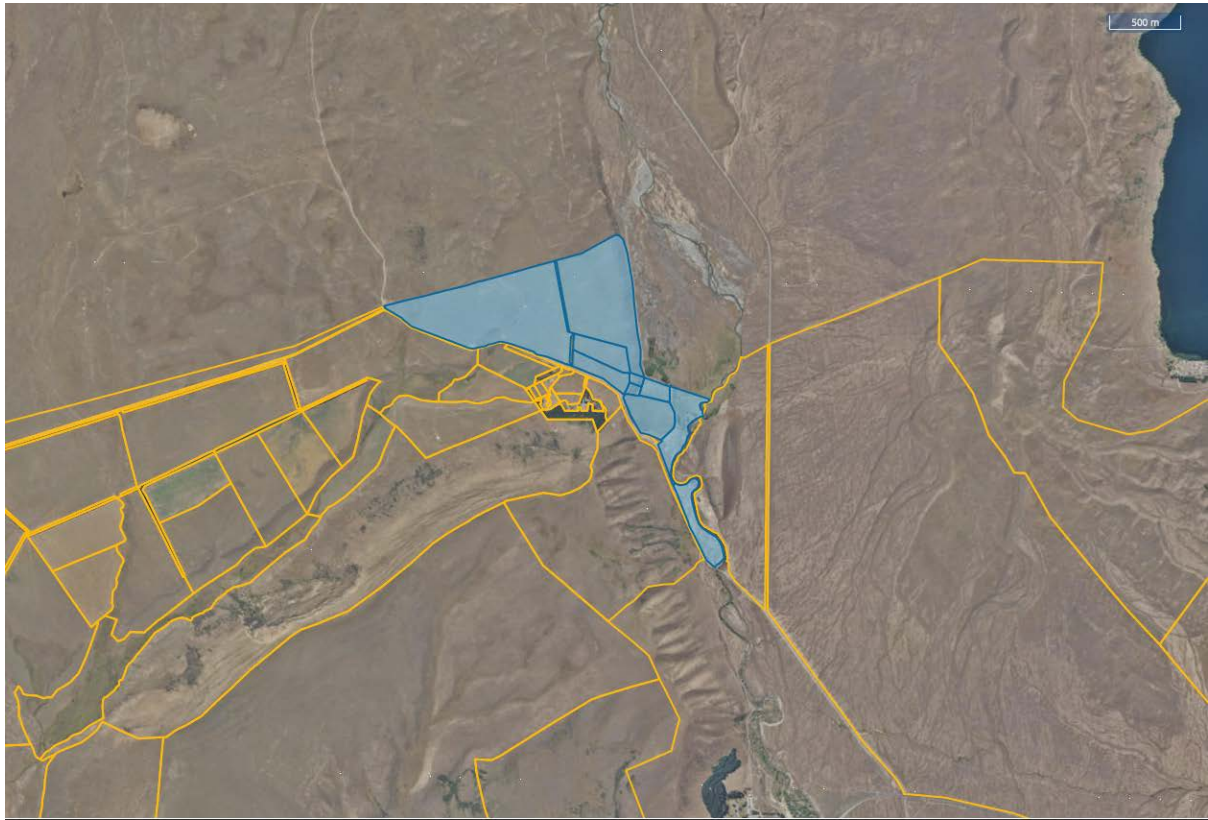
Why critical to farm: Value is limited because of high public use but does provide important grazing for non-lambing 2-tooth ewes when MA ewes are lambing.

Five-year management objectives:

- Maintain sheep grazing and explore options to control weeds such as sheep's bur.

- Maintain current recreational opportunities (walking, horse trekking and mountain biking) and explore opportunities for expansion.
- Vegetation monitoring with photo points completed annually and full vegetation assessments undertaken every five years (four vegetation plots in this LMU).

5.12 Deer Farm (LMU12)



Location and area: Deer fenced area between the Braemar Road and MOD land ('Rambo's', 'Mt Stevenson', 'Deer Pen 1', 'Deer Pen 2', 'Boney', 'Deer Holding Paddock 2', 'Deer Holding Pen 1', 'Deer Swamp':115 ha).

Landform: Outwash flats.

Vegetation cover: Improved pasture.

Stocking Policy: Deer, sheep and cattle.

Other Management Inputs: AOSTD and direct drilled.

Biodiversity values: Low – native vegetation largely lacking and not considered ecologically significant.

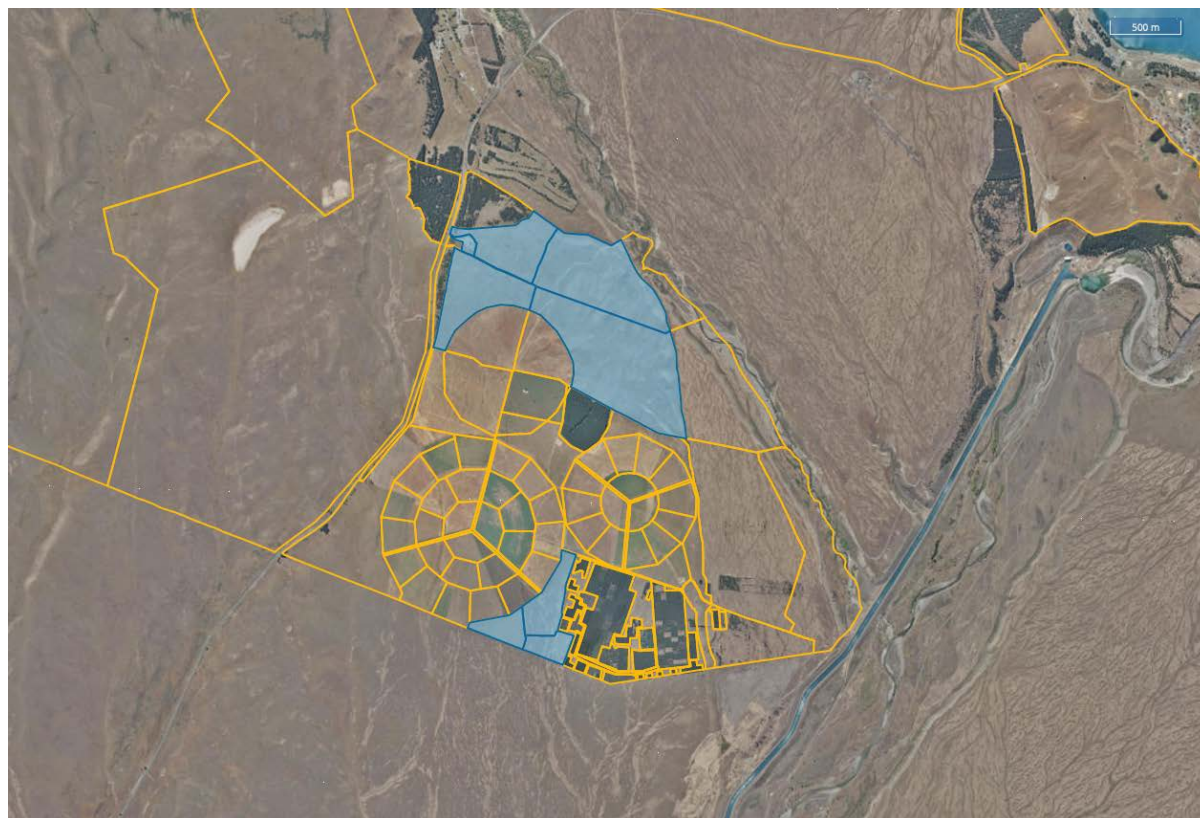
Recreation, tourism values: Moderate – currently low but has potential to develop accommodation with stunning views.

Why critical to farm: Developed paddocks that are essential for grazing at different times of the year.

Five-year management objectives:

- Deer are being discontinued and replaced with sheep and beef grazing only.

5.13 Improved Flats (LMU13)



Location and area: East of SH8 and north of the pivots plus a small area between the southern pivot and the SCION forestry trial plots (167 ha).

Landform: Flats and moraine.

Vegetation cover: Flats are predominantly exotic pasture while moraine supports depleted hard tussock grassland in an exotic pasture matrix (improved pasture). Several small ephemeral wetlands with turf communities are also present.

Stocking Policy: Sheep and cattle.

Other Management Inputs: Flats are drilled and fertilised, and used for baleage, while moraine has been regularly oversown and fertilized.

Biodiversity values: Moderate – the moraine landform is a ‘Chronically Threatened’ land environment and a number of ‘Nationally Threatened’ and ‘At Risk’ plants have been recorded from the site including *Amphibromus fluitans* (NV), tarn speedwell (ARD), grassland Spaniard (ARD), coral broom (ARD), dwarf broom (ARD) and *Epilobium*

angustum (NU). However, the site would also qualify as improved pasture making the assessment of significance more difficult.

Because the site can be regarded as improved pasture in terms of the Mackenzie District Plan and has a long history of management inputs and grazing it is not considered here as ecologically significant.

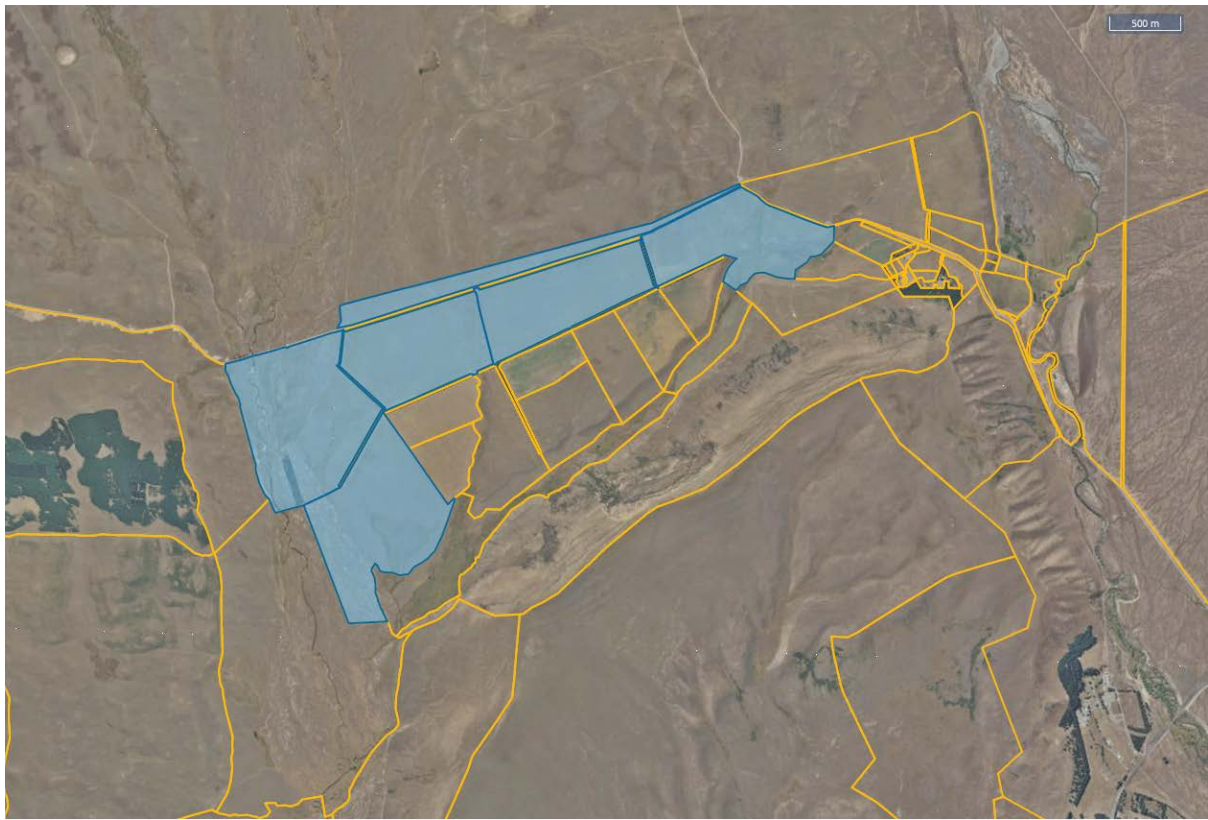
Recreation, tourism values: Low – but potential as location for an airstrip for skydiving.

Why critical to farm: High producing non-irrigated flats are important for producing winter feed and as complement to other parts of farm.

Five-year management objectives:

- Continue with same livestock and pasture management.
- Establish consented irrigation holding dam.
- Explore potential of establishing an airstrip for AOSTD and skydiving.
- Establish two monitoring points here.

5.14 Irishman Paddocks (LMU14)



Location and area: Paddocks on both sides of the Braemar Road ('The Long Mile', 'Airstrip', 'Irishman', 'Cattleyard', 'Toms', 'Lagoon Block', 'Dump': 395 ha).

Landform: Outwash flats.

Vegetation cover: Oversown and fertilized short tussock grassland that meets the definition of improved pasture.

Stocking Policy: Sheep and cattle (where current fencing permits).

Other Management Inputs: AOSTD and direct drilled.

Biodiversity values: Low – native vegetation largely lacking except for remnant hard tussocks and not considered ecologically significant.

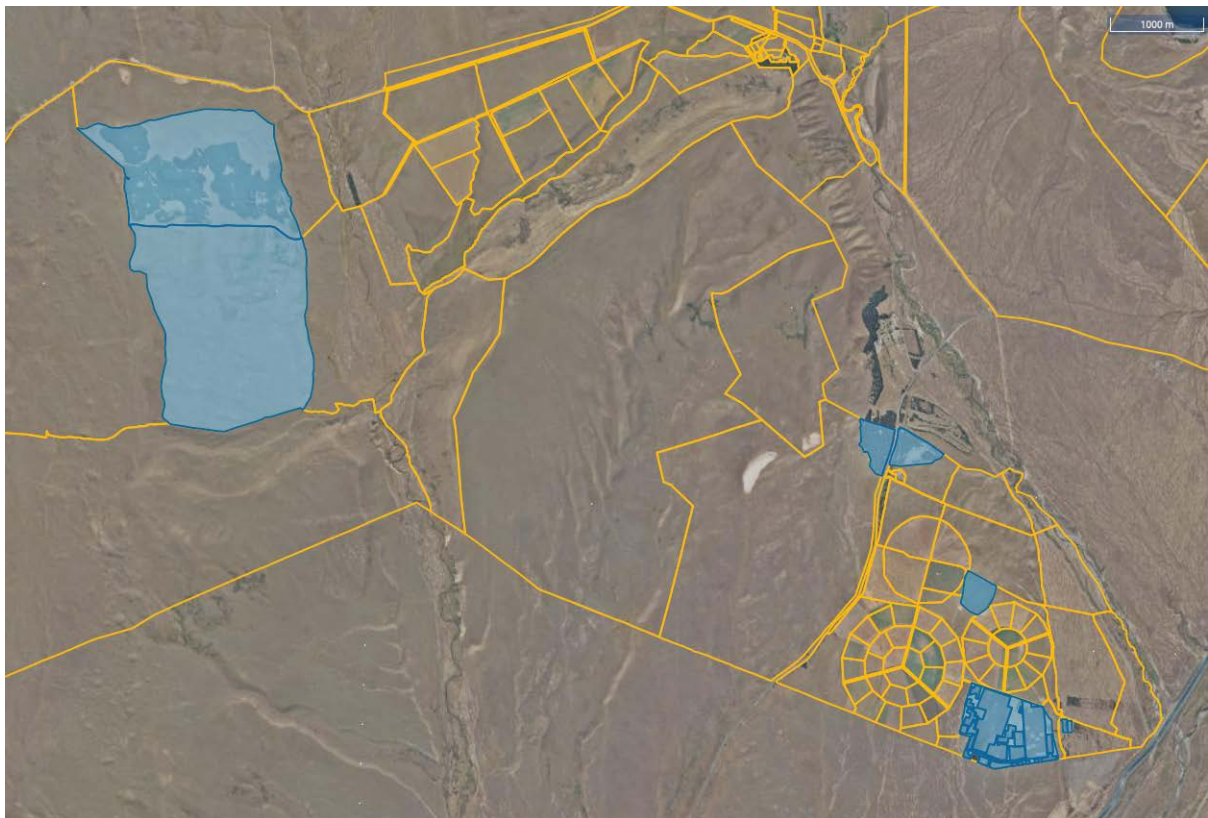
Recreation, tourism values: Low.

Why critical to farm: High producing non-irrigated flats important for feed and as complement to other parts of farm.

Five-year management objectives:

- Similar management inputs and grazing regime, but with appropriate fencing increase cattle use.
- Fence off Irishman Creek to prevent cattle access.
- Build cattle yards.

5.15 Plantation Forests (LMU15)



Location and area: Six blocks, including in Round Hill LMU, behind the homestead, both sides of SH8 adjacent to the Military Camp and the helicopter hanger, a block north of the irrigation block and the SCION trial site southeast of the irrigation block (648 ha).

Landform: Moraine and flats

Vegetation cover: Plantation forest and remnant hard and red tussock grassland in areas where tree establishment has failed.

Stocking Policy: The plantation area surrounded by the Round Hill LMU has sheep through it at the same time as Round Hill is grazed as it is currently not fully fenced.

Other Management Inputs: Routine plantation forest management.

Biodiversity values: Low – the previous native vegetation has been shaded out, but does provide habitat for native birds including greywarbler/riroriro and fantail/piwakawaka. Not considered ecologically significant.

Recreation, tourism values: Low – the plantation forest within the Roundhill LMU does have hunting potential as red deer are present.

Why critical to farm: Critical part of overall balance of business as provide an additional income stream as well as some extra grazing.

Five-year management objectives:

- Continue to manage as a commercial plantation forest focusing on hybrid pines with appropriate silvicultural treatments.
- Continue supporting SCION with their research trials.
- Continue to trade carbon and some of this income can be put back into wilding control over the rest of the property

5.16 Mount John Forest (LMU16)

Location and area: Steep faces of Mt John above the hot pools complex (43 ha).

Landform: Steep south facing slopes on the Mt John roche moutonnée.

Vegetation cover: Wilding conifer forest with European larch dominant but also including *Pinus nigra* and *Pinus ponderosa*. Small boulderfield (includes large mountain wineberry and porcupine shrub, and is likely good habitat for lizards).

Stocking Policy: Not stocked.

Other Management Inputs: Walking and horse trekking track maintenance and wilding conifer control.

Biodiversity values: Low – the previous vegetation has largely been shaded out (except for the boulder field which supports native plants and animals), but does provide habitat for native birds including greywarbler/riroriro and fantail/piwakawaka.

Recreation, tourism values: High – Mt John summit walking track and lower farm track used for walking and biking. A horse trekking track also runs through the forest.



Why critical to farm: Not important for farming but key part of scenic backdrop to Tekapo.

Five-year management objectives:

- Potentially remove some economically valuable large trees (if safe to do so).
- Control tree spread above this LMU.
- Ecological survey of boulderfield and based on results implement conifer management in order to protect this area if deemed necessary.
- Maintain public access along walking track and horse trekking tracks.

5.17 Shelter Belts (LMU17)

Location and area: Located within the Irishman Paddocks, Dryland Paddocks and Deer Farm LMU's (10 ha).

Landform: Flats.

Vegetation cover: Exotic conifers.

Stocking Policy: Nil.

Other Management Inputs: Minimal apart from tidying up wind damage.

Biodiversity values: Low, not ecologically significant.

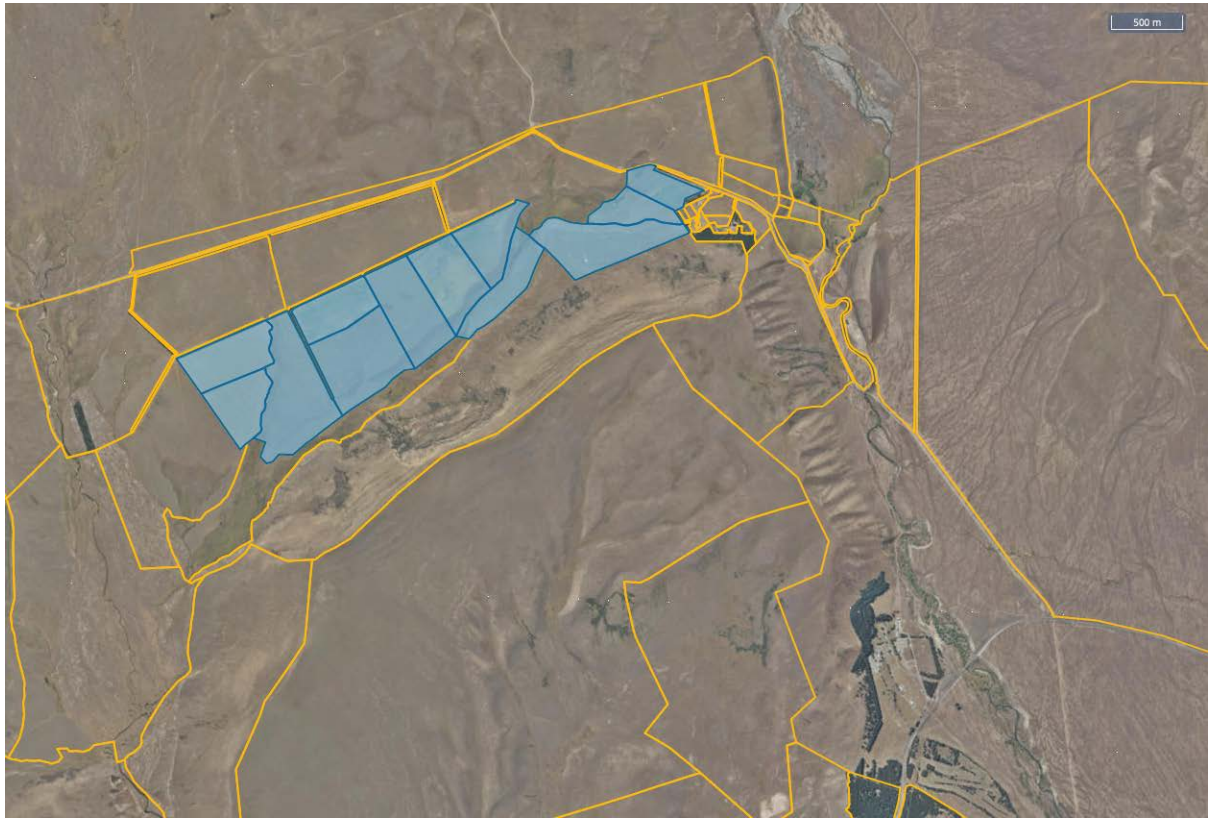
Recreation, tourism values: Low.

Why critical to farm: Essential for shelter.

Five-year management objectives:

- Remove spread-prone species.
- Gradually replace as trees become over-mature.

5.18 Dryland Paddocks (LMU18)



Location and area: Eight paddocks adjacent to Old Man Wetland ('Pump Shed', 'Sue's', 'Trial 1', 'Trial 2', 'Trial 3', 'Trial 4', 'Fred's', 'South Swamp', 'Rupert's', 'Triangle', 'Oat'; 357 ha).

Landform: Flats.

Vegetation cover: Improved pasture dominated by pasture species including cocksfoot, clovers, plantain and rye grass.

Stocking Policy: Sheep and cattle.

Other Management Inputs: Cultivated, oversown and fertilised since the 1980s and used for baleage and hay production, and grazing.

Biodiversity values: Low, not ecologically significant.

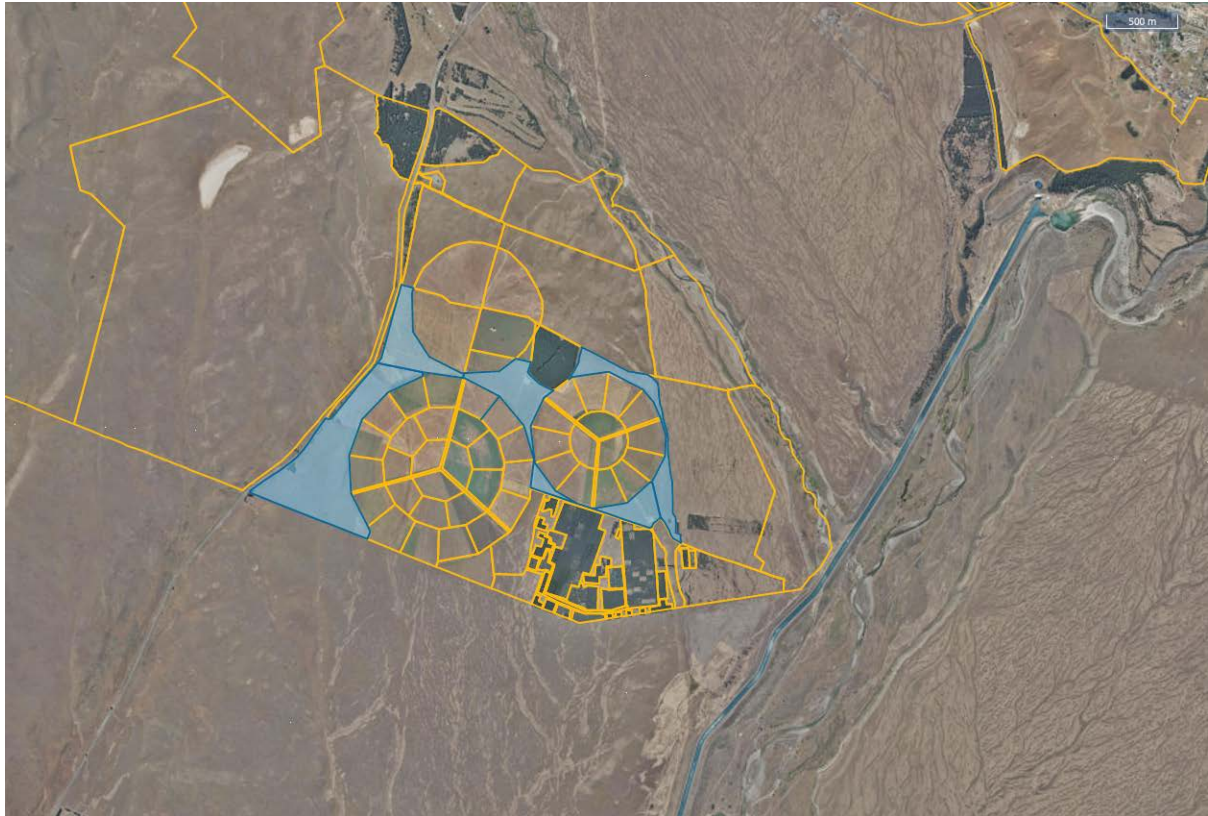
Recreation, tourism values: Low.

Why critical to farm: High producing non-irrigated flats are important for producing winter feed and as complement to other parts of farm.

Five-year management objectives:

- Much the same, but improve rotational use.
- Fence off Old Man Wetland to prevent cattle access.

5.19 Cultivated Paddocks (LMU19)



Location and area: Paddocks adjacent to the centre pivots (95 ha).

Landform: Flats.

Vegetation cover: Improved pasture dominated by cocksfoot, clovers, plantain and rye grass, and crops.

Stocking Policy: Sheep and cattle

Other Management Inputs: Cultivated, oversown and fertilised, and used for baleage and hay production., and gazing

Biodiversity values: Low, not ecologically significant.

Recreation, tourism values: Low.

Why critical to farm: High producing non-irrigated flats important for producing winter feed and as complement to other parts of farm.

Five-year management objectives:

- Much the same, but improve rotational use.
- Develop planting plan and establish new shelter (native species).
- Replace fencing adjacent to SH8.

5.20 Mount John Paddocks (LMU20)



Location and area: Paddocks to the west and east of Godley Peaks Road ('Rex's', 'Footstool', 'Silo', 'Bruce's', 'Roadside'; 114 ha).

Landform: Moraine and lower slopes of Mt John

Vegetation cover: Improved pasture dominated by cocksfoot, clovers, plantain and rye grass, and crops.

Stocking Policy: Sheep and cattle grazing.

Other Management Inputs: Cultivated, fertilised and sown for pasture and crops.

Biodiversity values: Low, not ecologically significant.

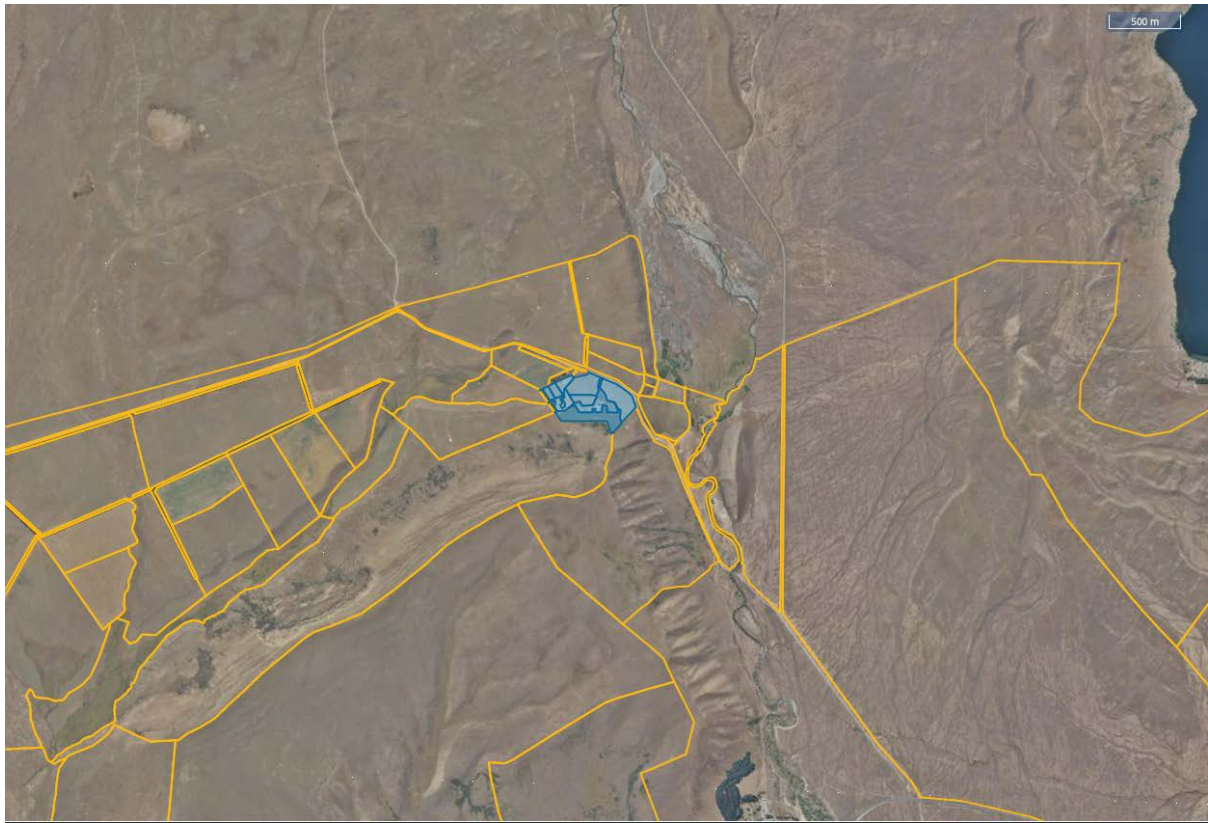
Recreation, tourism values: Low, but has potential for agri-tourism.

Why critical to farm: High producing non-irrigated flats and slopes that are important for producing winter feed and as complement to other parts of farm.

Five-year management objectives:

- Permanent paddocks that will be maintained in a similar manner.

5.21 Homestead Paddocks (LMU21)



Location and area: Paddocks surrounding the woolshed, covered yards and accommodation (includes 'Holding Paddock': 21 ha).

Landform: Flats and lower slopes Old Man Range.

Vegetation cover: Improved pasture together with tracks, buildings and yards.

Stocking Policy: Sheep and cattle.

Other Management Inputs: Oversown and fertilized.

Biodiversity values: Low, not ecologically significant.

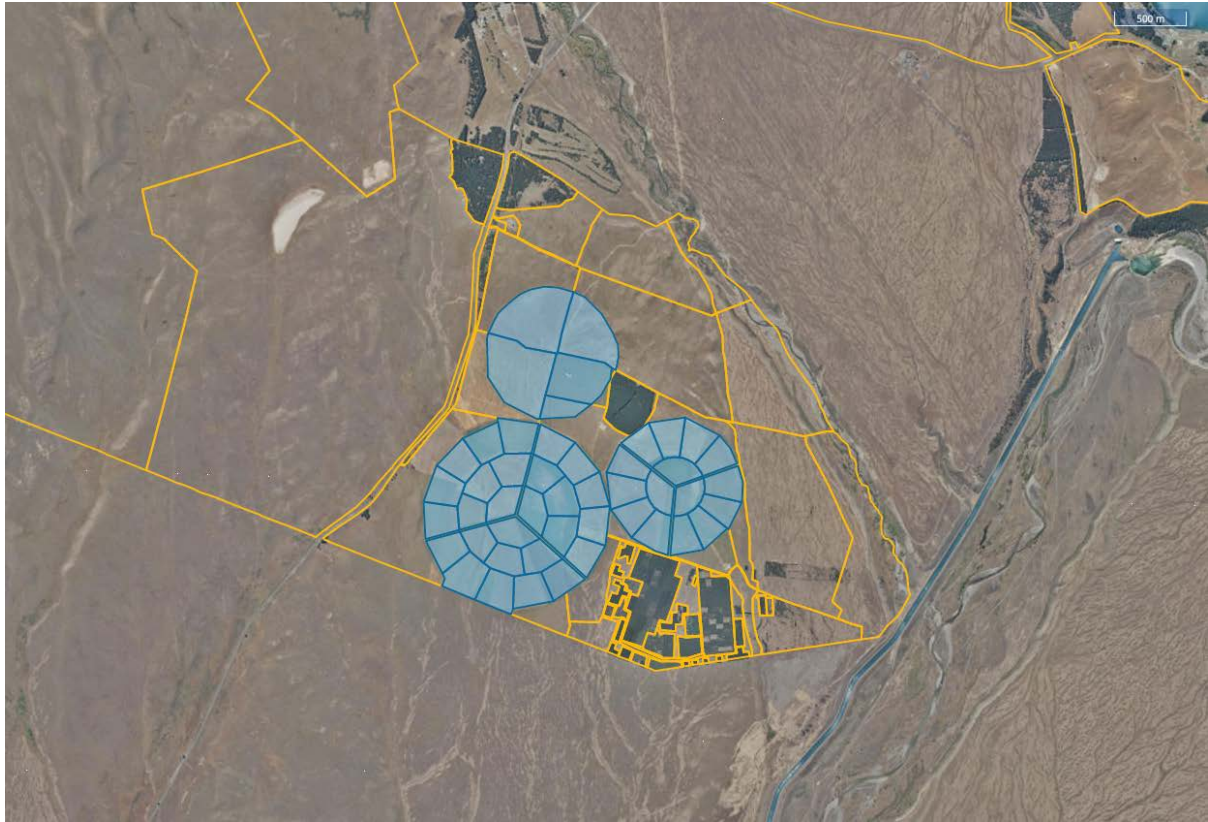
Recreation, tourism values: Low.

Why critical to farm: Critical for stock management as adjacent to the woolshed.

Five-year management objectives:

- Managed in much the same manner in the future.

5.22 Centre Pivot Irrigation Block (LMU22)



Location and area: Three centre pivots east of SH8 (280 ha).

Landform: Flats.

Vegetation cover: Pasture and crops.

Stocking Policy: Short rotation sheep and cattle grazing

Other Management Inputs: Cultivated, over sown, fertilised and irrigated – used for finishing livestock (prime lamb/hoggets and prime beef) and for baleage.

Biodiversity values: Low – although wading birds including ‘Nationally Threatened’ species such as kaki feed on the irrigated pastures.

Recreation, tourism values: Low.

Why critical to farm: Effectively the engine room of the farm in terms of growing forage to finish sheep and cattle and for producing baleage. This both makes the property economically viable but also allows the rest (majority) of the property to be managed in a conservative manner sustaining the other values present (native biodiversity, landscape, recreation, tourism).

Five-year management objectives:

- Optimise management in terms of plant and animal performance.
- Shelter planting.

5.23 Scott Block (LMU23)



Location and area: The David Scott / AgResearch trial area and adjacent paddock on the Godley Peaks Road ('Lupin', 'Davey's Trial Area': 120 ha).

This area was fenced out of the farm in the 1970s under a collaborative agreement with AgResearch (Dr David Scott) for use as a research trial site to study the effects of different management interventions on plant growth in the high country. Over the following years, the trial yielded many scientific papers, with the last published research results appearing in the early 2000's.

Landform: Moraine.

Vegetation cover: Very variable from improved pasture and dense areas of lupin to unimproved native country. Vegetation cover is a product of the intensive research manipulations undertaken by Dr David Scott at this site with multiple trials exploring the effects of a range of management inputs (fertilizer, seeding, stocking, irrigation etc) on plant growth.

Stocking Policy: Sheep only.

Other Management Inputs: Much of this area has been intensively fenced, fertilised, irrigated and over sown especially with lupins.

Biodiversity values: Low – most of the site has been substantially modified. Not ecologically significant but does have some scientific value because of the trials.

Recreation, tourism values: High – lupins when flowering currently but potential for a substantial agri-tourism operation.

Why critical to farm: Not important for farming but has huge potential for agri-tourism because of extensive paddock network and existing irrigation system, and being adjacent to Goldey Peaks Road.

Five-year management objectives:

- Continue intensive management (especially through ongoing use of current irrigation).
- Explore potential for a substantial agri-tourism venture.
- Potentially pull out some of the fences to make it easier to manage in regard to grazing.



SECTION 6: PROPERTY WIDE MANAGEMENT ACTIONS

The previous section outlined management actions by LMU while this section outlines more generic management actions that apply across the whole property. These include health, safety and wellbeing, iwi liaison, annual budget cycles, research and development, carbon accounting, monitoring, and management plan review.

6.1 Health, safety and wellbeing

The principles that underpin health, safety and wellbeing on Balmoral Station were covered in Section 4.1. The following are the key management actions that the farm implements to address the 10-year goal of “*being exemplary within the sector for its proactive approach to health, safety and wellbeing*”.

Five-year management objectives:

- Undertake an annual review & update of Health & Safety Plan.
- New staff are inducted during their first week of work.
- A register of health & safety training undertaken by staff is maintained.
- Monthly health, safety and wellbeing reviews are undertaken and the hazard register is updated as required.
- Regularly review the workloads of existing staff.
- Where necessary undertake due diligence on the feasibility of appointing additional staff.

6.2 Iwi liaison

As discussed earlier (Section 3.1), Ngāi Tahu are the iwi who hold mana whenua over the land that comprises Balmoral Station. The wider Mackenzie Basin is important to Ngāi Tahu both spiritually and practically with mountains, lakes and other geographical features part of Māori creation stories, while numerous sites were important for seasonal mahinga kai opportunities and several taonga species are present.

The Simpson family is keen to develop a strong and enduring relationship with Ngāi Tahu and would like to ensure that their management of Balmoral Station respects and protects the values that are important to Ngāi Tahu. As such, they will endeavor to develop this relationship and will actively pursue where they can while recognizing that this might take some time.

Five-year management objectives:

- Actively approach Ngāi Tahu to start developing a long-term relationships.

6.3 Annual budgeting

In order to track the financial goal for the property of continuing to “*be a financially viable farm that continues to grow the business, meet its environmental goals and provide for the future needs of the Simpson family*”, the farm operates around an annual budget cycle.

Balmoral Station current reviews management work and budgets three times each year:

- End November (5 months - after shearing and tailing) – first review to check that things are on target for the year.
- End February – (8 months) second review looking towards the end of financial year and starting to think strategically about the next year.

- End May (11 months)– full review of previous year and setting of budget for next year.

Five-year management objectives:

- Undertake budget development as described above.
- Develop an asset registrar for the property.

6.4 Research and development

Research and development (R&D) plays a key role in the success of a business, helping the business have a competitive edge. R&D should focus on potential future issues/problems that will require solutions. If done properly, R&D can act as a catalyst for speeding up adaptation by introducing new products or new ways of doing things before the external environment forces the business to change. A business that can successfully leverage its R&D efforts by translating these into developing new products or ways of doing things will find itself ahead of its competitors. Thus, R&D contributes to both the sustainability and resilience of the business and this applies as much to a farm business as it does to any other business. R&D expenditure should therefore be considered as an investment rather than as straight expenditure.

Balmoral Station is committed to making the most of R&D opportunities as they arise in two main ways. First, through ensuring that staff are sufficiently skilled, or have access to consultants with the skills, to be able to quickly take advantage of new innovative ways of doing things. Second, by implementing specific on-farm R&D initiatives that can inform future management.:

Five-year management objectives:

- Explore at least one novel agri-tourism opportunity.
- Undertake due-diligence on the potential of establishing a solar farm.
- Establish at least two weather stations on the farm as the basis for making more informed decisions about farm management (e.g. crop types).
- Continue to support SCION and their research on high country forestry.
- Explore the potential of new plant species either as forage or as new crops (e.g. hemp).

6.5 Carbon accounting

Carbon accounting that can verify that Balmoral station continues to be positive in terms of CO₂ emissions and exceeds Government obligations for biogenic methane is seen as a key part of farm management.

Five-year management objectives:

- Continue monitoring plantation forest carbon sequestration through Permanent Sample Plots.
- Source a carbon accounting package that will allow emissions (CO₂ and biogenic methane) to be accurately tracked.
- Explore the potential for monitoring soil carbon.
- Explore becoming carbon zero accredited once a “carbon budget” is complete to aid in good public perception and marketing our offerings the tourism side of the business.

6.6 Environmental monitoring

The regulatory environment within which land management at Balmoral Station operates and the auditing systems associated with marketing farm products requires reporting on a range of environmental outcomes on the property. Monitoring provide feedback on management activities (e.g. stocking rates and fertiliser regimes) and assurance to stakeholders in terms of consents (MDC, LINZ) and product assurance (NZFAP). The following environmental variables are currently being monitored on Balmoral Station:

- General land cover (photo-points)
- Vegetation composition
- Water quality

General land cover and vegetation composition

This monitoring is based on a network of permanent 10 x 10 m monitoring sites located across the land management units that have not been developed on Balmoral Station (ie those that can be considered as ecologically significant in order to quantify the effects of farm management activities on ground cover (especially native species). LMUs that have largely lost their native component through farming and forestry practices have been excluded. The basic approach to monitoring involves using the permanent 10x10 m plots as a basis for photo-points and to quantify ground cover. Monitoring density is roughly proportionally to LMU area. The total number of monitoring points established represented a balance between what was achievable in terms of the time and cost associated in remeasurement.

39 monitoring sites have been established:

Benchmark Area, 200 ha, 1 sample point (1 sample per 200 ha)

Little Mount John, 1244 ha, 6 sample points (1 sample per 207 ha)

Old Man South, 1648 ha, 8 sample points (1 sample per 206 ha)

Round Hill, 2098 ha, 11 sample points (1 sample per 210 ha)

McGregor, 705 ha, 4 sample points (1 sample per 176 ha)

Mount John, 410 ha, 4 sample points (1 sample per 103 ha)

Old Man Sunny Faces, 289 ha, 2 sample points (1 sample per 145 ha)

Old Man West Faces, 173 ha, 1 sample point (1 sample per 173 ha)

Improved Flats, 215 ha, 2 sample points (1 sample per 108 ha)

Sampling density aims for one sample point every 100-200 ha. Sample points were randomly located within each LMU but in a stratified manner so that the full extent of each LMU was covered.

The specific monitoring sample approach involved:

- Permanently marking 10 x 10 m plots using metal standards, with final locations chosen to be representative of the vegetation in that part of the LMU.
- The cover abundance of all vascular plants (and other ground covers) within each plot was estimated using the standard Landcare Research grassland monitoring protocol.
- Photos were taken from each plot corner looking diagonally across the plot to provide a visual record of plot vegetation (with one additional photo taken showing the general location of the plot).

Monitoring plots were established in January 2020.

Five-year management objectives:

- Repeat photos annually.
- Repeat vegetation measurements on a five-year cycle.

- Establish additional monitoring as described in Section 5.

Water quality

Water quality is tested at two sites in Fork Stream one just above the Tekapo River confluence (measured by Irricon Resource Solutions) and a second at the SH8 bridge (measured by ECan). Monitoring follows standard procedures and includes measurements of dissolved inorganic Nitrogen (mg/L), dissolved reactive Phosphorus (mg/L) and E coli (MPN/100mL). Measurements are made monthly from November to April.

Five-year management objectives:

- Continue water monitoring programme.

6.7 Plan review and responsibilities

It is proposed to review this management plan annually as part of developing the annual business plan and the work programme that arises from that. Balmoral Station current reviews management work three times through each year (see Section 6.2 above) and it is proposed that the 11-month review at the end of May each year will include a formal review of this management plan and will include identification of any issues that need to be addressed in the following year including revision of management goals and/or actions as required.

Depending on any external audit requirements, it is proposed that the annual review will include sign-off on any specific performance indicators associated with particular standards such as the RWS standard.

A more detailed review of this plan will occur after five years (2024) and it is proposed that this review will involve a more formal process and will include an independent assessment of the results of environmental monitoring.

Appendices

Appendix 1 – Ngāi Tahu place names and travel routes

The following place names and travel routes associated with Ngāi Tahu are located on or near Balmoral Station:

- Te Manahuna is the Māori name for the Mackenzie Basin, located in the high country of Te Waipounamu. An important component of the Ngāi Tahu systematic management of the tribe's mahinga kai, Te Manahuna was tribally renowned for its abundance of weka and tuna (eels). The central locality of Te Manahuna meant Ngāi Tahu hapū from the eastern seaboard of Te Waipounamu from Arowhenua down to North Otago undertook seasonal food-gathering expeditions there. May to August was the main season for gathering weka and tuna, as the fat content of the animals was at its highest during this time. This greatly assisted the process of preserving the flesh in fat, to store over the winter months.
- Takapō, which is now incorrectly known as Lake Tekapo, is the second-largest of three roughly parallel lakes running north-east along the north edge of Te Manahuna (Mackenzie Basin). Takapō was one of the lakes dug by the Waitaha explorer Rākaihautū with his kō (Polynesian digging stick) named Tūwhakaroria. After arriving in the Uruao waka at Whakatū (Nelson), Rākaihautū divided the group into two. Rākaihautū led his group down the middle of the island, digging the freshwater lakes of Te Waipounamu, and his son, Rakihouia, led the other group down the east coast. Along with the adjoining lakes of Takamana (Lake Alexandrina) and Whakarukumoana (Lake McGregor), the wider Takapō area was an important part of the extensive food gathering area of Te Manahuna (Mackenzie Basin) that was tribally renowned for tuna (eels) and weka.
- Takamana (Lake Alexandrina) lies immediately west of the much larger Lake Takapō (Tekapo) in Te Manahuna (the Mackenzie Basin).
- Whakarukumoana (Lake McGregor) is located between Takapō (Lake Tekapo) and Takamana (Lake Alexandrina) in Te Manahuna (the Mackenzie Basin).
- Ōtehiwai (Mount John) is the small mountain at the south-western corner of Lake Takapō (Tekapo) where the popular Mount John Observatory is located. Ōtehiwai was an ancestor on the Ārai-te-uru waka that capsized near Matakaea (Shag Point) on the Otago coastline. After the capsizing, many of the passengers went ashore to explore the land, but needed to be back at the waka before daylight. Many did not make it, including Ōtehiwai, and were transformed into many of the well-known geographical features of Te Waipounamu.
- Takapō is the correct spelling for the Tekapo River, which flows from Lake Takapō into the top of the artificial Lake Benmore (Te Ao Mārama). Prior to the existence of Lake Benmore, the Takapō River flowed directly into the Waitaki River, and was an ara tawhito (traditional travel route) that connected the Upper Waitaki with Lake Takapō. Specific kāinga mahinga kai (food-gathering places) were also located along the river, where foods such as weka, tuna (eels), and pora ('Māori turnip') were gathered.
- Hakatere (Fork Stream) rises in the Gamack Range and flows south-east into Takapō (the Tekapo River), which exits at Te Ao Mārama (Lake Benmore). Along with Te Kōhai (Mary Burn Stream) and Te Wai-a-Kohe (Irishman Creek), Hakatere is part of a large wetland complex in Te Manahuna (the Mackenzie Basin). Hakatere was part of the

extensive network of kāinga mahinga kai (food-gathering places) located throughout Te Manahuna (the Mackenzie Basin) that was renowned for tuna (eels) and weka.

- Te Wai-a-Kohe (Irishman Creek) flows into Takapō (Tekapo River) in Te Manahuna (the Mackenzie Basin). During the 1879 Smith-Nairn Royal Commission of Inquiry into the Ngāi Tahu land claims, Ngāi Tahu kaumātua recorded Te Wai-a-Kohe as a kāinga mahinga kai (food-gathering place) where weka were gathered.
- Takapō pathway: “Old Jack [Pukurākau] was a wizard at steering and could wriggle a course through roots, snags, trees, rocks or shingle beds that in the case of a less skilful steerer would have cut the flax underneath the raft and so ripped up its bottom so that it would break up. He used to take trips up to the heads of the lakes (Ohau, Pukaki and Tekapo) to get birds and more especially eels, to be preserved for storage as winter food. He had a pataka or whata down here to put his catch in and he valued his annual trips. The process was to gut the eels when caught and sun dry them or sun cure them and then pack them in handy form to be brought down river to the sea coast. Great numbers were caught and it required strong mōkihi to transport them. When he made his mokihi made and loaded he would paddle his craft across the lake and shoot the outlet and into the river current. He told me the most dangerous place on the whole trip was the lake outlet as the water was choppy or rather had also a long smooth swirl that was deceiving and treacherous.”



Appendix 2 – Ngāi Tahu taonga species

Taonga species listed in the Ngāi Tahu Claims Settlement Act 1998 that are known to be present on Balmoral Station.

Name in Maori	Name in English	Scientific Name
Kahu	Australasian harrier	<i>Circus approximans</i>
Kaki	Black stilt	<i>Himantopus novaezelandiae</i>
Karearea	New Zealand falcon	<i>Falco novaeseelandiae</i>
Karoro	Black backed gull	<i>Larus dominicanus</i>
Koau	Black shag	<i>Phalacrocorax carbo</i>
Parera	Grey duck	<i>Anas superciliosa</i>
Pateke	Brown teal	<i>Anas aucklandica</i>
Pihoihoi	New Zealand pipit	<i>Anthus novaeseelandiae</i>
Piwakawaka	South Island fantail	<i>Rhipidura fuliginosa fuliginosa</i>
Poaka	Pied stilt	<i>Himantopus himantopus</i>
Putakitaki	Paradise shelduck	<i>Tadorna variegata</i>
Riroriro	Grey warbler	<i>Gerygone igata</i>
Tara	Terns	<i>Sterna spp.</i>
Aruhe	Fernroot (bracken)	<i>Pteridium aquilinum</i> var. <i>esculentum</i>
Korokio	Korokio Wire-netting bush	<i>Corokia cotoneaster</i>
Koromiko/Kokomuka	Koromiko	<i>Hebe salicifolia</i>
Mania	Sedge	<i>Carex flagellifera</i>
Patotara	Dwarf mingimingi	<i>Leucopogon fraseri</i>
Taramea	Speargrass, spaniard	<i>Aciphylla spp.</i>
Wi	Silver tussock	<i>Poa cita</i>
Wiwi	Rushes	<i>Juncus</i> all indigenous <i>Juncus</i> spp. and <i>J. maritimus</i>

Appendix 3 – Approved LINZ consents

startterm	activity	term	comments
16-Oct-87	Cultivation	NO TERM SPECIFIED	Application to cultivate approximately 8 hectares. Consent granted subject to the following conditions: 1) That you do not carry out any activity which would prejudice the areas identified as PNA-10 and PNA-11 in the Tekapo Ecological District until such
10-Apr-91	Stock Exemption	NO TERM SPECIFIED	Application for amendment to personal stock limitation. Consent granted subject to the following conditions: 1) An overall stock limitation approved, subject to the maintenance of all present development work and the continuing availability for grazing of
31-Mar-93	Cultivation	NO TERM SPECIFIED	Application to cultivate previously direct drilled land on approximately 120 hectares. Consent granted subject to the following conditions: 1) That extreme care be taken during the cultivation process which shall commence in the autumn and be completed th
15-Sep-93	Plant Trees	NO TERM SPECIFIED	Application to afforest up to 78 hectares as part of a joint venture with The New Zealand Forest Research Institute. Consent granted subject to the following conditions: 1) That prior to any planting of trees that all statutory consents are obtained under
25-Feb-94	Cultivation	NO TERM SPECIFIED	Application to cultivate previously direct drilled land on approximately 30 hectares. Consent granted subject to the following conditions: 1) That extreme care be taken during the cultivation process which shall commence in the autumn and be completed the
14-Feb-95	Cultivation	NO TERM SPECIFIED	Application to cultivate Hieracium infested short tussock on approximately 120 hectares. Consent granted subject to the following conditions: 1) That extreme care be taken during the cultivation process which shall commence in the autumn and be completed
9-Apr-96	Cultivation	NO TERM SPECIFIED	Application to cultivate Hieracium infested short tussock on approximately 50 hectares. Consent granted subject to the following conditions: 1) That extreme care be taken during the cultivation process which shall commence in the autumn and be completed t
9-Aug-96	Plant Trees	NO TERM SPECIFIED	Application for forestry development of 2,300 hectares of which 1,300 hectares will be planted in exotic plantation forest and 1,000 hectares oversown and topdressed for the prevention of wilding tree spread and landscape enhancement. Consent granted subj
2-Apr-98	Cultivation	NO TERM SPECIFIED	Application to cultivate Hieracium infested short tussock on approximately 40 hectares. Consent granted subject to the following conditions: 1) That extreme care be taken during the cultivation process which shall commence in the autumn and be completed t
5-Oct-98	Plant Trees	NO TERM SPECIFIED	Application to formalise an area of wilding tree spread into a formal plantation covering an area of approximately 50 hectares. Consent granted subject to the following conditions: 1) That widening tree spread be strictly controlled over the remainder of

11-Jan-99	Tracking	NO TERM SPECIFIED	Application to form a vehicle track approximately 1 kilometre in length suitable for 4 Wheel Drive vehicles. Consent granted subject to following condition: 1) The consent is granted under the Crown Pastoral Land Act 1998 and does not imply consent under
26-Mar-99	Cultivation	NO TERM SPECIFIED	Application to maintain approximately 450 hectares through cultivation to establish permanent pasture for hay and grazing paddocks. Consent granted subject to the following conditions: 1) That all prudent measures are taken to minimise the risk of wind bl
26-Mar-99	Top Dressing	NO TERM SPECIFIED	Application to topdress with fertiliser approximately 1,100 hectares for which a request has been made to sow seed. Consent granted subject to the following conditions: 1)That fertiliser continue to be adequately applied to the area to maintain a good swa
26-Mar-99	Sowing Seed	NO TERM SPECIFIED	Application to maintain with seed an area of approximately 1,100 hectares previously oversown or cultivated. Consent granted subject to the following conditions: 1)That only certified permanent pasture seed free from weed impurities be sown. 2) The consen
26-Mar-99	Plant Trees	NO TERM SPECIFIED	1) To maintain and blank up forested areas for which approval has already been granted under section 108 Land Act 1948, comprising 1,341.7 hectares of afforestation, and approximately 10 kilometres of existing six and eight row shelter belts. 2) To establ
1-Aug-09	Recreation Permit	7 years 11 months	Helicopter hanger and operations
15-Apr-20	Stock limitation	NO TERM SPECIFIED	6,560 sheep 9including 3,500 breeding ewes) and 410m cattle (including 200m breeding cows)

Appendix 4 – Balmoral Station 2018 Farm Environment Plan audit

Appendix 5 – Mackenzie District Plan Change 18

Mackenzie District Plan Change 18 rules and definitions relating to Balmoral Station.

Plan change 18 has a direct impact on Balmoral Station. The primary way these rules affect what can occur on Balmoral Station relate to the mapping of areas of the property as Sites of National Significance, Scenic Grasslands or Scenic Viewing Areas. Areas that are mapped in this way have much tighter restrictions on them than areas that are not mapped.

The rules relating to pastoral intensification/agricultural conversion are perhaps the most restrictive as they make it very clear where these activities can and cannot occur. Agricultural Conversion is defined as “*direct drilling or cultivation (by ploughing, discing or otherwise) or irrigation*” and Pastoral Intensification as “*subdivisional fencing and/or topdressing and oversowing*”. However, it is not clear from the plan if continuation of an activity (e.g. topdressing and oversowing) is included in this definition (this is important – see below).

Pastoral intensification and agricultural conversion is permitted as of right in the so-called farm base areas (Rule 15A.1.2), but this is only a very minor area around the Balmoral homestead. The only other situation where it is allowed, and then as a controlled activity, is where a water permit has been granted by ECan prior to 14 November 2015 to take and use water for the purpose of irrigation and the consent has not lapsed. This applies to the Bottom Terrace LMU. But in assessing an application, a number of matters that MDC will consider are outlined including:

- iii. *“The extent and form of pastoral intensification and/or agricultural conversion taking into account*
 - a. *The extent to which there is compensatory protection and enhancement of stream corridors on the application property*
 - b. *The extent to which wilding trees are removed and controlled in future on the application property*
 - c. *Any agreement between the Mackenzie Country Charitable Trust and landowners that secures protection of significant landscape and biodiversity values as compensation for intensification of production*
- iv. *Whether any threatened or at risk plants are present, including the at-risk species listed in Appendix W”*

The plan also clearly states where pastoral intensification and agricultural conversion is a non-complying activity (Rule 15A.4.2) as “*within Sites of Natural Significance, Scenic Viewing Areas, Scenic Grasslands or Lakeside Protection Areas identified on the Planning Maps*”. On all other areas, pastoral intensification and agricultural conversion is a Discretionary Activity and will require a resource consent but no guidance is provided on the matters Council will consider or if consent is required for existing activities.

These rules essentially mean that pastoral intensification and agricultural conversion will not be allowed in these areas on Balmoral Station which includes substantial parts of the following LMUs: Southeast Old Man Range, Old Man Range faces, Little Mount John, McGregor and Mt John. However, where there has been a history of AOSTD in these areas (e.g. Old Man Faces East, Old Man Faces West, McGregor, Mt John) then this will be allowed to continue.

The following definitions are relevant:

Clearance is defined as “*felling, clearing or modification of trees or any vegetation by cutting, crushing, cultivation, spraying, burning or irrigation*” (direct drilling is not included here and could be argued as not included as the definition of Agricultural Conversion (above) refers to “*direct drilling or cultivation*”).

Indigenous vegetation is defined as “*a plant community of species native to New Zealand, which may include exotic vegetation*” (this would include in my mind all the areas with native tussocks – hard tussock and red tussock, as well as established native shrublands).

Improved pasture is defined as areas where “*species composition and growth have been modified and enhanced for livestock grazing within the previous 15 years, by clearance, cultivation or topdressing and oversowing, or direct drilling; and b) Exotic pasture species have been deliberately introduced and dominate in cover and composition*”. This could apply to tussock grassland that has been AOSTD and/or drilled but still has a tussock cover, but exotic pasture species would need to be dominant (which I assume to be grasses and clovers, but not hawkweed). The rule then goes on to state that “*For the purposes of this definition the assessment of dominance shall disregard indigenous vegetation which is growing upon land that has previously been modified and enhanced for livestock grazing in accordance with clause a) above and is less than 15 years old*” This exception allows for <15 year old native plants (matagouri is the most likely) that might have regenerated within the last 15 years in an area that would otherwise meet the definition of improved pasture. Notwithstanding this, matagouri is now ranked as At Risk Declining nationally and would be captured by the definition of indigenous vegetation under the proposed Indigenous Biodiversity National Policy Statement,

Given these definitions, vegetation clearance is likely to be an issue in the following LMUs – Bottom Terrace (although irrigation is already consented here), Western Moraine, Southeast Old Man Range, Old Man Range Faces, Old Man Wetland, Little Mount John and perhaps parts of McGregor and Mt John blocks.

The following is permitted: “*The clearance is for the purpose of maintenance or repair of existing fence lines, vehicle tracks, roads, firebreaks, drains, stockyards, farm buildings, water troughs or airstrips*” so long as it is not >900 m elevation (which is only the very top of the old Man Range) or in a SNS (which include parts of Southeast Old Man Range, Old Man Range Faces, and Little Mount John). Clearance is also permitted if “*The clearance is of indigenous vegetation within an area of improved pasture*” (as defined above – so this would allow for clearance of matagouri regrowth if that were an issue so long as it had occurred within the last 15 years). However, even for these activities there are setbacks from waterways as follows: 100m of a lake, 20m of the bank of a river, 100m of an ecologically significant wetland and 50m of all other wetlands.

Other clearance (e.g. to improve tussock grasslands more widely or even for new tracks in tussock grasslands) is then treated as a restricted discretionary activity and a Farm Biodiversity Plan is required. There is still the limitation that clearance is not permitted in a SNS. In assessing a restricted discretionary activity, the Council will restrict its discretion to the quality of and compliance with the biodiversity plan. Notwithstanding this rule, it is possible to clear up to 5000 m² (ie. 50 x 100 m) in any 5-year period so long as it is not in a SNS or within the same prescribed distances from water bodies as above. In this case Council

will restrict its discretion to actual or potential impacts on native biodiversity and any offsetting or mitigation proposed.

Finally, Council defines non-complying activities as any clearance >5000 m² that is not covered by the above and any clearance in a SNS or within the same prescribed distances from water bodies as above.



Appendix 6 – Proposed NPS ‘existing use’ provisions

The proposed Indigenous Biodiversity NPS suggests that councils should allow existing uses in significant natural areas but:

“ensure the continuation of an existing activity will not lead to the loss, including through cumulative loss, of extent or degradation of the ecological integrity of any SNA; and ensure the adverse effects of an existing activity are of no greater character, intensity or scale than they were before the National Policy Statement commencement date.”

Additionally, the proposed NPS notes that in areas where pastoral farming occurs councils need to recognize that: “

“indigenous vegetation may regenerate in areas that have previously been cleared of indigenous vegetation and converted to improved pasture;

and as long as the regenerating indigenous vegetation has not itself become an SNA in the time since the last clearance event, the periodic clearance of indigenous vegetation as part of a regular cycle to maintain improved pasture is unlikely to compromise the protection of SNAs or the maintenance of indigenous biodiversity;

and consideration of effects (under Schedule 1 of the Act or through a resource consent application) may be required in the following circumstances, to ensure the outcomes in subclause (2) are met:

- i) a proposed clearance is likely to have adverse effects that are greater in character, intensity or scale than the adverse effects of clearance that has previously been undertaken as part of a regular cycle to maintain improved pasture on the farm:*
- ii) there is inadequate information to demonstrate that a proposed clearance of regenerating indigenous vegetation is part of a regular cycle of clearances to maintain improved pasture:*
- iii) a clearance is proposed in an area that supports any threatened or at-risk species:*
- iv) a clearance is proposed in an area that supports alluvial landforms that have not been cultivated (ie, the land has not been disturbed for the purpose of sowing, growing or harvesting pasture or crops).”*

An issue that relates to the proposed NPS significance criteria and rules relates to landforms and rare species.

- The majority of the landforms that underlie Balmoral Station are considered significant.
- Matagouri, a common and widespread plant on the property, and one that responds readily to fertiliser application, is considered significant because it is now ranked nationally as At Risk Declining.

Some pragmatic discussion needs to occur with Mackenzie District Council about how such rules, should they become incorporated into the District Plan, might apply to the property.

Appendix 7 – Resource consents held

CRC012415.1 (Environment Canterbury): Discharge permit into Fork River (26 March 2002 – 31 January 2036).

CRC157070 (Environment Canterbury): Install and maintain a gallery and intake structures, Fork Stream (22 July 2015 – 31 January 2036).

RM150047 (Mackenzie District Council): Undertake earthworks within a SNS to lay irrigation pipes and to construct two water storage dams (9 November 2015).

CRC167996 (Environment Canterbury): Use land for farming within a sensitive lake nutrient allocation zone (9 June 2016 – 9 June 2031).

CRC171755 (Environment Canterbury): Divert, take and use water from Fork Stream (30 November 2016 – 31 January 2036).



Appendix 8 – Threatened and at risk species present

Threatened and At Risk plant and animal species known to be present on Balmoral Station (plants, birds) or recorded from Balmoral Station and/or on adjacent properties and potentially present (lizards, fish, invertebrates).

Conservation status based on the most recent Department of Conservation listings – 2017 for vascular plants, 2016 for birds, 2015 for reptiles, 2017 for freshwater fish and 2014 for invertebrates.

Common name	Scientific name	Conservation status
Vascular plants		
sneezeweed	<i>Centipeda minima</i>	Nationally Endangered
-	<i>Chaerophyllum colensoi</i> var <i>delicatum</i>	Nationally Endangered
buttercup	<i>Ranunculus brevis</i>	Nationally Endangered
water brome	<i>Amphibromus fluitans</i>	Nationally Vulnerable
cushion broom	<i>Carmichaelia nana</i>	Nationally Vulnerable
tussock bindweed	<i>Convolvulus verecundus</i>	Nationally Vulnerable
leafless pōhuehue	<i>Muehlenbeckia ephedroides</i>	Nationally Vulnerable
cushion pimelea	<i>Pimelea sericeovillosa</i> subsp. <i>pulvinaris</i>	Nationally Vulnerable
kirkianella	<i>Sonchus novae-zelandiae</i>	Nationally Vulnerable
bidibidi	<i>Acaena buchananii</i>	At Risk Declining
grassland speargrass	<i>Aciphylla subflabellata</i>	At Risk Declining
coral broom	<i>Carmichaelia crassicaulis</i> subsp. <i>crassicaulis</i>	At Risk Declining
dwarf broom	<i>Carmichaelia vexillata</i>	At Risk Declining
pin cushion	<i>Colobanthus brevisepalus</i>	At Risk Declining
-	<i>Coprosma intertexta</i>	At Risk Declining
matagouri	<i>Discaria toumatou</i>	At Risk Declining
pygmy club rush	<i>Isolepis basilaris</i>	At Risk Declining
-	<i>Leucopogon nanum</i>	At Risk Declining
hypsela	<i>Lobelia ionantha</i>	At Risk Declining
tarn speedwell	<i>Parahebe canescens</i>	At Risk Declining
scab weed	<i>Raoulia australis</i>	At Risk Declining
-	<i>Raoulia beauverdii</i>	At Risk Declining
Celadon mat daisy	<i>Raoulia parki</i>	At Risk Declining
-	<i>Rytidosperma exiguum</i>	At Risk Declining
tarn bristle grass	<i>Rytidosperma telmaticum</i>	At Risk Declining
-	<i>Agrostis pallescens</i>	Naturally Uncommon
hook grass	<i>Carex subtilis</i>	Naturally Uncommon
willow herb	<i>Epilobium angustum</i>	Naturally Uncommon
-	<i>Montia angustifolia</i>	Naturally Uncommon
cudweed	<i>Euchiton paludosus</i>	Data Deficient

Birds		
grey duck	<i>Anas superciliosa</i>	Nationally Critical
Kaki	<i>Himantopus novaezealandiae</i>	Nationally Critical
black-billed gull	<i>Larus bulleri</i>	Nationally Critical
black-fronted tern	<i>Sterna albobriata</i>	Nationally Endangered
wrybill	<i>Anarhynchus frontalis</i>	Nationally Vulnerable
banded dotterel	<i>Charadrius bicinctus bicinctus</i>	Nationally Vulnerable
New Zealand pipit	<i>Anthus novaeseelandiae</i>	At Risk Declining
New Zealand pied oystercatcher	<i>Haematopus finschi</i>	At Risk Declining
black shag	<i>Phalacrocorax carbo novaeseelandiae</i>	Naturally Uncommon
eastern New Zealand falcon	<i>Falco novaeseelandiae novaeseelandiae</i>	Recovering
Reptiles		
Mackenzie skink	<i>Oligosoma</i> aff. <i>lineocellatum</i> 'Mackenzie Basin'	Nationally Vulnerable
Scree skink	<i>Oligosoma waimatense</i>	Nationally Vulnerable
Jewelled gecko	<i>Naultinus gemmeus</i>	At Risk Declining
Southern long-toed skink	<i>Oligosoma</i> aff. <i>longipes</i> "southern"	At Risk Declining
southern grass skink	<i>Oligosoma</i> aff. <i>polychroma</i> Clade 5	At Risk Declining
Fish		
bignose galaxias	<i>Galaxias macronasus</i>	Nationally Vulnerable
Canterbury galaxias	<i>Galaxias vulgaris</i>	At Risk Declining
longfin eel	<i>Anguilla dieffenbachii</i>	At Risk Declining
alpine galaxias	<i>Galaxias paucispondylus</i>	Naturally Uncommon
Invertebrates		
robust grasshopper	<i>Brachaspis robustus</i>	Nationally Endangered
minute grasshopper	<i>Sigaus minutus</i>	At Risk Declining

Appendix 9 – Ecological significance assessment criteria

Criteria for determining significant indigenous vegetation and significant habitat of indigenous biodiversity (Canterbury Regional Policy Statement 2013, Appendix 3).

Representativeness

1. Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district. This can include degraded examples where they are some of the best remaining examples of their type, or represent all that remains of indigenous biodiversity in some areas.
2. Indigenous vegetation or habitat of indigenous fauna that is a relatively large example of its type within the relevant ecological district.

Rarity/Distinctiveness

3. Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent in the Region, or relevant land environment, ecological district, or freshwater environment.
4. Indigenous vegetation or habitat of indigenous fauna that supports an indigenous species that is threatened, at risk, or uncommon, nationally or within the relevant ecological district.
5. The site contains indigenous vegetation or an indigenous species at its distribution limit within Canterbury Region or nationally.
6. Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, occurs within an originally rare ecosystem, or has developed as a result of an unusual environmental factor or combinations of factors.

Diversity and Pattern

7. Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients.

Ecological Context

8. Vegetation or habitat of indigenous fauna that provides or contributes to an important ecological linkage or network, or provides an important buffering function.
9. A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal system.
10. Indigenous vegetation or habitat of indigenous fauna that provides important habitat (including refuges from predation, or key habitat for feeding, breeding, or resting) for indigenous species, either seasonally or permanently.

Under the proposed Indigenous Vegetation National Policy Statement, the following criteria are proposed for identifying significant natural areas;

Representativeness

- Ecological unit(s) present which has ecological integrity that is typical of the indigenous character of the ecological district;
- Habitat that supports a typical suite of indigenous fauna that is characteristic of the habitat type in the ecological district and the range of species expected for that habitat type in the ecological district.

Diversity and pattern

- Diversity of indigenous species, vegetation, habitats of indigenous fauna or communities in the context of the ecological district:
- Presence of ecotones, complete or partial gradients or sequences:

Rarity and distinctiveness

- Provides habitat for an indigenous species that is listed as Threatened or At-risk in the New Zealand Threat Classification System lists:
- An indigenous vegetation type or an indigenous species that is uncommon within the region or ecological district:
- An indigenous species or plant community at or near its distributional limit:
- Indigenous vegetation that has been reduced to less than 30 per cent of its former extent in the ecological district, region or land environment:
- Indigenous vegetation or habitat of indigenous fauna occurring on sand dunes:
- Indigenous vegetation or habitat of indigenous fauna occurring on naturally uncommon ecosystems:
- The type locality of an indigenous species:
- The presence of a distinctive assemblage or community of indigenous species:
- The presence of a special ecological or scientific feature.

Ecological context

- The characteristics that help maintain indigenous biodiversity (such as size, shape and configuration); and
- The contribution the natural area makes to protecting indigenous biodiversity in the wider landscape (such as by linking, connecting to or buffering other natural areas; providing 'stepping stones' of habitat or maintaining ecological integrity).



Appendix 10 – On-farm quality assurance programme comparison

Responsible Wool Standard (RWS)

Purpose: A global standard designed to recognise farms with best practice and to encourage more farmers to use them. The RWS looks at production methods through the eyes of your customers, to know the questions they are asking and provide verifiable answers, communicate your proven practices, and find places for future improvement.

Stock type: Sheep only.

Verification: Audit to verify compliance. Audits can be on site, desk top or a combination of both

Red Meat Profit Partnership NZ Farm Assurance Standard

Purpose: The NZFAP is the foundation upon which the collective red meat industry can deliver an authentic and independently verified best practice animal raising and production assurance standard to our international consumers. Red meat produced under this programme comes with assurances in terms of integrity, origin, traceability, bio security, environmental sustainability, animal health and welfare.

Stock type: Sheep, beef and deer.

Audit: Audit to verify compliance – requirements include

- Copy NZFAS
- All ASD’s for livestock purchased and sold
- Up to date NAIT records
- Residency requirement records
- Supplementary feeds, purchase receipts for stock feed. Nil ruminant protein to be fed to ruminants
- Animal remedy inventory and animal treatment records
- Staff training records detailing areas of competence
- Animal health plan
- Register for all agrichemicals and fertiliser used on farm
- Livestock mortality records for weaned animals

Pre-audit farm check includes

- All livestock facilities be checked i.e. no sharp edges etc
- Loading ramps
- Water availability
- Dog kennels, shade, shelter, water/feed available
- Agrichemical storage areas locked, inventory including expiry dates
- Animal remedies – securely stored and separated from agri chemicals, inventory including expiry dates
- Hospital pen / paddock available
- Shade and shelter on farm

Comparison between two standards

<i>Desired outcome</i>	<i>RWS requirement</i>	<i>NZFAS requirement</i>
<i>Origins and Traceability</i>		
		<ul style="list-style-type: none"> – No imported livestock – Animal history – process in place to enable identification of

		<p>animals, ASD forms retained for 5 years</p> <ul style="list-style-type: none"> - Cattle & Deer identified as per NAIT regulations - GMO's excluded - Sheep & Deer shall not be treated with HGP's. Cattle identified appropriately
Security & Food Safety		
		<ul style="list-style-type: none"> - Livestock showing signs of unusual illness or ill thrift must be notified to veterinarian - Infectious diseases – human sewage shall not contaminate pastures grazed by livestock - Farmers must ensure farm workers are aware of disease threats - Livestock suspected of having foreign material embedded in the meat i.e. foreign needle/fencing wire must be identified. Animals can only be presented for slaughter after consultation with the processor
Animal Welfare		
<p>Management: Farmers have a clear strategy and set of protocols to safeguard the welfare of sheep, and to demonstrate compliance to the RWS</p>	<ul style="list-style-type: none"> - Parallel production is not allowed – all sheep on the farm shall fall under RWS certification - Farmer to give full access to the farm and operations that fall under certification - Farm shall comply with all applicable legislation on animal welfare and land management - Farmers shall be knowledgeable on current and best practices regarding animal welfare and land management in sheep production - Workers shall be trained or experienced and competent in handling animals, and shall possess and practice the ability, knowledge and competence necessary to maintain the health and welfare of the animals. They shall be knowledgeable in current best practices for animal welfare and land management for sheep production - All external workers that come onto the farm to perform work involving the sheep shall be made aware of the relevant parts of the RWS 	<p>Five Freedoms</p> <ul style="list-style-type: none"> - Freedom from thirst, hunger and malnutrition - Freedom from discomfort - Freedom from pain, injury or disease - Freedom from stress - Freedom to express normal behaviour - Livestock will be cared for by qualified people and monitored on the following – stock type, farming system, seasonality and weather events - All facilities will be well designed and maintained to mitigate injury or stress to animals & humans - Staff training records kept detailing experience - Clear & accurate records must be maintained - Records must be hard copy or electronic - Records must be kept for five years

	<ul style="list-style-type: none"> - Records shall be kept for a minimum of five years. 	
<p>Nutrition: Sheep shall have access to sufficient feed & water, suited to the animals age and needs, to maintain normal health and to prevent prolonged hunger, thirst, malnutrition or dehydration</p>	<ul style="list-style-type: none"> - Sheep shall have access to adequate nutrition, suited to the animals age and needs, to maintain normal health and to prevent prolonged hunger or malnutrition - Stocking rates shall be recorded and followed to plan pasture, feeding rations and water resource availability - The body condition of sheep shall be routinely monitored and recorded as part of the farms management system to confirm the health of the sheep - Changes in diet shall be introduced gradually - Sheep shall only be deprived of feed and water for reasonable management practices (such as shearing, transport or slaughter) Deprivation periods shall be no longer than 24 hours - Feed shall be stored properly - Routine checks and monitoring shall be conducted regularly to ensure feed and water quality is maintained - In exceptional circumstances (extreme weather events) measures shall be taken to ensure adequate feed and water are made available to sheep 	<ul style="list-style-type: none"> - All supplementary feed must be recorded - Evidence shall be available that no ruminant protein has been used - Records must include, Type of supplement, purchase date, source, expiry date, class of animal being fed, total quantity of feed, period of feeding and reason for supplementation - All livestock shall receive sufficient quantities of food and nutrients enabling them to maintain good health & meet their physiological requirements - All livestock shall have access to water which is sufficient for there daily needs - Water will be available to all livestock awaiting trucking
<p>Infrastructure: Sheep are kept in an environment that provides the conditions and facilities needed for health, safety, comfort & normal behaviour</p>	<ul style="list-style-type: none"> - All sheep shall have access to effective shade, shelter and/or windbreaks if necessary, to protect them from adverse weather conditions - Handling and housing systems (including woolsheds) shall be designed, constructed and maintained so as to minimise stress and the likelihood of injury to the sheep during handling - All fencing shall be appropriate and shall be regularly inspected and maintained 	<ul style="list-style-type: none"> - All livestock shall have access to shelter to reduce risk to their health and welfare - Livestock must be provided with shelter to minimise the effects of heat/cold stress

<p>Animal Health: The farmer demonstrates a good understanding and a proactive approach to ensure that the health of the sheep is maintained through all stages of life. Sheep are free from pain, injury or disease through prevention, rapid diagnosis and treatment.</p>	<ul style="list-style-type: none"> - Annual management plan for flock health & animal welfare - The farm shall conduct routine welfare inspections and monitor for signs of disease or production disorders - Mortality records shall be kept - Measures taken to prevent or control external & internal parasite infestations such as fly strike, ticks, lice, gastro-intestinal worms and scab - Action shall be taken promptly to treat lameness and to remove any cause of lameness - Sheep that are found suffering from serious health problems shall be treated promptly - Any treatments for the health of the sheep shall be appropriately administered - Good hygiene practices shall be followed in relation to facilities, personal, handling and instruments - The decision to carry out injurious husbandry procedures including tail docking and castration shall be based on a welfare risk/benefit analysis rather than routine - Animal husbandry procedures shall be performed or supervised by a competent stockperson, using well maintained equipment designed specifically for the purpose - Tail docking shall only be carried out if failure to do so would lead to welfare problems - Castration shall only be carried out on males that are being kept beyond puberty - Any sheep marking for identification shall be in accordance with current legislation and best practices - Dehorning, disbudding and substantial horn trimming is prohibited unless needed to address animal welfare - Mulesing is prohibited 	<ul style="list-style-type: none"> - Annual health plan for livestock & dogs - Signs of ill health or injury shall result in timely remedial action - Animal treatments used in accordance with manufacturer conditions - Any animals that die on the property must be recorded, along with cause of death - Mortality records to include date, class, ID, cause of death (if known), action taken - Slaughter record for animals slaughtered for home kill or dog food
<p style="text-align: center;">Animal Husbandry</p>	<ul style="list-style-type: none"> - The decision to carry out injurious husbandry procedures including tail docking and castration shall be based on a welfare risk/benefit analysis rather than routine - Animal husbandry procedures shall be performed or supervised by a competent stockperson, using well maintained equipment designed specifically for the purpose - Tail docking shall only be carried out if failure to do so would lead to welfare problems - Castration shall only be carried out on males that are being kept beyond puberty - Any sheep marking for identification shall be in accordance with current legislation and best practices - Dehorning, disbudding and substantial horn trimming is prohibited unless needed to address animal welfare - Mulesing is prohibited - Shearing shall be performed by or under the direct supervision of a competent shearer using techniques and equipment designed to minimise stress and injury 	<ul style="list-style-type: none"> - Castration shall be carried out in a way to minimise pain and when the animal is as young as possible - Castration shall be carried out before 6 months of age. Post 6mths of age pain relief shall be given - A docked tail must be of sufficient length to cover the vulva in female lambs and of equivalent length for male lambs - Animals with intact or tipped horns shall be managed to minimise risk or injury to other animals - Disbudding will be of a method to minimise pain and be carried out by qualified persons - Mulesing is prohibited - Dehorning will be of a method to minimise pain. Pain relief must be given to animals greater than 9mths of age - Only registered remedies within expiry date can be used
	<p style="text-align: center;">Shearing</p>	

<p><i>Euthanasia & On Farm Slaughter</i></p>	<ul style="list-style-type: none"> - All shearing related injuries shall be attended to promptly - Sheep shall be euthanised without delay if they are experiencing severe pain or illness and do not have a reasonable expectation of improvement - When an animal is slaughtered on farm it shall be done using a method that is quick, causes minimal stress, pain and results in a rapid loss of consciousness followed by death without the animal regaining consciousness 	<ul style="list-style-type: none"> - All products must be recorded and stored separately to farm chemicals - Expired remedies must be disposed of appropriately - All treatments of animals must be recorded, including date, species etc
<p><i>Breeding, Pregnancy and Lambing</i></p>	<ul style="list-style-type: none"> - Breeding strategy shall address welfare traits and suitability for the type of environment in which the sheep are raised - Artificial breeding procedures shall be carried out by competent operators - Lambing shall be supervised, and timely action taken while keeping disturbances to a minimum. In extensive systems where animals are unaccustomed to daily supervision breeds or strains suited to easy care births and good maternal care should be used - The lambing period shall be planned to coincide with local climatic conditions favourable to good welfare and survival - Practices and procedures for lamb feeding and provisions for fostering shall be planned prior to the start of lambing 	<ul style="list-style-type: none"> - Persons undertaking emergency or other slaughter of livestock shall be competent in the humane killing of sheep, deer and cattle - Cattle/deer shall be rendered insensible by a shot to the head and shall be bled out immediately - The spinal cord shall not be severed or neck broken in any animal until after death - Electric prodders, sticks or goads shall not be used on sheep, deer or calves
<p><i>Dog Welfare & Ovis Management</i></p>		<ul style="list-style-type: none"> - Quality shelter from climatic conditions shall be available for all dogs - Dogs will receive adequate quantities of nutritious food and clean fresh water - Dogs must be on an appropriate ovis management programme - Slaughtering of sheep meat shall be carried out in a secure dog proof area - Raw offal must not be available to dogs - Frozen dog food must be frozen for 10 days at -10 degrees C

		<ul style="list-style-type: none"> - If cooking dog food / offal it must be boiled for at least 30 minutes
<p>Animal Behaviour & Handling: Good human-animal relationships are in place that allow the sheep to be in a positive emotional state and express natural behaviour</p>	<ul style="list-style-type: none"> - Isolation of individual sheep shall be minimised - Animals shall be handled humanely, mistreatment of animals is unacceptable - Long term close confinement in crates or tethering is prohibited - Sheep moved on foot shall not be forced to proceed at a pace that will cause exhaustion, heat stress or injury - In situations where the farm is responsible for or in control of transport of sheep, the requirements in the RWS Transport Guidance or regional legal requirements shall be met - The farmer shall keep records of injury and death rates associated with all transport of their sheep and take actions to address high rates - Stockperson shall have good command of dogs and be in control when working sheep - All other animals kept on the farm shall be treated humanely 	
Land Management		
<p>Soil: Farmers have an understanding of what will impact the health of their soil and have a strategy to mitigate damage and improve soil health</p>	<ul style="list-style-type: none"> - Land shall not be degraded by overgrazing and/or other management techniques - Soil compaction shall be monitored and managed - Soil erosion shall be monitored and managed - Soil organic matter shall be monitored and managed - Hazardous materials shall not be disposed of on the farmland unless specifically allowed by law and it is safe to use the affected land for grazing 	<ul style="list-style-type: none"> - Farm map detailing the locality of fuel, chemical, fertiliser storage, dead stock disposal, waste disposal, stockyards, shearing sheds, silage/feed storage areas/pits, houses and safe entry points - Control of noxious plants shall be carried out in accordance with local by laws - An environmental environment plan will be written to cover current practices and for continuous improvement - Sustainable land management practices should be followed for erosion control, excessive pugging, soil fertility, best practice fertiliser use (qualified by soil testing)
<p>Biodiversity: Farmers have an understanding of what will impact the biodiversity of their land</p>	<ul style="list-style-type: none"> - Sensitive and high conservation value areas and wildlife species on the property shall be monitored and managed 	<ul style="list-style-type: none"> - Water quality and care of water ways should be maintained/enhanced ensuring minimisation of fertiliser runoff,

<p>and have a strategy to protect and improve it over time</p>	<ul style="list-style-type: none"> - The farmer shall monitor and manage the infestation of unwanted exotic or invasive plants - Farmers shall monitor the population of predators and wildlife (birds, mammals or reptiles) on the farm and apply livestock husbandry practices that maintain biodiversity - Lethal control shall be minimised and done humanely - Deforestation for conversion to agricultural land is prohibited 	<p>damage to stream banks by livestock and excluding livestock from waterways</p> <ul style="list-style-type: none"> - Establishing, maintaining and supporting biodiversity and native flora should be encouraged
<p>Fertiliser: Farmers use the minimum amount of inputs to meet the nutritional needs of their land to maintain their carrying capacity</p>	<ul style="list-style-type: none"> - There shall be a fertiliser management strategy that is reviewed annually - The farmer shall test and record soil nutrient levels at intervals relevant to maintaining a healthy vibrant soil - Fertilisers applied shall be appropriate and as specific to the situation as possible with minimal side effects - Application methods and equipment that minimise waste and pollution shall be adopted 	<ul style="list-style-type: none"> - All agrichemicals and fertiliser applications to land must be recorded by paddock - Application record must include date, location, product used, application rates, withholding period, person applying, earliest grazing date and earliest slaughter date.
<p>Pesticides: Farmers use the minimum amount of pesticides to achieve adequate control of pest burden on their farm</p>	<ul style="list-style-type: none"> - There shall be an Integrated Pest Management plan or strategy that is reviewed annually - Farmers shall have a monitoring program for crop, pasture and for parasites - Biological, physical and cultural control methods shall be used over chemical methods if they provide satisfactory control - Pesticides applied shall be appropriate and as specific to the situation as possible with minimal side effects - Farmers shall use the minimum amount of pesticides to achieve adequate control of pest burden on their farm - Measures shall be in place that limit the impact of pesticide use - Actions shall be taken to avoid pesticide resistance - Application records shall be kept for all pesticides that have been used 	<ul style="list-style-type: none"> - All farm agrichemical products must be recorded on the agrichemical register - Agrichemical treatments must be stored in a locked facility stored away from direct sunlight - Unused or expired agrichemicals must be disposed of appropriately
<p>Waste Management</p>		
		<ul style="list-style-type: none"> - All waste including effluent, waste water, offal, chemicals,

		<p>oils & containers shall be disposed of as appropriate</p> <ul style="list-style-type: none"> - Disposal of packaging and other products (baleage wrap) must be appropriate - Chemical containers must be triple rinsed before disposal - Recycling must be undertaken where possible (baleage wrap, drench containers) - Offal pits must be fenced, and gate locked to ensure exclusion of children, dogs and livestock - Injections needles / sharps must be disposed of in an environmentally safe manner - Silage/baleage storage – steps must be taken there is no leakage or leachate
Transport		
<p>It is important livestock are held to empty out before being transported. This will help minimise any potential risk of contamination, animal welfare issues and excessive build up of effluent on trucks</p>		<ul style="list-style-type: none"> - Prior to transport all livestock checked ensuring “fit for purpose” - Animals shall be able to stand and able to bear weight on all four limbs - Cattle shall not be less than body score 3.0 to be acceptable for processing. All other cattle will require a vet cert - Animals will not be transported if likely to give birth - Animals will be at least 24 days old before transporting - Cattle with horns that may cause injury or be damaged (>550mm) will not be transported - Animals will not be transported with bleeding horn/antler stumps, within 21 days of being disbudded, dehorned or within 7 days of being docked or castrated - Deer with hard antler growth > 110mm measured from the centre of the skull must not be presented for slaughter - All livestock carrying an injury must be deemed fit to transport by a vet (vet certificate) - All livestock shall have access to clean drinking water for a minimum of 4 hours prior to loading

		<ul style="list-style-type: none">- The owner or an authorised person must be present during loading- There must be all weather truck access to loading ramps- The following documentation will be presented to the driver<ul style="list-style-type: none">o ASD or eASDo Vet cert for any injured animal
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Appendix 11 – Stocking data by LMU

This table summarises the average (1 July 2020) stocking pattern across Balmoral Station.

BALMORAL STATION (TEKAPO) LTD																						
SHEEP (commercial)	MA Ewes	2th Ewes	Ewe Hgts	MA Wthrs	Wthr Hgts	Rams	Others	Ewe Lambs	Wthr Lambs	Input data												
Opening Stock 1st July 20	2000	1030	1300	0	1300	0	0	0	0	<table border="1"> <tr> <td>MA Ewe lambing %</td> <td>100%</td> </tr> <tr> <td>2th lambing %</td> <td>95%</td> </tr> <tr> <td>Deaths</td> <td>5%</td> </tr> <tr> <td>Opening Stock Units</td> <td>5110</td> </tr> <tr> <td>Closing Stock Units</td> <td>5849</td> </tr> <tr> <td>Variation</td> <td>739</td> </tr> </table>	MA Ewe lambing %	100%	2th lambing %	95%	Deaths	5%	Opening Stock Units	5110	Closing Stock Units	5849	Variation	739
MA Ewe lambing %	100%																					
2th lambing %	95%																					
Deaths	5%																					
Opening Stock Units	5110																					
Closing Stock Units	5849																					
Variation	739																					
lams born								1489	1489													
Purchases	0	0	0	0	0	0	0	0	0													
Deaths	100	52	65	0	65	0	0	74	74													
balance	1900	979	1235	0	1235	0	0	1415	1415													
Transfer out	350	950	1185		400			1415	1415													
Sold	500	29	50		835			0	0													
Dogs																						
balance	1050	0	0	0	0	0	0	0	0													
Transfer in	950	1185	1415	400	1415																	
Closing Stock 30th June 21	2000	1185	1415	400	1415	0	0	0	0													
Note: Commercial Flock - Closing capital stock numbers are forecasting to increase by 739 stock units after transferring 350 annual draft ewes to Mt Hay Station - Stocking Policy - retaining 400 wthr hoogets for wool production utilising "native country" not suitable for lambing down ewes. Numbers will build to 1200 over the next three years.																						

BALMORAL STATION (TEKAPO) LTD																						
SHEEP (stud)	MA Ewes	2th Ewes	Ewe Hgts	MA Rams	Ram Hgts	Rams	Others	Ewe Lambs	Ram Lambs	Input data												
Opening Stock 1st July 20	350	100	150	70	150	0	0	0	0	<table border="1"> <tr> <td>MA Ewe lambing %</td> <td>100%</td> </tr> <tr> <td>2th lambing %</td> <td>100%</td> </tr> <tr> <td>Deaths</td> <td>5%</td> </tr> <tr> <td>Opening Stock Units</td> <td>760</td> </tr> <tr> <td>Closing Stock Units</td> <td>945</td> </tr> <tr> <td>Variation</td> <td>185</td> </tr> </table>	MA Ewe lambing %	100%	2th lambing %	100%	Deaths	5%	Opening Stock Units	760	Closing Stock Units	945	Variation	185
MA Ewe lambing %	100%																					
2th lambing %	100%																					
Deaths	5%																					
Opening Stock Units	760																					
Closing Stock Units	945																					
Variation	185																					
lams born								225	225													
Purchases	0	0	0	0	0	0	0	0	0													
Deaths	18	5	8	4	8	0	0	11	11													
balance	333	95	143	67	143	0	0	214	214													
Transfer out		95	100		20			238	238													
Sold	50	0	43	0	14			0	0													
Temuka				0	109	0	0	0	0													
balance	283	0		67		0	0	0	0													
Transfer in	95	100	238	20	238																	
Closing Stock 30th June 21	378	100	238	87	238	0	0	0	0													
Note: Stud Flock - Closing stock units increase by 185 - KPI's - 100% lambing and 5% deaths - Sales include 50 cast for age ewes, 43 cull ewe hoggets, 35 stud 1shr rams and 88 cull 1shr rams (Temuka) - The full compliment of lambs born 2020 will be retained for replacements and prime hgt 2021/22																						

BALMORAL STATION (TEKAPO) LTD																						
CATTLE	MA Cows	R2 Hfrs	R1 Hfrs	R2 Strs	R1 Strs	Bulls	C/O 2019/20	Hfr calves	Str calves	Input data												
Opening Stock 1st July 20	154	96	81	61	75	7	0	0	0	<table border="1"> <tr> <td>MA Cow calving %</td> <td>90%</td> </tr> <tr> <td>R2 yr calving %</td> <td>90%</td> </tr> <tr> <td>Deaths</td> <td>4%</td> </tr> <tr> <td>Opening Stock Units</td> <td>2410</td> </tr> <tr> <td>Closing Stock Units</td> <td>2756</td> </tr> <tr> <td>Variation</td> <td>346</td> </tr> </table>	MA Cow calving %	90%	R2 yr calving %	90%	Deaths	4%	Opening Stock Units	2410	Closing Stock Units	2756	Variation	346
MA Cow calving %	90%																					
R2 yr calving %	90%																					
Deaths	4%																					
Opening Stock Units	2410																					
Closing Stock Units	2756																					
Variation	346																					
Calves born								113	113													
Purchases	0	0	0	0	0	1	0	0	0													
Deaths	6	4	3	2	3	0	0	5	5													
balance	148	92	78	59	72	8	0	108	108													
Transfer out		50	78		72			108	108													
Sold	15	42		59	0	1	0	0	0													
Dogs				0				0														
balance	133	0	0	0	0	7	0	0	0													
Transfer in	50	78	108	72	108																	
Closing Stock 30th June 21	183	78	108	72	108	7	0	0	0													
Note: Cattle - Capital Angus heifer purchase has been deleted - Closing stock units are forecasting to increase by 352 reflecting natural increase																						

Appendix 12 – Ecological significance matrix

Ecological significance matrix for the twenty LMUs present on Balmoral Station. Significance assessment criteria after Appendix 9. Significance assessment is based in part on that of Hoosen (2013) for the pastoral lease and further assessments by David Norton (2018-2020). Green colours mean the whole of the LMU is significant for this criterion and blue colours mean that part of the LMU is significant for this criterion.

	Criterion	1	2	3	4	5	6	7	8	9	10
LMU1	Benchmark area	Green	Green	Green	Green		Green	Green	Green	Green	Green
LMU2	Mt John wetland	Green	Green	Green	Green			Green	Green	Green	Green
LMU3	Old Man sunny faces	Green	Green	Green	Green		Green	Blue			Green
LMU4	Old Man south	Green	Green	Green	Green		Green	Green	Green	Green	Green
LMU5	Round Hill	Green	Green	Green	Green		Green	Green	Green	Green	Green
LMU6	Little Mt John	Green	Green	Green	Green		Green	Green	Green	Green	Green
LMU7	Bottom terrace				Blue		Blue		Blue		Blue
LMU8	Old Man West Face				Blue						
LMU9	Old Man East Face				Blue						
LMU10	McGregor				Blue						Blue
LMU11	Mt John				Blue		Blue				
LMU12	Deer farm										
LMU13	Improved flats				Blue		Blue				
LMU14	Irishman paddocks										
LMU15	Plantation forest										
LMU16	Mt John forest				Blue		Blue				
LMU17	Shelterbelts										
LMU18	Dryland paddocks										
LMU19	Cultivated paddocks										
LMU20	Mt John paddocks										
LMU21	Homestead paddocks										
LMU22	Centre pivots										
LMU23	Scott										