Toitu te whenua
Land Information
New Zealand

Crown Pastoral Land Tenure Review

Lease name : KINROSS

Lease number : PO 348

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.

November 07

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DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF

KINROSS PASTORAL LEASE

PAL 14-04-348

UNDER PART 2 OF THE CROWN PASTORAL LAND ACT 1998

November 2007

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PART 1
INTRODUCTION

1.1 Background

Kinross is a 2042 ha pastoral lease (PL) lying between the Waianakarua River to the north and State Highway 85, the Pigroot, to the south. It is situated 28 km inland from Palmerston.

The property runs from the main highway at 300 m altitude over the Horse Range at 700 m then drops again to 300 m at the back corner on the Waianakarua. Maximum altitude is 965 m and only approximately 120 ha lies above 800 m. The bulk of the PL is situated within the Dansey Ecological District (ED), with the homestead blocks on the south western side of the Pigroot being situated within the Macraes ED. A Protected Natural Areas Programme Survey was published for the Dansey ED in 1992 and for Macraes ED in 1997. No Recommended Areas for Protection where identified on the PL. The back block includes remnant forest, the middle part is dominated by indigenous tussock and shrubland, with the front being the most developed for farming.

There are a full range of facilities on the PL with the main buildings being located on the other side of State Highway 85. There is a network of good standard tracks which are often steep, but these provide access to most parts of the PL.

There are no reserves or formally protected areas on the PL.

The PL was first inspected for conservation values by a team of Department of Conservation specialists in the summer of 1997/98 with the Conservation Resources Report being submitted in March 1998. Following the sale of the PL in 2003 and the reinstatement of tenure review, the property was re-inspected in May of 2006 and again in September 2007. This report is the updated version of the Conservation Resources Report taking into account the later inspections and additional information gained from recent surveys undertaken on adjoining leases.

PART 2

INHERENT VALUES: DESCRIPTION OF CONSERVATION RESOURCES AND ASSESSMENT OF SIGNIFICANCE

2.1 Landscape

METHODOLOGY

Three landscape units (LUs) were identified on Kinross PL.

The boundaries of each unit are defined principally by changes in topography, aspect and ground cover. Each LU is defined and a description of landscape character in terms of landform, land cover and land use is given. An assessment of landscape values is made using the criteria of naturalness, legibility and aesthetic values.

Visual values or "visual amenity" are described and an assessment of the vulnerability to change of each LU is made.

Horse Range Hill Country (Landscape Unit 1)

Landscape Unit 1 (LU1) is a rather narrow face which occupies the southwest facing rolling hill country overlooking The Pigroot and the north-east facing slope at the headwaters of the North Branch Waianakarua River (NBWR). The main ridgeline of the Horse Range forms the highest part of the unit and The Pigroot defines the south-western extent. The unit is divided into several grazing blocks which are easily accessible from the main access track.

The landform is dominated by a series of rounded ridgelines divided by winding concave gullies. The gullies to the south-west drain into Happy Valley Creek, a tributary of the Shag River.

The existing vegetative cover has been strongly influenced by farm management practices. Most of the lower and mid side slopes are clad in a fragmented pattern of modified grasslands with scattered shrublands in the gully bottoms. The grasslands comprise a sparse covering of short tussock, scattered tall tussock at higher elevations with oversown and topdressed pasture grasses and legumes. The headwaters of NBWR have small wetland areas dominated by *Carex secta.*

<u>Landscape Values</u>

Most of the hill country overlooking The Pigroot has moderate inherent landscape values. The original ground cover has been extensively modified but gullies retain significant shrubland patches. Much of this unit is obscured from the view of the public by a pine plantation adjacent to SH85.

Potential Vulnerability to Change

This unit has the potential to be adversely affected by changes in land use and activities including the following:

- Dispersal of wilding pines.
- Infestation of shrublands by exotic woody species such as wild hawthorn.
- Unsympathetic blocks of plantation forestry sited on the rounded landform.
- Unsympathetic tracking, especially zigzagging up prominent spur lines.

Central Dissected Hill Country (Landscape Unit 2)

Landscape Unit 2 (LU2) encompasses the north facing dissected hill country in the centre of the PL. The boundary of the unit is defined by the valley to the north–east of Horse Range and by a north - south spur that descends towards NBWR, being the last spur from the eastern boundary. The altitudinal range extends from 965m near Conical Peak down to 300m at the NBWR.

The physical relief of the unit is characterised by a broken pattern of narrow-crested spurs separated by deep gullies which are typically asymmetrical in profile. The west-facing slopes are typically very steep with numerous rock ribs, outcrops and bluffs. The corresponding east-facing slopes are less steep and have deeper soils.

Aspect and landform largely dictate vegetation characteristics and composition. The steep western slopes have considerable bare rock with typical rock-dwelling species of herbs and shrubs. These are interspersed with modified short/tall tussock grasslands and shrublands. Expansive areas of mainly matagouri/mingimingi shrublands clad the valley bottoms to part way upslope.

The eastern slopes typically are more open, with short matagouri towards the bottoms, and significant areas of short tussock grading into snow tussock higher up. Small patches of flat hawkweed are spread across the drier sunny ridgelines. These faces are broken by shrublands along water courses and damper areas. These faces have been frequently disturbed by fire, and have been oversown and topdressed.

The view out to Mt Stalker PL contributes to the values. NBWR is a small clear mountain river in many places cut to bedrock. These qualities help to produce the feelings of remoteness and naturalness within this unit.

Landscape Values

LU2 possesses moderate inherent landscape values, with the western facing slopes possessing significant inherent landscape values due to the presence of substantial rock outcropping surrounded by relatively intact tall tussock grasslands and mixed shrublands. The original ground cover, especially on the sunnier slopes, is extensively modified. Sunnier slopes generally contain a higher component of both short tussock and introduced pasture.

Potential Vulnerability to Change

This unit has the potential to be adversely affected by changes in land use and activities including the following:

- Further loss of tall tussock grasslands due to burn-offs.
- Further infestation of flat hawkweed.
- Dispersal of wilding pines.
- Planting of exotic trees
- Further tracking.

Eastern Catchment (Landscape Unit 3)

Landscape Unit 3 (LU3) comprises a tributary of NBWR which drains to the north from between high point 965m and Bells Saddle on the adjacent Glencoe PL. The boundary is defined by a major north–south spur and the property boundary which generally runs along the valley bottom. This creek catchment has been subdivided into approximately three grazing blocks. This unit is the least developed for farming, but upper parts have recently been burned.

The principal landform is the north draining valley and an east facing slope, which like others on the property is of easier contour than the opposite faces.

Most is depleted tall tussock grassland, grading to short tussock and introduced species at lower altitudes. The conspicuous difference about this face is that the gullies retain remnant Podocarp/broadleaf forest vegetation. Prominent species are broadleaf, marble leaf, narrow leaf lacebark and other taller statured trees. Surrounding these areas are typical matagouri/mingimingi dominated shrublands, with mountain flax obvious in places.

Exotic broom has invaded the lower valley slopes, where it has replaced tussock grasslands. An area in excess of 100ha of dense broom is actively spreading upslope. There are widespread outliers which are particularly obvious when flowering. Pine trees are obvious in the gully bottom, the oldest of which appear to have been planted.

Landscape Values

LU3 possesses moderate inherent landscape values. These are influenced by the presence of remnant forest patches, however exotic broom detracts from its naturalness. The steep faces of Mt Miserable on the opposite face (on Glencoe PL), create an expansive setting with a remote feel. The grey shrublands and exotic broom contrast to the greener forest remnants and tawny tussocklands.

Potential Vulnerability to Change

This unit has the potential to be adversely affected by the following changes in land use and activities including the following:

- Further wilding pine spread.
- Patch burn-offs, especially of the narrow-leaved snow tussock.

- Continued expansion of broom.
- Further earth disturbances, e.g. bulldozed fence lines, which can form corridors for opportunist species to infest grasslands.
- Decline in the ecological health of the remnant broadleaved forest and shrublands with palatable species being grazed out by stock.

Summary of visual landscape values on Kinross PL

The visual landscape values of LU1 are limited. Much of the unit is obscured from view from public vantage points by a roadside pine plantation. This unit has the appearance of a culturally modified landscape, which has been oversown and topdressed for farming.

LU2 contains most of the visually striking areas on the PL, primarily the areas that have steep rock ribs, outcrops and bluffs. Much however is not accessible or visible from any public vantage points. It is not until the gullies are viewed from the main farm track near Conical Peak, does the size of the landscape and feeling of remoteness become evident.

LU3 in itself is not striking. However its value is gained from the wider setting under Mt Miserable. Exotic broom and wilding pine invasion is likely to increasingly detract from this unit.

2.1.1 Significance of Landscape

Inward views of gullies and larger catchments are more important on Kinross PL than outward views. Much of the PL, particularly the dissected mid country, has moderate inherent landscape value due to the modification of the vegetative cover by pastoral practices. West facing rocky faces have higher values that contribute to the landscape significance of the PL as a whole, as do the extensive shrubland areas.

Kinross PL features an incised landscape of sharp ridges and spurs with moderate to very steep faces dropping to valley floors. Located strategically within the Horse Range, the PL adjoins an expansive natural area of public conservation land (Waianakarua Scenic Reserve) and other pastoral land subject to the tenure review process. These connections with adjoining similar natural areas make this PL important to the protection of the wider distinguishable high country landscape of the Kakanui Mountains.

2.2 Landforms & Geology

The Kinross PL is located within the broad band of high dissected hills which form the transition zone between the Kakanui Mountains and the Horse Range, the latter rangelands grading into the lower coastal Razorback Range further to the south-east. Collectively, these mountain lands and high hills form a major land divide which links the South Island's eastern high country to the east coast. The PL is virtually all heavily dissected hill country, with high relief between the boundary streams, Happy Valley Creek and the North Branch of the Waianakarua River (NBWR), and the high point just east of Conical Hill at 965 m. Landforms are generally steep

rolling hillslopes, interspersed with narrow valley floors, the latter with very few alluvial terraces. No true alpine altitudes or vegetation are evident. These ranges lie on the upthrow side of the Waihemo Fault. They are mostly steep and incised, but contain some relicts of the Otago peneplain surface.

Geology

The geology of the Kakanui Ecological Region which includes the Dansey and Waianakarua ED's is mainly Haast schist with some Torlesse greywacke. This is overlain in parts of the Waianakarua ED with loess, tertiary coal measures, limestone, sandstone, basaltic tuffs and lavas. Kinross PL has rather uniform geology being part of the Horse Range – poorly foliated schist of the Haast Schist Group (NZ Geological Survey 1963). The southern boundary of the PL is bounded by the Waihemo No. 1 fault, along which the Horse Range is uplifted.

Soils

The soils of the Danseys ED are derived largely from schist or greywacke loess. The soils comprise: yellow-brown earths; yellow-grey earths; some small areas of dark coloured recent, limestone derived rendzina soils; and small areas of brown basalt derived granular loams (Comrie, 1992).

The soils have been mapped as follows (NZ Soil Bureau Bulletin no 26):
Karitane soils are on the homestead block and are derived from calcareous sandstones. These are rolling to moderately steep contour and are of medium natural fertility.

Tengawai yellow-grey earth soils occupy the lower country adjoining SH85 and the Horse Range. These are silt and stony silt loam over pale stony clay subsoil. These have a medium natural fertility.

Hurunui soils occupy lower altitude areas of the rest of the property below 700m. These are generally shallower and have more rock outcropping.

Kaikoura soils above 700m are generally very shallow and/or rocky, mainly steep with parts subject to erosion. These have a very low natural fertility.

2.2.2 Significance of Soils

None of the above characteristics are significant on either a local or ED scale. There are no geopreservation sites on the PL.

2.3 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 Kinross 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 PL (ha)
Acutely Threatened	N3.1b	0	1	No Change	0.24
	N3.1c	3	0	Decrease	61.29
	N3.3a	3	1	Decrease	58.64
Chronically Threatened	Q4.3b	17	3	Decrease	2.58
At Risk	Q2.1c	25	9	Decrease	1122.77
Critically underprotected	Q2.1a	38	9	Decrease	286.67
No Threat Category	Q1.1d	85	35	No Change	525.75

2.3.1 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.

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

- ~ 5.8 % of the PL has Level IV LENZ units that have less than 10% of their land area still in indigenous vegetation cover (whether protected or unprotected). These include three 'Acutely Threatened' Units (N3.1b, N3.1c and N3.3a).
- ~ 0.1 % of the PL has Level IV LENZ Units that have 10-20% of indigenous vegetation cover (whether protected or unprotected). This includes one 'Chronically Threatened' Unit (Q4.3b).
- ~ 54.5 % of the PL has Level IV LENZ Units that have 20-30% of its land area still in indigenous cover. This includes one 'At Risk' Unit (Q2.1c).
- ~ 13.9 % of the PL 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' Units (Q2.1a).
- ~ 25.5 % of the PL has Level IV LENZ Units that have >30% of its land area still in indigenous cover and >20% protected. This includes one 'No Threat' Units (Q1.1d).

Where indigenous cover remains within these threatened LENZ units, it attains significance for tenure review.

LENZ Map is attached as Appendix 1. (Please note the areas on the LENZ map are approximate only)

2.4 Climate

The climate is typical coastal Otago. Rainfall 625mm-750mm, reasonably evenly spread but tending drier in summer and with periodic drought years. Fog which rolls in from the coast is a feature of the Kakanui Mountains. Temperatures overall are moderate and significantly affected by cool easterly winds. Snowfalls are common in winter and can occur at any time of year, but snow does not lie for more than a few days over most of the PL.

2.5 Vegetation

INTRODUCTION

The present vegetation on the PL is thought to be very 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 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.

Fire has been used repeatedly since the beginning of pastoralism and has been used recently on Kinross and adjoining pastoral leases. Burning, combined with grazing, aerial oversowing and topdressing, has substantially modified the natural communities of the District, particularly below 900 m.

The first comprehensive assessment of the botanical significance of the Kakanui Mountains arose through the PNAP which surveyed the Dansey ED in the summer of 1989/90. The resulting report (Comrie 1992) identified 10 Recommended Areas for Protection (RAPs).

SURVEY METHOD

The latest botanical survey was undertaken 3 May 2006 and 21-22 September 2007. Approximately 18 hours was spent on the PL. Survey was carried out by vehicle and 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

Shag Valley Tributaries

North of SH 85

An approximately 1 km wide belt of PL extends from the top of the Horse Range to the valley floor. This takes in several small headwater catchments of Happy Valley Creek. The vegetation over most of this area is improved pasture grassland with patches of short tussockland and scattered tall tussockland at higher elevations. Some exotic trees including a plantation of Douglas fir are present near the valley floor.

The largest tributary of Happy Valley Creek on the PL contains considerable riparian scrub and patches of treeland comprising cabbage tree (*Cordyline australis*), kowhai (*Sophora microphylla*) - a grove of at least 30 trees of varying sizes, matagouri (*Discaria toumatou*) *Coprosma propinqua, Coprosma rugosa, Carmichaelia petriei, Olearia lineata, Fuchsia*

perscandens, Rubus schmidelioides, Muehlenbeckia complexa and *M. australis*. Other mostly single trees of kowhai are widely scattered over the hillslopes.

Small wetlands in the creek bed have *Carex secta*, silver tussock (*Poa cita*) and both exotic and native wetland herbs.

South of SH 85
This comprises gently sloping terrain surrounding the Kinross homestead and ancillary buildings. Although not inspected in detail, the vegetation appears to include pasture grasses and associated agricultural weeds, and a range of exotic amenity trees.

North Branch Waianakarua River and tributaries

East-facing slopes
The most eastern sub-catchments contain remnants of podocarp/broad-leaved forest. Forest and shrubland is best developed in the riparian margins and on adjoining south-facing debris-mantled slopes. Canopy species include Hall's totara, kohuhu (*Pittosporum tenuifolium*), broadleaf, putaputaweta, lancewood (*Pseudopanax crassifolius*), narrow-leaved lacebark (*Hoheria angustifolia*), three-finger (*Pseudopanax colensoi* var. *ternatus*) and lemonwood (*Pittosporum eugenioides*). Understorey, subcanopy and fringing species include wineberry (*Aristotelia serrata*), *Coprosma propinqua, C. linariifolia, C. rigida, C. tayloriae, C. rugosa, C. rotundifolia,* koromiko (*Hebe salicifolia*), *Olearia bullata, Corokia cotoneaster*, false beech (*Gaultheria antipoda*) and *Helichrysum lanceolatum.*

Some *Coprosma* –dominated riparian scrub is sheltering well-advanced regeneration of forest canopy species, especially broadleaf and putaputaweta.

Dense exotic broom (*Cytisus scoparius*) infestations occupy the lowermost slopes, and outliers are developing in the surrounding mixed short and tall tussocklands.

Above and surrounding the forest remnants are mixed short and tall tussocklands of variable composition, density and stature dependant on aspect, and management history. A generally high natural character is maintained on eastern aspects through the catchments to the west until the eastern slopes of the Horse Range. At this point, despite the lingering presence of indigenous plants such as matagouri, *Muehlenbeckia complexa* and short tussocks, the vegetation is overwhelmingly dominated by exotic pasture grasses.

West-facing slopes
West-facing valley sides are characterised by steep slopes and numerous rock ribs, outcrops and bluffs. These have common rock-dwelling species such as *Helichrysum intermedium, Scleranthus uniflorus, Asplenium flabellifolium* and porcupine shrub (*Melicytus alpinus*) but also provide habitat for a range of shrubs and herbs which are either not present or at low occurrence elsewhere outside of rupestral sites. Such species include coral broom (*Carmichaelia crassicaulis* subsp. *crassicaulis*), *Gingidia grisea, Celmisia hookeri* and *Vittadinia australis.*

Lower parts of these west-facing slopes often have dense narrow-leaved tussock (*Chionochloa rigida*) with scattered mountain flax (*Phormium cookianum*), matagouri and *Coprosma* species. Shrublands containing these species and others occur in some gullies. One such gully contains a large, multi-leadered tree of *Olearia fimbriata* along with a second much smaller shrub of this rare species. Aspect differences are marked with south-west facing slopes harbouring a range of ferns and fern allies including little hard fern (*Blechnum penna-marina*), prickly shield fern (*Polystichum vestitum*), mountain fern (*Blechnum montanum*), thousand-leaved fern (*Hypolepis millefolium*) and alpine clubmoss (*Lycopodium fastigiatum*). This damper aspect also has greater density of mountain flax, *Brachyglottis bellidioides* and giant speargrass (*Aciphylla scott-thomsonii*).

North-facing slopes above main North branch Waianakarua River

The vegetation on these dry, semi-arid slopes, suggests a high fire frequency with consequently strong fire-induced patterning. Lower slopes have a dominant cover of generally dense short-statured (0.5 -1m tall) matagouri interspersed with pockets of short tussock, mouse-ear hawkweed, native herbs and pasture grasses. Patches of taller *Coprosma propinqua* dominated scrub on shady micro-aspects and along water courses suggest these have been spared from wider conflagrations.

Some spur crests and other closely grazed convex slopes contain elements of a drought-tolerant herbaceous and low-shrub flora that includes *Carmichaelia corrugata, Raoulia beaverdii, R. australis, R. parkii, Muehlenbeckia axillaris, Leucopogon fraseri* and *Dichondra repens.*

Rock outcrops contain a similar flora to that described for similar habitat on west-facing slopes. With increasing altitude; narrow-leaved tussockland prevails.

Conical Peak and associated ridge above 900 m

This topographic feature has a steep south-facing rock escarpment with a herbfield and shrubland on debris mantled crest. Species diversity is considerably greater than on equivalent but lower altitude features. Shrubs include *Helichrysum intermedium, Dracophyllum pronum, Pimelea pseudolyallii, Myrsine nummularia, Coprosma cheesemanii* and *Hebe buchananii* although there is evidence that their abundance has been reduced by fire. Common herbs include *Gingidia grisea, Celmisia hookeri, Anisotome flexuosa, Brachyglottis bellidioides, Pentachondra pumila, Kelleria dieffenbachii, Celmisia lyallii* and *Anaphalioides bellidioides.*

2.5.1 Significance of Vegetation

Kinross PL falls predominantly within the Dansey ED, part of the wider Kakanui Ecological Region. A PNAP report for the Dansey ED was prepared in 1992 following survey work in the summer of 1989/90. Ten Recommended Areas for Protection (RAPs) were identified in Comrie (1992). No RAPS were identified on this PL. A small portion of the PL, based around the homestead, falls within the Macraes ED, for which a PNAP report was produced in 1997, following survey in the summer of 1994/95 (Bibby 1997).

At least 163 native vascular species (see Appendix 2) are present representing approximately 55% of the indigenous vascular plant diversity recorded for the much larger (97740 ha) and ecologically diverse Dansey ED (Comrie 1992).

Of the native vascular plant species present, at least seven are listed as threatened and a further one as Data Deficient in the most recent threat classification system (Hitchmough 2007; Table 1 below). A list of these species with their threat of extinction status and distribution within the PL is provided in Appendix 2 and 3.

Of high significance is the occurrence of a small population of a tree daisy *olearia fimriata* (ranking of Serious Decline) in a small tributary of the North branch Waianakarua River. This is the first record for the Kakanui Mountains and adds to the list of about 13 contemporary Otago populations. This species, along with several other threatened tree daisies, is the subject of a national recovery plan (Rance, in prep.). This plan urges the physical and legal protection of sites.

Species listed in the category Gradual Decline fall within the division 'Chronically Threatened'. Species in this division face extinction, but are buffered slightly by either a large total population size, or a slow decline rate. Species listed as Sparse and Range Restricted fall under the division "At Risk". Although they are not currently in decline, their population characteristics mean a new threat could rapidly deplete their populations. Sparse taxa have very small, widely scattered populations. Species listed as Data Deficient have insufficient information on which to make an assessment as to their appropriate category.

Table 1: Threatened plant species found on Kinross PL

Threat Division	**Threat Category**	**Species**	**Location on PL**
Chronically Threatened	Serious Decline	*Olearia fimbriata*	Small steep tributary of NBWR on western side.
	Gradual Decline	*Carmichaelia crassicaulis* ssp. *crassicaulis*	Riparian shrubland and rock outcrops in NE sector
		Pachycladon cheesemanii	Single location on riparian rock bluff in NE sector
At Risk	Sparse	*Olearia lineata*	In riparian shrubland in tributary of NBWR and in Happy Valley Creek
		Pimelea pseudolyallii	Scattered in tussock grassland
		Celmisia hookeri	Throughout eastern half on rock outcrops and gorge sides
	Range Restricted	*Gingidia grisea*	Throughout eastern half on rock outcrops and gorge sides
Data Deficient		*Vittadinia australis*	Rock outcrop NE sector

In addition a further species is present, *Carmichaelia corrugata*, that is uncommon in Otago (Regionally Significant). Although more widespread in Canterbury this record represents its most southern currently known location.

Highly significant original woody remnants are present at several sites across the PL. These include the podocarp/mixed broadleaved forest remnants of the most eastern catchment on the PL; the *Olearia fimbriata* relict already mentioned; and the kowhai grove in Happy Valley Creek. The importance of woody vegetation in Central Otago has been given prominence by Walker et al. (2003) whose study area extended to and included the Kakanui Mountains. The indigenous woody communities remaining on this PL form a core from which recovery towards their former extent could occur. The recovery of woody vegetation in the absence of grazing and fire has been demonstrated at several sites in Central Otago (Walker et al. 2003) and is apparent at specific sites on this PL. Of particular relevance, is the well-advanced regeneration of forest canopy species, especially broadleaf and putaputaweta, amongst some secondary *Coprosma* – dominated riparian scrub.

Substantial cliff and rock outcrop habitat exists throughout the eastern two thirds of the PL. These areas of true non-forest habitat support a range of indigenous shrubs, herbs and grasses that are uncommon in the surrounding landscape. Of particular note is the frequent occurrence of the north Otago endemics *Gingidia grisea* and *Celmisia hookeri*, a daisy restricted to north east Otago and northern Southland. Only a representative selection of sites of these two species is shown in Appendix 2.

2.5.2 Problem Plants

At least 30 exotic species of plants are present on the lease 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 least one hawkweed is widespread (*Hieracium pilosella*), but is seldom common except in localised dry sites where all taller vegetation has been removed. Of most serious concern are the dense broom (*Cytisus scoparius*) infestations that occupy the most eastern catchment, along with the outliers that are developing in the surrounding mixed short and tall tussocklands. 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 560 m above sea level on the slopes beneath Mt Miserable.

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 1300 m in the Craigieburn Range but reported the observation of flowering broom at 1400 m in the range.

As no part of Kinross PL exceeds 1000 m 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 Significant Inherent Values (SIVs) need to be considered with a view to minimising

broom management costs and carrying out control in a systematic and timely manner, preferably following an agreed plan.

2.6 Fauna

2.6.1 Invertebrate Fauna

Conical Peak Tussock Lands:
Three chafer beetle species, native leaf vein slugs, earwigs, darkling beetles, the large weevil *Anagotis lewisi*, and the carabid *Holcaspis angustula* associated with rock outcrops, are indicative of a diverse invertebrate community, with multiple trophic layers, and dominated by natives.

Waianakarua River Catchment below Conical Peak and Bells Saddle:
This catchment comprises lower elevation tussock grassland with fingers of broadleaved forest in the gullies and areas of shrubland and shield fern. Much of it is south facing and below 600m. The strong influence of coastal forest is demonstrated by the insects found. These include the carabid beetle species *Megadromus fultoni/memes* and *Megadromus haplopus*. *M. fultoni/memes* is widely distributed in Otago, while *M. haplopus* is only known from shrub and forest remnants between Palmerston and Oamaru. This is a small area for such a species and maintenance of the existing habitat is a priority. The lowland-montane grasshopper *Sigaus campestris* is present and the bush edge ant species *Prolasisus advena* is part of the mosaic communities present. Pill millipedes, leaf vein slugs, and an undescribed ground weta from the forest floor indicate that these small areas are still large enough to support viable populations of sensitive invertebrate species.

North Branch Waianakarua River:
The river is bound by steep slopes in most places with few toe slopes or terraces. The aquatic invertebrates were not sampled, however, the diversity of pools with litter retention, riffle habitat and the numerous side steeps is expected to have a diverse range of caddis, stoners and mayflies species.

Carex Wetland:
The wetland bunch sedge *Carex secta* is found in open wetland areas throughout the Pigroot along the Shag River, however, these wetlands are significantly modified and in decline. There is a small, but healthy area of *C. secta* adjacent to the homestead. Big herbivorous insects on these plants are the weevil *Anagotus graniger*, and moths *Wiseana umbraculata* and *Tmetolophota sulcana*.

2.6.2 Significance of Invertebrate Fauna

The carabid beetle species *Megadromus fultoni/memes* and *Megadromus haplopus* are both listed as threatened in the most recent threat classification system (Hitchmough 2007). They are listed in the category "Sparse".

2.6.3 Herpetofauna

No specific lizard survey has been undertaken on Kinross PL. However, known lizard population distributions and the results of recent lizard surveys on nearby properties, indicate the likely presence of several lizard species. Habitat type and previous records within the Dansey and Waianakarua ED's suggest the following species may be present on the PL. These include:

- Cryptic skink (*Oligosoma inconspicuum*) usually inhabits damp microsites in grassland, herbfield or open shrubland (Whitaker *et al.* 2002). Such habitat was patchy in its distribution on the PL and usually within relatively degraded and modified habitat.

- The green skink (*O. chloronoton*) is known from approximately 25 km away in the Kakanui Mountains on rocky slopes and boulder banks within grassland and shrubland habitat. This habitat type is common in the north of the PL.

- The jewelled gecko (*Naultinus gemmeus*) is known from the Waianakarua ED (Whitaker et al. 2002), including on neighbouring Glencoe Pastoral Lease. Good habitat for jewelled gecko is available in mixed shrublands which extend up gullies and in various tributaries of the NBWR. Kinross PL is well within their distributional limits.

- common skink (*O. nigriplantare polychroma*)

- McCanns skink (*O. maccanni*)

- the gecko *Hoplodactylus* aff. *maculatus*

(Hitchmough 2007, ARDS database, Whitaker et al 2002).

2.6.4 Significance of Herpetofauna

Suitable green skink habitat is present on Kinross PL and populations are known in nearby areas. Good habitat for jewelled gecko *Naultinus gemmeus,* classified as in 'gradual decline' (Hitchmough 2007), is also present and is within the distributional limits of the gecko.

2.6.5 Avifauna

Several native and exotic bird species have been observed during inspections carried out on the adjoining properties of Caithness, Shag Valley and Glencoe PLs. It is likely that most of these species will also be found on Kinross PL, of which ten are native species (Table 2). Eastern NZ falcons (*Falco novaeseelandiae*) have been seen patrolling the main ridge near Conical Peak.

Table 2: Bird species recorded on adjoining Shag Valley, Caithness and Glencoe PLs. Exotic species are denoted by an asterisk.

Species	Common name
*Alauda arvensis**	Skylark
Anthornis melanura	Bellbird
Anthus novaeseelandiae	New Zealand pipit
Circus approximans	Harrier
Falco novaeseelandiae	New Zealand falcon (eastern)
*Fringilla coelebs**	Chaffinch
Gerygone igata	Grey warbler
Hirundo tahitica	Welcome swallow
Petroica macrocephala	Tomtit
Tadorna variegata	Paradise shelduck
*Turdus merula**	Blackbird
*Turdus philomelos**	Thrush
*Gymnorhina hypoleuca**	Magpie
Mohoua novaeseelandiae	Brown Creeper
Phalacrocarax carbo	Black Shag

2.6.6 Significance of Avifauna

The New Zealand Eastern Falcon (*Falco novaeseelandiae* 'eastern'), classified as in 'gradual decline' (Hitchmough 2007), has been recorded on adjoining properties.

2.6.7 Aquatic Fauna

There are no freshwater fish records for Kinross on the NIWA freshwater fish database. A fish survey in the vicinity of Kinross along the North Branch of Waianakarua River was carried out at three sites at which only *Galaxias vulgaris* was collected.

In a fish survey undertaken on adjoining Shag Valley PL, three fish species, all native, were recorded. These were upland bully (*Gobiomorphus breviceps*), longfin eel *(Anguilla dieffenbachia)* and Canterbury galaxias *(Galaxias vulgaris)*. Upland bully were found in a tributary of the South Branch of the Waianakarua River (SBWR), Canterbury galaxias in the Main Branch of the Waianakarua River (MBWR) and longfin eel in both streams. Twelve taxa of invertebrates were located within that PL, most having a high MCI[1] value and indicative of

[1] The MCI is commonly used as an indicator of water quality in New Zealand stony streams. In its simplest, non-quantitative form the index is calculated by summing the tolerance scores of all taxa collected at site, graded from 1-10, dividing by the number of scoring taxa, and multiplying this average value by 20

high water quality. The presence of New Zealand's only burrowing mayfly (*Ichthybotus hudsoni*) in the MBWR was a notable find.
The Kinross lessee reported that on one occasion he saw an eel (most probably a longfinned eel).

2.6.8 Significance of Aquatic Fauna

Longfin eel (*Anguilla dieffenbachii*) is of conservation concern and has a ranking of Gradual Decline (Hitchmough 2007). Habitat protection is a regional priority. This species was once abundant throughout New Zealand. Habitat modification and hydro dams which inhibit passage to and from the sea have led to the decline of this species.

2.6.9 Problem Animals

Rabbits (*Oryctolagus cuniculus*), hares (*Lepus europaeus*), possums (*Trichosurus vulpecula*), feral cats (*Felis catus*), ferrets (*Mustela furo*), stoats (*Mustela erminea*), hedgehogs (*Erinaceus europaeus*) and rats (*Rattus* spp.) are most probably present throughout the PL. These undoubtedly reduce populations of palatable native plants, native birds, reptiles and invertebrates. On the more intensely farmed country, rabbits require regular control. Pigs (*Sus scrofa*) are present but are largely controlled by recreation hunters. Wild sheep (*Ovis aries*) and deer (*Cervus spp*) are occasional visitors to the PL.

2.7 Historic

While there are no recorded historic sites of significance on the PL and no pre-European features are known to DOC, it is important to note that the absence of information is not evidence of the absence of sites.

An old hut is known to exist adjacent to pine trees at the rear of the PL adjacent to the Glencoe PL boundary. Its condition is unknown.

2.8 Public Recreation

2.8.1 Physical Characteristics

Kinross has a relatively small frontage onto SH 85, the Pigroot. From there a track winds up to the top of the Horse Range. Beyond farm tracks are formed on most ridges but these are generally steep and sometimes narrow. The network of tracks is linked by a track along the North Branch Waianakarua River. Tracks can be very slippery when wet.

2.8.2 Legal Access

The track from SH 85 appears to approximate a legal road. It then travels outside the PL to the south-west, along the top of the Horse Range. The NBWR along the PL's northern boundary has a marginal strip along much of its length.

The lease adjoins the Waianakarua Scenic Reserve at one point near Bells Saddle.

2.8.3 Activities

There are opportunities for walking, mountain biking, horse riding, and 4WDing on the PL. Pig and deer hunting are popular activities on the PL and adjoining land. A group of local hunters have built a hut adjacent to NBWR, which appears to get frequent use.

The PL may provide part of a possible tramping route along the length of the Kakanui Mountains, with a route either along the Horse Range, or from the adjoining scenic reserve past Conical Peak and down to NBWR.

2.8.4 Significance of Recreation

The PL provides physical links from the Pigroot up to the Horse Range and Kakanui Mountains and to the adjacent Waianakarua Scenic Reserve. The PL also provides opportunities for extended walk-in routes through the Waianakarua Scenic Reserve, identified as a priority for the area in the Otago CMS.

PART 3
OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

The following comments were made at the meeting with NGO's in Dunedin on 6 March 1997;

- Access from Green Valley (Pigroot Road) to the Waianakarua Scenic Reserve for foot and bicycle.
- Cross country 4WD possibilities.
- Walking access/mountain bike along the crest of Horse Range which would be an easy undulating climb with good views and could possibly have horse trekking potential. The aim would be to extend this access right along the Kakanui Mountains and Horse Range so that people could make a complete traverse along these mountains.

3.2 Regional Policy Statements & Plans

Regional Policy Statement

The Regional Policy Statement for Otago provides a policy framework for all of Otago's significant regional resource management issues. It does not contain rules. District Plans shall not be inconsistent with the Regional Policy Statement. In respect of natural values the Regional Policy Statement includes the following policy and method statement:

Policy: To maintain and where practicable enhance the diversity of Otago's significant vegetation and significant habitats of indigenous fauna, trout and salmon.

Method: Identify and protect Otago's significant indigenous vegetation and significant indigenous habitat of indigenous fauna, trout and salmon, in consultation with relevant agencies and with Otago's communities.

In respect of landscape and natural features it includes the following policy and method statement.

Policy: To recognise and provide for the protection of Otago's outstanding natural features and landscapes.

Method: Prepare in conjunction with relevant agencies and in consultation with the community and affected landowners, an inventory of outstanding features and landscapes that are regionally significant.

3.3 District Plan

The PL is located within the Rural Scenic and Rural General zones of the Waitaki District Plan. The proposed Waitaki District Plan (amended to incorporate several variations) does contain trigger rules for the protection of tussock grasslands, smaller wetlands and areas of indigenous woody vegetation of specified sizes, though these rules do not apply to land under 900m asl that has been freeholded under the Crown Pastoral Land Act 1998. No indigenous vegetation clearance, exotic tree planting or earthworks (other than that associated with the maintenance of existing structures) is allowed within 20m of a water body or in any wetland or in areas over 900m asl. There are provisions for the protection of scenic values from inappropriate siting of exotic tree plantings.

There are no registered archaeological sites, or areas of significant indigenous vegetation and habitat of significant indigenous fauna as set out in the appendices of the plan. Protection is limited to the controls set out above.

3.4 Conservation Management Strategy & Plans

The Otago Conservancy of DOC has prepared a Conservation Management Strategy (CMS) which was approved by the New Zealand Conservation Authority in August 1998. The CMS identifies 41 special places of conservation interest in Otago Conservancy. The Kinross PL lies to the south east of the Kakanui Special Place and just west of the Shag Point –Waianakarua Special Place.

Shag Point - Waianakarua Special Place encompasses almost all the Waianakarua ED which adjoins the Dansey ED. Priorities for the Waianakarua Special Place include extending, rationalising and securing protected area boundaries (both coastal and inland) and improving ecosystem management and species habitats (CMS:177). Of minor relevance to Kinross PL is an identified management issue which relates to river quality degradation resulting from agricultural run-off. This may have some relevance if pastoral activity on Kinross PL was intensified.

The CMS objectives for the Shag Point- Waianakarua Special Place relevant to Kinross PL include:

To link areas of more or less continuous indigenous vegetation in the Trotters Gorge-Pigeon Bush-Waianakarua area, by endeavouring to negotiate protection, and to improve the management of the natural resources of those areas (CMS:175).

The key implementation methods relevant to Kinross PL are:

- Protected area boundaries will be rationalised by disposals, acquisitions, swaps and by other means to link as far as practicable the existing inland protected areas and areas of indigenous vegetation between them.
- Management of inland protected areas will be improved with emphasis on fencing, plant pest control, wild animal control and fire protection.

- The department may retain or create a small number of longer distance tracks or routes through the inland protected areas, in back country walk-in settings.
- In order to assist with the control of animal pests in the Waianakarua Scenic Reserve and adjoining protected areas, recreational access to and information about these areas will be improved and, if resources allow, a basic hut for overnight use will be constructed or permitted in an appropriate location.

Priorities for the Shag Point – Waianakarua Special Place are:

Extending, rationalising and securing protected area boundaries (both coastal and inland) and improving ecosystem management and species habitats will be priorities in this Special Place.

The Kakanui Special Place largely comprises the Kakanui Mountains. The key objective for the Kakanui Special Place is to maintain the natural resources contained within the existing protected areas on the Kakanui Mountains while taking opportunities that may arise through pastoral lease tenure review to negotiate protection of and access to areas of high natural and recreational value (CMS:259)

Management issues identified for the Kakanui Special Place with some relevance to the Kinross PL include: the limited access available to the Kakanui Range; wilding pine control; landscape protection on the Kakanui mountains i.e. advocacy on burning, tracking issues and plantation forestry; and siting of installations in visually sensitive locations especially skylines.

The CMS priority for the Kakanui Special Place states:

In this special place, tenure review negotiations and wilding tree control will be the priority method for implementing the objective during the course of this CMS

3.5 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.

PART 4

ATTACHMENTS

4.1 Additional Information

4.1.1 References

Comrie, J. 1992 Dansey Ecological District. Protected Natural Areas Programme Series No. 23. Department of Conservation, Wellington, Dunedin.

Hitchmough, R., Bull, L., Comarty, P (comp.) 2007. New Zealand threat classification system lists 2005. Department of Conservation, Wellington.

Leathwick, J.R., Wilson, G., Rutledge, D., Wardle, P., Morgan, F. Johnston, K., McLeod, M., Kirkpatrick R., 2003 Land Environments of New Zealand. David Bateman Ltd, Auckland.

Rance, B, (in prep). Rare small-leaved tree daisies recovery plan. Department of Conservation.

Taylor, N.H.;Pohlen, I. 1962. Classification of New Zealand soils. Pp 15-33 in Soils of New Zealand, Part 1. Soil Bureau Bulletin 26(1). 142p with 1:1,000,000 scale soil map of New Zealand. DSIR, Wellington.

Whitaker, A., Tocher, M.D., Blair, T. 2002 Conservation of Lizards in Otago Conservancy 2002 - 2007.Department of Conservation, Wellington, New Zealand.

4.2 Maps

4.2.1 Topographic and Cadastral
4.2.2 Landscape Units and Significant Landscape Units
4.2.3 Values – Ecological and Recreational Values

Maps are attached before the appendices.

4.3 Photographs

Attached before appendices.

4.4 NGOs Comments

Written submissions were received from Federated Mountain Clubs, refer Appendix 4.