Toitu te whenua
Land Information
New Zealand

Crown Pastoral Land Tenure Review

Lease name : GLENCOE (North Otago)

Lease number : PO 366

Conservation Resources Report - Part 1

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

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

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

December 10

2010 ADDENDUM TO DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF

GLENCOE PASTORAL LEASE

PAL 14-04-366

UNDER PART 2 OF THE CROWN PASTORAL LAND ACT 1998

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PART 1

INTRODUCTION

1.1 Background

Glencoe Pastoral Lease (PL) was originally inspected in November 1998. Early tenure review surveys were generally not as comprehensive as those that are undertaken today and the use of additional tools (e.g. LENZ and structured SIV Guidelines) are now available to assist with assessment of ecological patterns and values present. A re-inspection therefore presented the opportunity to both examine the original proposed designations and to consider any major deficiencies in the original proposal.

The re-inspection of the PL was undertaken on 17 November 2009, for the purpose of determining if changes were required to the initial Conservation Resources Report (CRR), which was based on information derived from the original inspection carried out in November 1998.

The re-inspection team consisted of Tony Perrett (High Country Tenure Review Manager), John Barkla (Technical Support, Biodiversity Assets – vegetation), Shar Briden (Technical Support – Historic) and Fiona Hall (Technical Support – Recreation).

It is important to note that the original assessment and recommendations were done over ten years ago. However, most of the original proposed designations have been reconfirmed as retaining natural heritage and the recommendations made in this report improve and compliment these. This addendum document is to be read in conjunction with and as an addition to the original CRR.

The original DOC recommendations relating to the 1998 CRR recommended protection of a wide range of landforms, plant and fauna communities by way of return to full Crown ownership. The area recommended covered the majority (63%) of the small PL. Progress on negotiations failed to materialise in part due to grazing not being made available in the lower part of the proposed Conservation Area. A different approach is required to progress negotiations and the new DOC recommendations have been designed to achieve this and also to take account of new government high country policy whilst meeting the objectives for tenure review as contained in the Crown Pastoral Land Act.

Additional areas have also been identified as containing significant inherent values, based on the application of the current version of the SIVs Guidelines. In particular the significance of a raised rim pit considered to be a probable umu was noted by DOC.

PART 2

INHERENT VALUES: DESCRIPTION OF CONSERVATION RESOURCES AND ASSESSMENT OF SIGNIFICANCE

The following description and assessment of inherent values is to be read in conjunction with the original CRR.

2.1 Land Environments of New Zealand (LENZ)

There are two databases that have been used to assess biodiversity protection (Walker et al 2003).

1. Environmental distinctiveness has been assessed through the Land Environments of New Zealand (LENZ). This is a classification of New Zealand landscapes using a comprehensive set of climate, landform and soil variables chosen for their roles in driving geographic variation in biological patterns (Leathwick et al 2002 & 2003). It is presented at four levels of detail containing 20, 100, 200 or 500 environments nationally. The most detailed is called LENZ Level IV.

2. The area of unprotected indigenous cover in threatened land environments has been identified in the national land cover database (LCDB).

From the above databases, spatial data depicting indigenous cover and legal protection were overlaid on LENZ Level IV environments to identify biodiversity that is most vulnerable (most likely to be lost). This provides a measure for:

a. percentages legally protected and;
b. percentages of remaining indigenous cover

Based on these two criteria, five categories of threatened environments have been used to identify environments containing indigenous biodiversity at most risk of loss. They are classified as follows:

1. **Acutely threatened:** <10% indigenous cover remaining
2. **Chronically threatened:** 10-20% indigenous cover remaining
3. **At risk:** 20-30% indigenous cover remaining
4. **Critically underprotected:** >30% indigenous cover remaining and <10% protected

5 **Underprotected:** >30% indigenous cover remaining and 10-20% protected

6. **No Threat:** >30% indigenous cover remaining and >20% protected

Table 1: Land Environments of New Zealand (LENZ) Units on Glencoe PL

Threat Category	Level 4 LENZ Unit	% Indigenous vegetation cover remaining	%Protected nationally for conservation purposes	Indigenous Vegetation Cover Change 1997-2002	Approximate Area on Lease (ha)
Acutely Threatened	N3.3a	2.55	0.7	Decrease	12
Chronically Threatened	N3.1e	12.65	1.94	Decrease	777
	Q4.3b	17.14	3.18	Decrease	3
At Risk	Q2.1c	24.56	8.5	Decrease	662
	Q4.3a	23.41	7.74	Decrease	2
Critically Underprotected	Q2.1a	38	9.27	Decrease	120
Underprotected	Q3.3c	90.03	17.21	Decrease	18
	Q4.1c	52.31	19.8	Decrease	3
No Threat Category	Q1.1d	84.66	34.76	No Change	273
	Q4.2a	33.86	24.8	Decrease	38
Total					**1908**

2.1.1 Significance of LENZ

Attributing significance to LENZ units, while a useful exercise must be treated with caution. Work is currently underway to improve the accuracy of underlying spatial data. For example, soils data is being upgraded, as median patch size for polygons sourced from the Land Resource Inventory is currently between 10,000 and 100,000 hectares, while at Level IV resolution, LENZ units cover areas as small as 10 hectares. Also underway, albeit as lesser priority, is ongoing work relating to continuous improvements of the underlying classification process which generates LENZ units.

Glencoe PL has the following land environments that are significant because the indigenous vegetation has largely been removed, and/or little of the environment is represented in lands protected primarily for conservation purposes.

- ~ 0.62 % of the property has Level IV LENZ units that have less than 10% of their land area still in indigenous vegetation cover (whether protected or unprotected). This includes one 'Acutely Threatened' Unit (N3.3a).
- ~ 40.88 % of the property has Level IV LENZ Units that have 10-20% of indigenous vegetation cover (whether protected or unprotected). These include two 'Chronically Threatened' Units (N3.1e and Q4.3b).
- ~ 34.81% of the property has Level IV LENZ Units that have 20-30% of its land area still in indigenous cover. These include two 'At Risk' Units (Q2.1c and Q4.3a).

- ~ 6.30% of the property has Level IV LENZ Units that have 30% of their land area still in indigenous cover and <10% is protected. This includes one 'Critically Underprotected' Unit (Q2.1a).
- ~1.1% of the property has Level IV LENZ Units that have >30% of their land area still indigenous cover and 10-20% protected. These include two 'Underdprotected' Units (Q3.3c and Q4.1c).
- ~ 16.29% of the property has Level IV LENZ Units that have >30% of its land area still in indigenous cover and >20% protected. These include two 'No Threat' Units (Q1.1d and Q4.2a).

See Appendix 1 for LENZ Level IV map and table

2.2 Vegetation

Introduction

The present vegetation on the PL is thought to be considerably different from that in the past. Prior to Polynesian fires, Comrie (1992) considered that, with the exception of the higher slopes of the Kakanui Mountains, Dansey Ecological District (ED) would have been covered in conifer-broadleaved forest. Matai (*Prumnopitys taxifolia*), Hall's totara (*Podocarpus hallii*), rimu (*Dacrydium cupressinum*) and kahikatea (*Dacrycarpus dacrydioides*) would probably have been the dominant tall podocarps, with lowland ribbonwood (*Plagianthus regius*), broadleaf (*Griselinia littoralis*), mapou (*Myrsine australis*), kowhai (*Sophora microphylla*) and putaputaweta (*Carpodetus serratus*) as important broadleaved components. Patches of mixed broadleaved forest remain on Glencoe PL with steep areas previously cleared of this forest now supporting abundant secondary kanuka forest. Forest is likely to have once covered most of the PL which lies at an altitude below the natural treeline for the region.

Burning, combined with grazing, aerial oversowing and topdressing, has substantially modified the natural communities of the District, particularly below 900 m. This is especially evident on the gentle peneplain landform of the Glencoe PL, large parts of which have been fully converted to exotic pasture.

Survey Method

Approximately 9 hours were spent on the PL. Parts of the PL were accessible via internal 4WD tracks but steep terrain, gorges, and other areas remote from tracks were surveyed on foot. Descriptions were made of the composition of major plant communities. Threatened plants were searched for in potentially suitable habitats. Digital photographs were taken of particular species, communities and landscapes to aid in interpretation. Specimens were collected of noteworthy or uncertain taxa for herbarium accession and determination.

Vegetation Description

West and north of road in Red Hut

Above Red Hut (about 600 m asl) to the summit of Mount Miserable (884 m) the vegetation cover is increasingly dominated by narrow-leaved tussock (*Chionochloa rigida*) with some short tussock, especially silver tussock (*Poa cita)*. These are variable in condition with localised patches of exotic grasses and pasture weeds, especially mouse-ear hawkweed (*Hieracium pilosella)* and tussock hawkweed (*H. lepidulum)*. Dry north-facing slopes in particular have a sparser tall tussock cover with correspondingly more short tussock and pasture species. Other important taller components of the tussocklands are speargrass *Aciphylla aurea* and the shrubs *Melicytus alpinus, Olearia bullata*, manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*) and *Dracophyllum rosmarinifolium*. Native ground cover species include *Gaultheria macrostigma, Leucopogon fraseri, Celmisia gracilenta, Helichrysum filicaule* and *Kelleria* spp.

Rock outcrops on the steep western escarpment of Mount Miserable have scattered shrubs of *Corokia cotoneaster, Coprosma dumosa, Gaultheria crassa* and *Myrsine nummularia*. Associated with these areas is a predominantly native ground cover of *Pentachondra pumila, Raoulia subsericea, Brachyscome longiscapa, Brachyglottis bellidioides, Luzula rufa, Chaerophyllum colensoi, Leucopogon fraseri, Celmisia hookeri, Gingidia grisea* and *Gentianella* spp. Less steep colluvial slopes below support a much denser *Coprosma*/matagouri (*Discaria toumatou*) shrubland which merges with a dense and apparently advancing band of exotic broom (*Cytisus scoparius*). Small, scattered outlier plants of exotic broom are present almost to the summit of Mt Miserable.

Seepages on the north side of Mt Misery have a red tussock, flax or *Coprosma rugosa* margin with herbaceous turfs of *Gonocarpus aggregatus, Ranunculus foliosus, Hydrocotyle* sp, *Leptinella squalida, Plantago triandra, Centella uniflora* and *Viola cunninghamii*. These are showing significant damage from cattle trampling and invasion by jointed rush (*Juncus articulatus*). Flax (*Phormium cookianum*) extends down stream channels emanating from these seepages, forming dense ribbons where the streams begin to steepen significantly.

Below about 700 m on the north side of Mount Misery are steep slopes dropping towards the North Branch Waianakarua River (NBWR). These become increasingly shrubby with matagouri, *Carmichaelia petriei, Coprosma propinqua, C. crassifolia* and exotic broom common. Near the valley bottom and along the riverbanks are dense patches of gorse, broom and bracken.

Further east, the steep slopes above the Waianakarua River are dissected by numerous steep gullies with much rock exposed as bluffs. Small forest remnants in fire refugia are present in the deepest parts of these gullies. These are often dominated by broadleaf (*Griselinia littoralis*), kowhai (*Sophora microphylla*) and cabbage tree (*Cordyline australis*). Other common species include lancewood (*Pseudopanax crassifolius*), marbleleaf (*Carpodetus serratus*), wineberry (*Aristotelia serratus*), tarata (*Pittosporum eugenioides),* tree fuchsia *(Fuchsia excorticata), Coprosma rotundifolia* and tree nettle (*Urtica ferox).* Exotic broom is spreading upslope and outliers are present up to c. 600 m.

Steep, mostly inaccessible bluffs, are sparsely vegetated with shrubs and herbs. Common shrub species include *Helichrysum intermedium, Gaultheria crassa, Carmichaelia crassicaulis* subsp. *crassicaulis* and *Hebe buchananii*. A few shrubs of the semi-parasitic *Exocarpus bidwillii* were noted. Herbs include *Gingidia grisea, Leptinella pectinata* and *Brachyscome longiscapa*.

East of Red Hut remnants of the uplifted peneplain are mostly in improved pasture. The steep slopes dropping down from the peneplain to the NBWR have fewer bluffs than that previously described and a more continuous scrub or forest cover. This is almost entirely kanuka dominated although pockets of tall mixed broadleaved forest are present, especially on more fertile valley bottom sites. Narrow-leaved lacebark (*Hoheria angustifolia)* is locally abundant at these sites and present elsewhere along with broadleaf, marbleleaf and kowhai. Understorey species include *Coprosma linariifolia, C. propinqua, C. rotundifolia, Melicytus* aff. *alpinus*, kohuhu (*Pittosporum tenuifolium)* and *Helichrysum lanceolatum*. The fern *Polystichum vestitum* is the dominant ground cover.

The kanuka forest has a sparse understorey comprising *Coprosma rhamnoides, C. liniarifolia*, prickly mingimingi (*Leptecophylla juniperina*), and mapou (*Myrsine australis*) and a sparse ground cover that includes *Lagenifera pinnatifida, Acaena juvenca* and *Hydrocotyle moschata*.

Mixed short tussock-exotic pasture grasslands occupy areas between shrub patches, and between the upper limit of shrubland and the fenceline delineating improved pasture.

South of road into Red Hut (Shepherds Creek)
A small wetland in the head of Shepherds Creek immediately west of Red Hut has dense patches of *Olearia bullata* with some manuka, *Coprosma tayloriae* and *C. rugosa*. Purei (*Carex secta)* occurs along the creek margins and elsewhere the ground cover is comprised of *Juncus* sp., mosses and small herbs such as *Leptinella squalida*, *Hydrocotyle* spp., *Lagenifera barkeri, Nertera ciliata*, and *Ranunculus amphitrichus*. There is evidence of periodic stock trampling and grazing. Manuka and kanuka dominate the surrounding dry slopes.

Elsewhere in Shepherds Creek the vegetation consists of a mosaic of shrubland patches, short tussockland, exotic pasture and exotic forest. Shrublands are predominantly dominated by kanuka but riparian shrubland along Shepherds Creek have greater diversity and include *Olearia bullata, Hebe anomala* and *Melicytus flexuosus*.

A wetland east of Table Hill is dominated by copper tussock (*Chionochloa rubra* subsp. *cuprea*) and has scattered shrubs of *Olearia bullata*, manuka, *Coprosma tayloriae, C. elatirioides,* and *Ozothamnus vauvilliersii*. The groundcover includes exotic grass around the margins with greater dominance of natives in the core. Common species include *Sphagnum* moss, hard fern (*Blechnum penna-marina*), *Viola cunninghamii, Aciphylla scott-thomsonii, Schoenus pauciflorus, Anaphalioides bellidioides, Celmisia gracilenta* and *Oxalis magellanica*.

See Appendix 2 for a full list of vascular plant species recorded

2.2.1 Significance of Vegetation

Vegetation

Glencoe PL straddles both the Dansey ED and the Waianakarua ED, part of the wider Kakanui Ecological Region. The Waianakarua ED has not been surveyed as part of the Protected Natural Areas Programme.

At least 179 native vascular plant species (see Appendix 2) are present representing approximately 50% of the indigenous vascular plant diversity recorded for the much larger (97642 ha) and ecologically diverse Dansey ED.

Threatened and At Risk species

Of the native vascular plant species present, none are listed as 'Threatened' and five as 'At Risk' in the most recent threat classification system listing (de Lange et al. 2009). A list of these species with their threat of extinction status and distribution within Glencoe PL is provided below in Table 2 and Appendix 3 - Map 1.

The New Zealand Threat Classification System provides a tool for assigning a threat status to candidate taxa. Species listed in the super category 'Threatened" are grouped into three categories: 'Nationally Critical', Nationally Endangered', and 'Nationally Vulnerable'. Taxa in these three categories are facing a very high risk of extinction in the wild.

The latest revision (Townsend et al. 2008) of the 2002 system includes the addition of the new categories 'Declining', 'Naturally Uncommon', 'Recovering' and 'Relict' within a super category 'At Risk'. Declining taxa do not qualify as 'Threatened' because they are buffered by a large total population size and/or slower decline rate. However, if the declining trends continue, these taxa may be listed as 'Threatened' in the future. The category 'Naturally Uncommon' is adopted to distinguish between biologically scarce and threatened taxa. 'Recovering' allows for threatened taxa whose status is improving through management action and 'Relict' is used to encompass taxa that have experienced very large historic range reductions and now exist as remnant populations that are not considered unduly threatened.

Table 2: Threatened plant species found on Glencoe PL

Super Category	Threat Category	Species	Location on property
At Risk	Declining	*Carmichaelia crassicaulis* subsp. *crassicaulis*	Rock outcrops and bluffs in western sector
		Melicytus flexuosus	Shepherds Creek riparian terrace
	Naturally Uncommon	*Celmisia hookeri*	Rock outcrops and bluffs in western sector
		Gingidia grisea	Rock outcrops and bluffs in western sector
		Lagenifera barkeri	Upland wetlands

In addition, three species that are uncommon in Otago (Regionally Significant) or uncommon in this area but reasonably common in the rest of Otago (Locally Notable species) were found. A list of these species is provided below in Table 3.

Table 3: Regionally significant and locally notable plants found on Glencoe PL

Status	Species	Location on property
Regionally significant	*Exocarpus bidwillii*	Western rock escarpment
	Lagenifera pinnatifida	Kanuka forest understorey
	Pimelea traversii	Western rock escarpment

Rare Ecosystems

Terrestrial ecosystems that were rare before human colonisation of New Zealand often have highly specialised and diverse flora and fauna characterised by endemic and nationally rare species. Rare ecosystems are defined as those having a total extent less than 0.5% (i.e. <134 000 ha) of New Zealand's total area (268 680 km2). A framework has been developed (Williams et al. 2007) based on descriptors of physical environments that distinguish rare ecosystems from each other and from more common ecosystems. Using this framework 72 rare ecosystems have been defined using pertinent environmental descriptors selected from soil age, parent material, soil chemistry and particle size, landform, drainage regime, disturbance, and climate.

On Glencoe PL two rare ecosystems were identified, both in the wetland category (seepages and flushes, and cushionbog).

Ecosystem Services

The Land Use Capability (LUC) system is a nationally consistent land classification system based on physical sustainability that has been used in New Zealand to help achieve sustainable land development and management since 1952. The LUC system has two key components.

Firstly, Land Resource Inventory (LRI) is compiled as an assessment of physical factors considered to be critical for long-term land use and management. Secondly, the inventory is used for LUC classification, whereby land is categorised into eight classes according to its long-term capability to sustain one or more productive uses (Lynn et al. 2009).

Analysis of LUC for Glencoe PL revels that the land falls predominantly into two classes. Land at highest altitude and on the steepest slopes is classified as Class 7 and 8. Remaining land is Class 4 and 6. Class 8 land has severe to extreme physical limitations or hazards which make it unsuitable for arable, pastoral, or commercial forestry use. Erosion control, water management and conservation of flora and fauna are the main uses of this land (Lynn et al. 2009). Class 7 land has severe physical limitations and consequently it is high risk land requiring active management to achieve sustainable production. Both of these classes have a subclass 'e' which indicates that erodibility is the main kind of physical limitation or hazard to use that has been identified.

Land at highest altitude and on steepest slopes also contains potential for further carbon sequestration. The full potential of tussocklands present to increase in density and stature and ultimately to succeed to indigenous woody cover, is currently retarded by stock grazing.

2.2.2 Problem Plants

At least 31 exotic species of plants are present on the PL but relatively few are of conservation concern. Many are plants of agricultural importance or are common pastoral weeds. Most are present only at the lower elevations of the PL. At lease three hawkweed species are present but are seldom common except in localised dry sites where all taller vegetation has been removed. Of most serious concern are the dense broom (*Cutisus scaparious*) infestations that occupy the northwestern corner, along with outliers that are developing in the surrounding mixed short and tall tussocklands. They are part of a much larger broom infestation straddling the adjoining Kinross and Mt Stalker PL's. These infestations appear to be comprised almost solely of broom with little or no associated native species. Their current altitudinal extent is up to about 600m above sea level on the slopes beneath Mt Miserable, although outliers extend much higher.

The continued unchecked spread of broom presents a serious risk to indigenous biodiversity, natural character and recreational access. Williams (1981) in his study on the ecology of broom in Canterbury noted that the altitudinal limit of broom in New Zealand, as in Europe, appears to be limited by winter cold or winter drought affecting the previous season's growth. Williams grew broom experimentally at over 1300m in the Craigieburn Range but reported the observation of flowering broom at 1400m in the range.

As no part of Glencoe PL exceeds 900m there would appear to be few natural impediments to a much wider extension of its range. Without intervention, most if not all of the indigenous tussocklands are at risk of invasion by broom in the short to medium term. For these reasons protection of SIVs need to be considered with a view to minimising broom management costs.

2.3 Avifauna

During the re-inspection of the PL, a number of bird species both indigenous and introduced were sighted on the PL. Birds recorded are listed below in Table 4

Table 4 : Birds noted on Glencoe PL during the re-inspection. Exotic species are denoted by an asterisk.

Common Name	Species
South Island Pied Oystercharcher	*Haematopus ostraliegus finschi*
Magpie*	*Gymnorhina tibicen*
Paradise shelduck	*Tadorna variegata*
Greywarbler	*Gerygone igata*
Starling*	*Sturnus vulgaris*
Swallow	*Hirundo tahitica neoxena*
Blackbird*	*Turdus merula*
Chaffinch*	*Fringilla coelebs*
Pipit	*Anthus novaeseelandiae*
Australasian harrier	*Circus approximans*
Skylark*	*Alauda arvensis*
Browncreeper	*Finschia novaeseelandiae*
Spur-winged plover	*Vanellus miles novaehollandiae*
Black-backed gull	*Larus dominicanus*

2.3.1 Significance of Avifauna

No species of avifauna listed in Hitchmough (2007) were sighted during the inspection period.

2.4 Historic

Historic Records

The history of the PL is primarily one related to 19th and 20th century pastoral activity. Historic records describing the history of people who occupied or worked the land which encompasses the Glencoe PL are concerned primarily with ownership of the run and related pastoral activities.

The Glencoe PL, part run 464, corresponds to part of the early Hampden/Kakaho lease Run 10 and White Bluff lease Run 11. Mantell named Run 10, Kakaho (sometimes prefixed by Te), and the homestead site was named Tuparitaniwha in 1852. Mantell named Run 11 White Bluff. Alexander Fraser and his twin, Thomas Fraser, bought out John Cormack for Run's 10 (Hampden/Kakaho) and 11 (White Bluff) in 1853. The brothers were known as 'The Twins', and were alike as two peas. Their friends even had trouble telling them apart. Alexander was known as Sandy and had a Maori wife. The brothers were whaling at Mana Island as early as 1840 and were stockowners and shipowners. The two runs were worked together under the

name of Kilmoge (or Kilmog) which may be a corruption of Kirimoko, the Maori name for a type of small manuka. John Duffy was the manager of the two runs. Alexander Fraser was granted the neighbouring lease, Shag Valley Run 209, in 1858 (Bettie 1979:17, 322, Pinney 1981:135-136).

Dr Michael Sherlock Gleeson and Robert McBean picked up the White Bluff lease in September 1859. Gleeson sat on the Provincial Council from 1863-1867 and was associated with the Oamaru Brewery and Burkes Brewery. Gleeson was added to the Roll of Surgeons in Oamaru in 1871. The partnership with McBean was dissolved in 1861. McBean sat on the Provincial Council from 1863-67. In 1860, the lease was transferred to Matthew Holmes in partnership with Gleeson until 1865 when the lease was passed to the NZ & Australia Land Co. Matthews name also appears on the Shag Valley lease in 1860. Matthew Holmes was one of the great 19th century landowners who emigrated to Victoria in 1837. There he set up a profitable business exporting wool. Matthew Holmes married Ann McLean, a cousin of the McLean brothers, Alan and 'Big' John, in 1841. Holmes was acting for a Scottish syndicate known as Hankey & Coy. which became the Canterbury and Otago Association (Pinney 1981:136, Sinclair 2003:39, 49, Thomson 1998:233).

In 1859, Holmes came to New Zealand and bought huge tracts of land throughout the South Island for the company. He also bought in two shiploads of immigrants, stock and equipment for the stations. In 1862, he returned to England and bought his family back to New Zealand in 1864. Holmes settled down to manage Castlerock in Southland and Awamoa near Oamaru. Awamoa became known for its fine plantings and pedigree stock. He was a keen supporter of the A&P Society, active in road boards in the 1860's, and a founding member of the Oamaru Dock Trust in 1869. Other business interests included the Otago Daily Times, Dunedin Exchange Coy, and the Southern Meat Preserving Coy. Holmes was a member of the Southland Provincial Council and represented Oreti on the Otago Provincial Council after the provinces were re-united. He was a member of the Legislative Council from 1866 until his death in Wellington in 1901. In 1878, the Canterbury and Otago Association merged with the NZ & Australia Land Coy with Matthew Holmes as General Manager in New Zealand (Sinclair 2003:49, Thomson 1998:233).

The Glencoe Run, or Mount Misery Run (464), was formed out of part of Run 11. From 1883 Mount Misery (Run 464) was auctioned to the Land Company until the lease expired in 1899 and it was taken up by Thomas M. Macaulay, the Moeraki Estate manager. Thomas was the son of Robert Macauley of Totara. In 1913, the lease was bought by Dougall George Matheson of Fernside. Upon his death in May 1919 the lease passed to Daniel Matheson. The lease was transferred to James Rodman, an Oamaru clothier, in 1921 (Pinney 1981:136-138).

Mr Bell was the lessee in 1925 (LINZ 2006:3). In 1924, David Gordon Matheson acquired the lease. David was the stock manager for Shag Valley Station for six years. In 1957, David transferred the run to his son Douglas Raymond, who had replaced him at Shag Valley, and to another son, Gordon Russell, a lamb buyer. There was only one hut on the run and use was made of the Shag Valley woolshed (Pinney 1981:136-138).

G.R. Matheson transferred his half share to his nephew D.J. Matheson, who lived on an adjoining property, and planned to farm this lease in partnership with his father D.G. Matheson. In 1974, Gordon's share was transferred to Jeffrey David Matheson (LINZ 2006:3, Pinney 1981:138).

The lease was transferred to John Dene Oscar Thening of The Dasher and Carolyn Joyce Thelning in April 1988. The run was transferred to Barry John Thom in October 1995 (CT 11B/1498: LINZ). The run was transferred to the current lessee Windsor Blue Ltd in April 2005.

Method

The historic features were surveyed by the Department of Conservations field archaeologist, an archaeologist on behalf of Ngai Tahu, also accompanied the DOC team. A hand held Garmin GPX60CSx was used to locate waypoint coordinates of historic features which are depicted in Appendix 4 Figure 1. Other waypoints that are not historic features indicate the location of photo waypoints. A list of GPS waypoints will be held in the Department of Conservation Otago Conservancy's historic database.

New Recorded Archaeological/Historic Sites (Appendix 4)

There are no records of archaeological sites on the PL although an historic musterer's hut the Red Hut, was noted as a shepherds hut in the Due Diligence Report (LINZ 2006:5) as being the only building on the PL. Pinney (1981:138) confirms that only one hut was located on the run. The LINZ report notes that they are not aware of any historic sites on the PL and none are marked on survey or cadastral maps.

Three previously unrecorded archaeological/historic features of probably European origin were recorded during the field survey, the Red Hut (I42/141), a 19th century surveyor's Trig Station (I42/138), and remnants of the late 19th century or early 20th century fence lines.

Pre-contact Maori Site (Appendix 4)

There was evidence of a probable Maori site noted within the boundaries of the Glencoe PL. A circular raised rim pit, that may be an umu (I42/133), was recorded on a flat terrace on the northern slope of Little Table Hill (Appendix 4, and Appendix 5, Plate's 1-2). The pit measured 3.2m diameter internally, 5m from rim top to rim top, and 0.7 to 0.9m deep from the top of the raised rim. The rims are 1.2m wide and up to 2m wide at the lower northern side. Two small rocks were evident in the base of the pit. There may be sub-surface archaeological features or artefacts present in the area. A new NZAA site record form has been raised for this site (I42/133).

The NZAA database holds records for ovens or umu located throughout Herbert Forest recorded by Brian Allingham in the 1980's. Similar raised rim pits (J42/99) are located on Government Hill 1.4km north east of the newly recorded umu detailed above. One pit is 3 x 5m and 1.3m deep and the second is 4 x 3m and ca.1m deep. Stones are visible in the bases of the pits and cabbage trees are noted in a nearby gully. Ross Ewing found an adze on the top of Government

Hill close by the stone line and oven recorded on J42/99 (A. Stringer pers. comm.). Jill Hamel recorded a further two umu-ti located on top of Government Hill in 1999 (J42/137). One is 4.5m from crest to crest and 0.4m deep, and the second is 3m crest to crest and 0.3m deep.

A large oven (probably an umu-ti), 3m in diameter and 0.45m deep, is located ca.400m north of the ovens described above (J42/10). Heat affected volcanic stones locally sourced were recorded in the base and sides of the pit. A group of five ovens is located ca.2.8km north east of the umu on Little Table Hill (J42/9). The ovens range in size from 1.6m to 3m diameter and 10 – 40cm deep respectively. Two of the larger ovens have raised rim pits with heat affected stones clearly exposed on the surface. The larger depressions are probably umu-ti.

Celimisia daisys were recorded on the north east facing slope of Mt. Miserable that would probably have been collected for use by Maori (Appendix 5, Plate 3).

Pastoral

The Red Hut Site (I42/141)

The Red Hut site (I42/141) is located on Shepherds Creek on Mt Misery Road close to the western boundary of the early White Bluff Run 11 and the neighbouring lease, Shag Valley Station, Run 209 (Sinclair 2003). The hut may be a musterer's hut built for the early White Bluff Station, Run 11, although the date of construction is not known (Appendix 5, Plate's 4-10).

The hut is a bevelled weather boarded structure with wood piles. The hut's floor boards are 90mm wide tongue and grooved boards. The chimney is a later addition constructed of concrete blocks (Appendix 5, Plate 6). The ceiling and walls have been lined internally with hardboard therefore no maker's marks are visible on the inside of the corrugated iron roof (Appendix 5, Plate's 7-8). The front porch appears to be a later addition as an earlier concrete block used as a doorstep is retained under the porch.

Other features and artefacts were recorded around the Red Hut, a concrete pad and trench feature, and a metal chimney flue. The concrete pad and trench is located around 10m below the Red Hut (Appendix 5, Plate's 9-10). A small water race, 0.6m wide and 0.2m deep, diverts from the creek leading to the concrete pad and trench. The trench is 4m east of the pad and consists of a 0.55m dug trench 2.2m long with concrete lined uprights either side (Appendix 5, Plate 9). The feature may represent a sheep dip although this is not confirmed.

The chimney flue is located under a stand of manuka ca.55m above the Red Hut (Appendix 5, Plate 11). The flue is made from a circular corrugated drum, 0.39m in diameter and 0.54m in length, and an attached corrugated sleeve 1.78m long. The total length of the flue is 2.32 m long. Metal fragments are located spread around 2m further from the end of the corrugated sleeve that appears to have rusted out where it lay on the ground. The chimney flue may have been the original flue of the Red Hut replaced by the current concrete block chimney.

A pile of wooden weatherboards, 20cm wide and 0.3cm thick, are located 30m east of the hut (Appendix 5, Plate 4). The boards may represent an 'in situ' collapsed outbuilding although this

is not confirmed. A long drop toilet is located behind and above the Red Hut. Some of the original wood posts are retained in the fenced yard to the east of the Red Hut.

Tracks

The vehicle access track that runs through to Mt Miserable dates back to the 19th century and is the main access into the PL. Pinney (1981:137) notes that the pastoral leases, The Dasher, Mt Misery (the current Glencoe lease), and Mt Fortune, were run from Moeraki using the inconvenient track by the Telemet Road.

A 19th century hunters track is shown on Survey Office Plans, SO 1349 dated to 1861 and SO 1842 dated to May 1882, that cuts through part of the lease. The track runs from Mt Fortune through Trig 'N' to the east of Table Hill Trig'X' to exit the PL at its south eastern extent. This track appears to mark the southern boundary of the PL from Table Hill.

Fence Lines

A 19th century or early 20th century wood post, wire, and flat standard fence line was recorded striking north/south (Appendix 5, Plate 12). The wood post is rectangular cut, 00 x 68mm, and stands 1.2m above ground. One angled drill hole is evident on the wire wrapped post.

A remnant section of a wood post, wire, and flat standard fence line wass located (Appendix 5, Plate 13). A metal chain is attached to a modern replacement post that Brian Allingham indicated may have been used to tie up farm dogs. There are no Survey Office Plans that indicate internal or boundary fence lines on the PL.

Trig Stations

A search of Survey Office Plans (QuickMap) indicated two 19th century survey Trig stations located on, or close by the boundaries of the PL. Trig 'X' on Table Hill (SO 1349 dated to 1861), and Trig 'E' on Mt Miserable (SO 1842 dated to May 1882). The 19th century suveyors markers are important in Otago's history for allowing orderly settlement by the first runholders. Trig station 'E' is located on the summit of Mt Miserable (Appendix 5, Plate 14). A new site record has been allocated to this site (I42/138). The Trig was established by Dennison and Grant in 1882 and a 2m metal Clarke beacon was constructed over the original Trig in 1986 (A297:LINZ geodetic database). Trig station 'X' on Table Hill (Appendix 5, Plate 15) is located on the southern boundary although it is not clear whether this trig lies within the PL boundary as it is located just outside the fence and vehicle access track. There was no Trig station evident on the summit of Little Table Hill.

Other

No gold mining sites were identified on the PL during the inspection although Jill Hamel (pers. Comm.) mentioned that a small isolated field is located in the southern part of Herbert Forest and gold was found early in the sands of a small stream near Hampden (AJHR 1863:D-6 page 3).

SO 1349 (Appendix 6), shows a hut on the true left bank of Shepherds Creek to the north of Table Hill Trig 'X'. This area was not surveyed. The Red Hut is located 2km further west along

the access road. An old run hut is shown on SO 1842 dated to May 1882 (Quickap: Land Information New Zealand) located to the north of Trig Station 'E' on Mt Miserable. The hut appears to be outside the western boundary of the present Glencoe Run.

2.4.1 Significance of Historic

The history and archaeological sites recorded during the Tenure Review field survey of the PL illustrate some of the history of this PL. The PL retains direct evidence of pastoral activity primarily related to the early pastoral runs. Historic records provide information on the pastoral runs and the people associated with the running of the PL. Of most historic significance on the PL is the recording of a probably Maori umu on Table Hill, the musterer's hut, the Red Hut and physical evidence of late 19th and/or early 20th century fence lines.

PART 3

OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

The following additional comments were made at the meetings with NGO's in Alexandra on 10 September 2009.

- Woody values important especially beech forest in centre of PL, suggested that this should be covenanted.
- 4WD access for hunting needs to be formalised, although NGOs acknowledged problem with private forest access next door.

3.2 District Plan

The PL is located within the Rural General zone of the partially operative Waitaki District Council District Plan.

Earthworks which exceed either 100m3 in volume or 50m2 in area require resource consent, as does subdivision of less than 4ha for a residential dwelling. Any building, earthworks or establishment of exotic forestry within 20m of any water body also requires resource consent. The clearance and/or modification of indigenous vegetation requires a resource consent should specified thresholds be breached. These thresholds include the clearance of more than 500m2 of shrubland or 1000m2 of indigenous tussock grasslands.

There are no registered archaeological sites, or areas of significant indigenous vegetation and/or habitat of significant indigenous fauna identified within the District Plan or on the accompanying maps.

Within the Otago Regional Council Regional Plan: Water for Otago there are no significant wetlands identified on the PL. Shepherds Cree, due to it s fisheries values, is identified however as a water body that is sensitive to suction dredging and hence in this water way suction dredging requires resource consent.

Protection is therefore limited to the controls set out above.

3.3 New Zealand Biodiversity Strategy

The New Zealand Government is a signatory to the Convention on Biological Diversity. In February 2000, Government released the New Zealand Biodiversity Strategy which is a blueprint for managing the country's diversity of species and habits and sets a number of goals to achieve this aim. Of particular relevance to tenure review, is goal three which states:

Maintain and restore a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhance critically scare habitats, and sustain the more modified ecosystems in production and urban environments, and do what is necessary to:-

Maintain and restore viable populations of all indigenous species across their natural range and maintain their genetic diversity.

The strategy outlines action plans to achieve this goal covering terrestrial and freshwater habitat and ecosystem protection, sympathetic management, pest management, terrestrial and freshwater habitat restoration, threatened terrestrial and freshwater species management, etc.

3.4 Protecting Our Places

In April 2007 the Ministry for the Environment produced a new policy document titled 'Protecting Our Places' which was jointly launched by the Minister of Conservation and the Minister for the Environment. This publication introduces four national priorities for protecting rare and threatened native biodiversity on private land. The national priorities identify the types of ecosystems and habitats most in need of protection.

The policy statement supports the government's pledge to maintain and preserve New Zealand's natural heritage. This began in 1992 when New Zealand signed the United Nations Convention on Biodiveristy; followed in 2000 with the release of the New Zealand Biodiversity Strategy.

The four national priorities for biodiversity protection are listed below. They are based on the most up to date scientific research available.

National Priority 1:
To protect indigenous vegetation associated with land environments, (defined by Land Environments of New Zealand at Level IV), that have 20 percent or less remaining in indigenous cover.

National Priority 2:
To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.

National Priority 3:
To protect indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not already covered by priorities 1 and 2.

National Priority 4:
To protect habitats of acutely and chronically threatened indigenous species.

These national priorities have relevance beyond conservation initiatives on private land. For example they are used to help assess applications for grants under the government funded Community Conservation Fund which funds conservation projects on public land by community groups.

The national priorities also provide a useful measure for assessing tenure review recommendations and outcomes.

3.4 Ecological Sustainability and Carbon Storage

Sustainability

The PL contributes to a number of "ecosystem services". Constanza et al (1997) define ecosystem services as flows of materials, energy, and information from natural capital stocks which combine with manufactured and human capital services to produce human welfare. They identify 17 "services". This PL contributes to three of these services excluding those of a recreation and cultural nature which are described elsewhere.

1. Gas Regulation:

One hectare of mixed grassland/shrubland stores about 42 tonnes of carbon versus approximately 2t for unimproved grassland.

2. Climate Regulation:

Carbon storage in expanding shrublands, forest and tall tussock grasslands makes a modest contribution to ameliorating the current anthropogenic induced rise in atmospheric carbon dioxide levels.

3. Disturbance Regulation:

Wetland and upland bogs have an important role in flood runoff. These same wetland areas also store water which helps to maintain summer flows, as does storage of water in the shallow unconfined ground water on the colluvium mantled slopes. These values contribute to "disturbance regulation" by damping out environment fluctuation such as floods and droughts.

PART 4

ATTACHMENTS

4.1 Additional Information

4.1.1 References

Appendices to the Journal of the House of Representatives **(AJHR**). (1863). Mines Department Reports.

Beattie, J.H. (1979). *The Southern Runs.* Invercargill: Southland Times Co. Ltd.

Comrie, J. (1992). Dansey Ecological District. Survey Report for the Protected Natural Areas Programme. Department of Conservation, Wellington.

Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, J. Paruelo, R. G. Raskin, P. Sutton, M. van den Belt. (1997): The value of the wrold's ecosystem and natural capital. *Nature*, 387 (6230): 255.

de Lange, P.J; Norton, D.A; Courtney, S.P; Heenan, P.B; Barkla, J.W; Cameron, E.K; Hitchmough, R; Townsend, A.J. (2009). Threatened and uncommon plants of New Zealand (2008 revision). New Zealand Journal of Botany 47: 61-96.

Leathwick, J; Wilson, G; Rutledge, D; Wardle, P; Morgan, F; Johnston, K; McLeod, M; Kirkpatrick, R (2003): Land Environments of New Zealand. Ministry for the Environment.

Lynn, I.H; Manderson, A.K; Page, M.J; Harmsworth, G.R; Eyles, G.O; Douglas G.B; Mackay, A.D; Newsome, P.J.F; (2009). Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land 3rd ed. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, GNS Science. 163 p

Land Information New Zealand (2006). Due Diligence Report. Glencoe – East Otago (PO366).

Land Information New Zealand. Geodetic database. Search for Geodetic marks. http://www.linz.govt.nz/geodetic/geodetic-database/search/index.aspx?mode=text

Ministry for the Environment. (2007). Protecting Our Places. Introducing the National Priorities for protecting rare and threatened native biodiversity on private land. Ministry for the Environment, Wellington.

New Zealand Archaeological Association. NZAA Site Recording Scheme.

Otago Land Registry. Title 11B/1498.

Pinney, R. (1981). *Early Northern Otago Runs.* Auckland: William Collins Publishers Ltd.

QuickMap. Land Information New Zealand. Survey Office Plans.

Sinclair, John. (2003). The early pastoral runs of Otago and Southland. Index and biographies. Hocken Library Archives, Dunedin.

Thomson, J. (ed.) (1998). *Southern People. A Dictionary of Otago Southland Biography.* Dunedin: Longacre Press in association with the Dunedin City Council.

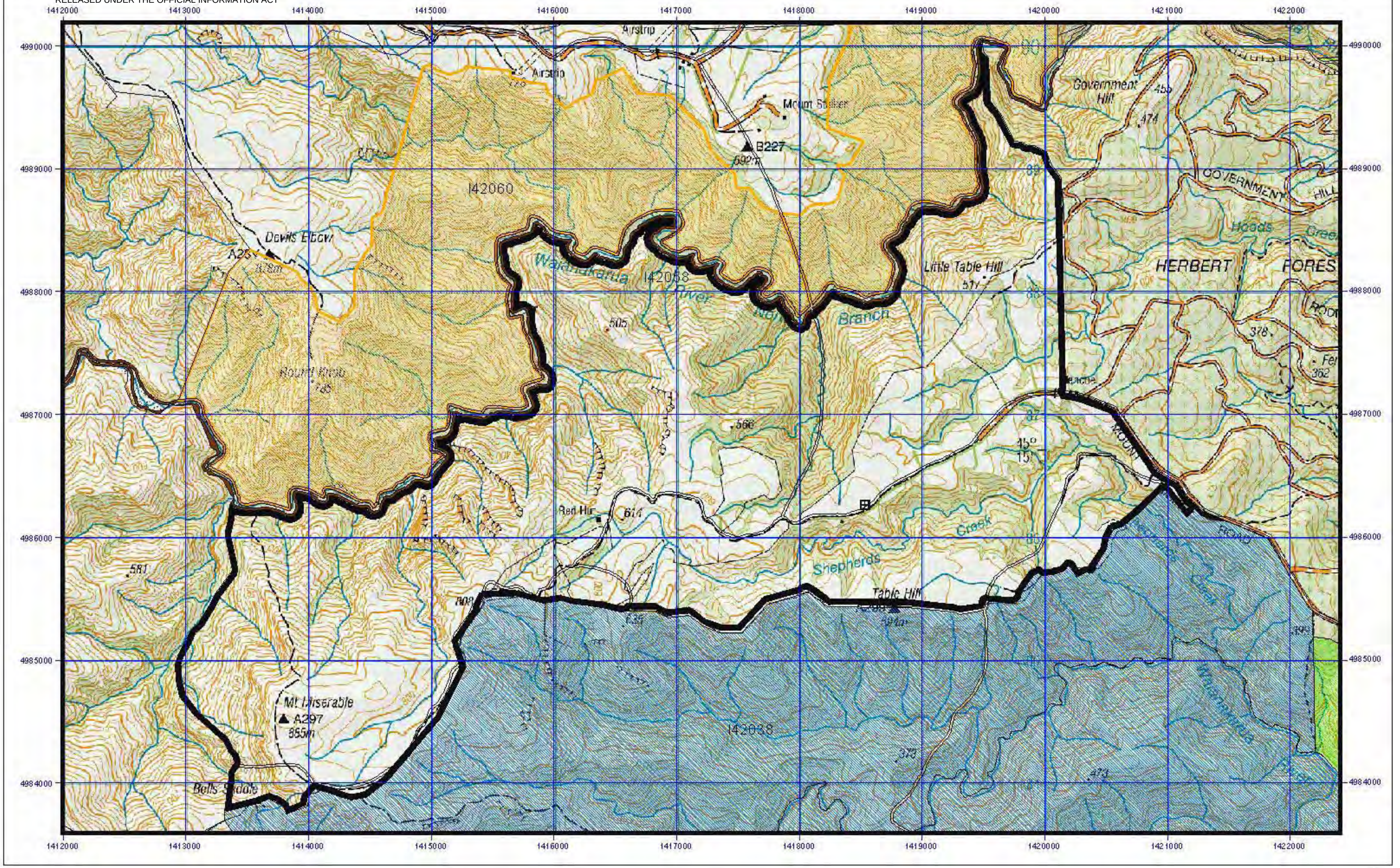
Townsend, A.J; de Lange, P.J; Duffy, C.A.J; Miskelly, C.M; Molloy, J;Norton, D.A (2008). New Zealand Threat Classification System manual. Science & Technical Publishing, Department of Conservation, Wellington.

Williams, P. A. (1981). Aspects of the ecology of broom (Cytisus scoparius) in Canterbury, New Zealand. *New Zealand Journal of Botany, Vol 19*: 31-43

Williams, P.A, Wiser S, Clarkson B, Stanley M.C (2007). New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. New Zealand Journal of Ecology 31(2): 119-128

4.2 Maps

4.2.1 Topographic and Cadastral
4.2.2 Values – Ecological and Historic

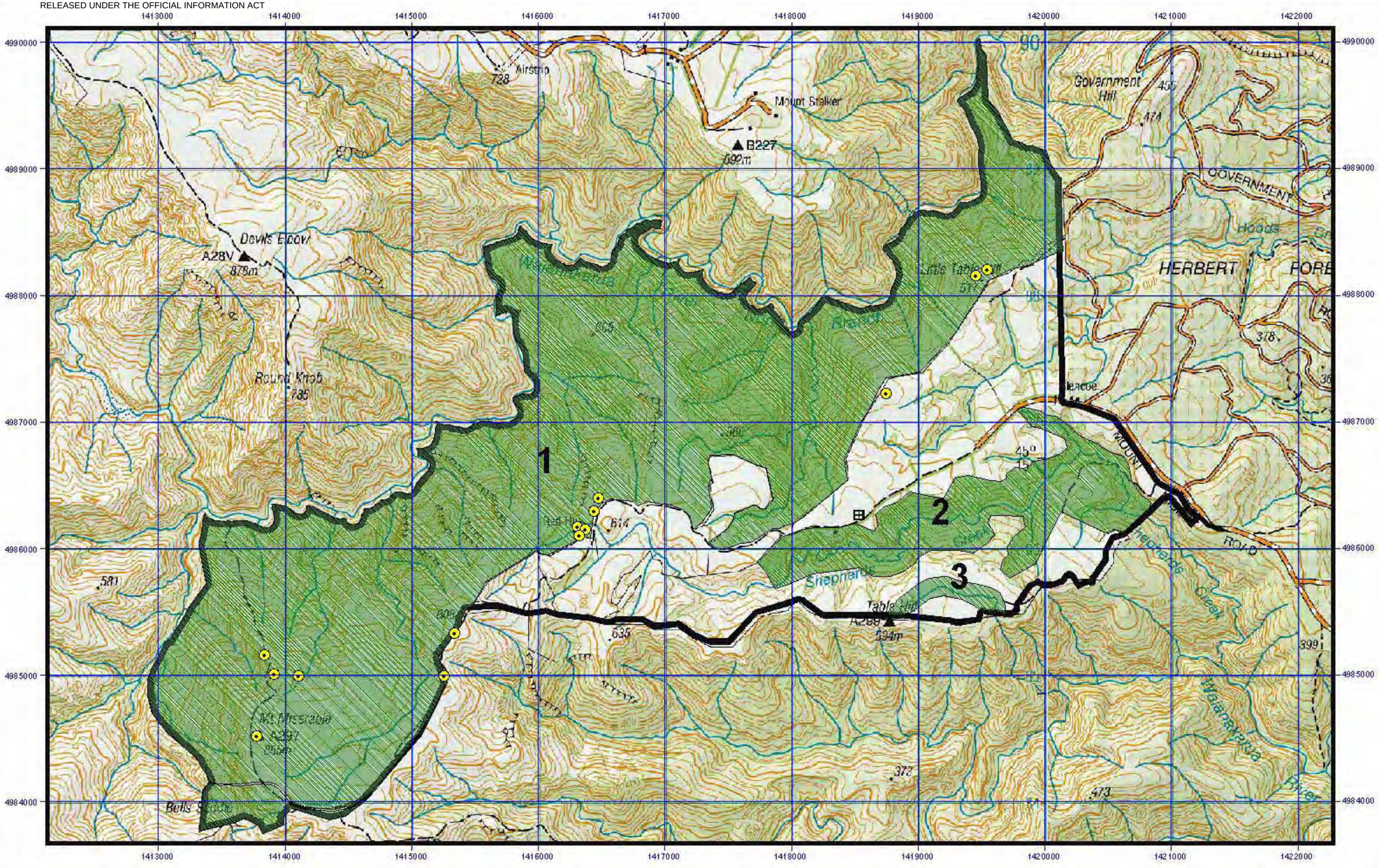


4.2.1 Topographical & Cadastral
Glencoe Pastoral Lease

Estate-legend.shp
- Stewardship Areas
- Reserves
- Marginal Strips
- Protected Land Agreements

0.3 0 0.3 0.6 0.9 1.2 Kilometers

N



4.2.2 Values - Ecological and Historic
Glencoe Pastoral Lease

Historic points

Significant Ecological Values

0.4 0 0.4 0.8 1.2 1.6 Kilometers

N

4.3 Photographs

Broom in North West corner of PL

Forest Gully Tributary of North Branch Waianakarua River

North Branch Waianakarua River from spur running north

Red Hut and wetland from above

Red Hut

Red tussock wetland east of Table Hill