

Crown Pastoral Land Tenure Review

Lease name : GLEN DENE STATION

Lease number : PO 136

Conservation Resources Report

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

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

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

June

06

DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF GLEN DENE PASTORAL LEASE AND ADJACENT UNOCCUPIED CROWN LAND

PART 1

INTRODUCTION

1.1 The lessees of Glen Dene pastoral lease have applied to the Commissioner of Crown Lands for a review of the property's pastoral lease tenure.

Glen Dene was originally part of Mount Burke Station which has been leased by the Burdon family for three generations. In 1980 the area now known as Glen Dene was subdivided from Mount Burke.

The 7800 hectare property is located on a narrow ridge system which separates Lake Wanaka from Lake Hawea. The entire property is within the Clutha Catchment. The Wanaka faces comprise a series of small catchments with an a westerly aspect. The Craig Burn, the Long Burn and Mount Burke Creek which all converge before flowing into Lake Hawea are the largest catchments on the property. The homestead lies on the shores of Lake Hawea on the eastern side of the Makarora - Lake Hawea Road.

Altitude ranges between 320 metres on the shores of Lake Hawea to 1455 metres at the head of Mount Burke Creek.

The pastoral lease is made up of approximately 360 ha of cultivated paddocks and highly developed rolling country, 2460 ha of moderately steep AOSTD hill country and 4970 ha of steep undeveloped predominantly native country including the Hawea Faces and the headwaters of a series of catchments which flow into Lake Hawea.

The property is in the Lakes Ecological Region and the Wanaka Ecological District. No Protected Natural Areas Survey Programme (PNAP) of the ecological district has been carried out.

No parts of the lease are currently subject to protection for conservation purposes.

Inherent values are also described for an area of neighbouring Crown land which extends for some four km to the north of the property as far as Camp Creek. This area lies between Lake Wanaka and SH6 (Pt Run 798 SO 19256, Sec 4 SO 22384, and Sec 3 SO 22384). A conservation assessment of this area is confined to botanical values as the land's status as unallocated Crown Land has only recently been ascertained.

PART 2

INHERENT VALUES: DESCRIPTION OF CONSERVATION RESOURCES AND ASSESSMENT OF SIGNIFICANCE

2.1 Landscape

Landscape Context

Glen Dene Pastoral Lease forms part of the spectacular inland Lake Basin of Wanaka and Hawea. Significant factors that contribute to the character and appearance of the land are the geology and basement schist rock; the action of ice; the nature and type of indigenous landcover; and use of the land.

To better understand this large land area it is useful to break it into land types based on landform. In simple terms there are three types. The vast majority is rugged steep mountain slopes. The second type is the distinctive ice sculptured lumpy landform which occurs at the Neck, and close to the lake adjacent to Dinner Flat and Trig 10781. The third type consists of fans, prominent along the edge of both lakes and small areas of alluvial flat near the mouth of the Craig Burn and at Dinner Flat.

Methodology

The landform types assists with identifying three landscape sub-units on Glen Dene (of the larger Inland Wanaka / Hawea Lake Basin). These include;

- 1 Lake Wanaka mountain slopes or faces
- 2 The summit ridge and northern and eastern mountain slopes
- 3 Hawea fans, foothills and river flats

For each landscape sub-unit, characteristics and attributes are described and a description of visual and scenic values present given. This is followed by an evaluation summary which provides a simple assessment or judgement using five key attributes. The five attributes are:

- a) Intactness- the level of intactness or naturalness of the vegetation. Whether natural patterns and processes are intact.
- b) Coherence- this is an aesthetic judgement about the level of visual harmony evident. It is derived from characteristics including intactness, unity, continuity, compatibility. Visual intrusions, encroachments, alterations, disruptions tend to detract.
- c) Distinctiveness - is it distinctive or unique?
- d) Visibility - visibility from public places or important viewing areas.
- e) Significance -refers to the significance of the characteristics and features. If they are locally, regionally or nationally significant.

Unit 1 Lake Wanaka Faces

Characteristics and Attributes

This unit extends from the Neck to the property's southern boundary with adjoining Mount Burke Station and forms one fairly homogenous landscape unit. It consists of steep mountain slopes which are locally incised by streams. Slope debris, slumping and landslides are characteristic. Rock outcrops and bluffs are common especially on upper slopes.

The shoreline is often rocky with no beach.

Vegetation below approximately 1000 metres is predominantly bracken fern, exotic grasses and regenerating shrubland. Cabbage trees and emerging shrublands are a significant feature. Regeneration is patchy and variable, but vegetation overall to be making a strong comeback. The bracken and shrubland is a distinctive olive green colour in contrast to the predominantly tussock colour higher up. Some beech forest which has escaped burning is preserved in gullies.

Stony Creek catchment, includes impressive landslide and slump topography, and a well developed fan at the base of the slope. It is a distinctive feature at the southern end of the unit. Shrubland is at an advanced stage of regeneration on the fan.

A large part of the Wanaka faces are similar in landform and vegetation, with the notable exception of Stony Creek and the ice sculptured hummocky landform at the Neck.

The lake faces below Isthmus Peak to the Neck (with the exception of the lakeshore strip) have less shrubland regeneration. This coincides with the smoother ice over-ridden landform characteristic of the Neck and probably greater stock pressure.

Two huts remain from a by-gone era when mustering was done differently. These, and a boundary fence adjoining Mount Burke and a block fence at the Neck are the only man-made features. The effects on vegetation through burning and grazing are the most significant aspects of human intervention.

Visual and Scenic Values

The Wanaka faces are a large and significant part of the eastern visual enclosure to Lake Wanaka. The rugged and often rocky shoreline and dramatic landforms rising abruptly from the lake are visually impressive along the full length of the Wanaka faces. Boulder filled streams within incised gullies retain high natural values. Waterfalls cascading over steep drops are a feature within some watercourses.

The mountain slopes remain largely unmodified with no tracks, few fences and two huts. Vegetation modification over much of the shrubland component has impacted on visual values. However in the absence of burning, revegetation is starting to reverse this situation. Continuation of the revegetation process will greatly

enhance visual values and the integrity of this inland lake basin landscape.

The Stony Creek catchment is a significant landform and landscape feature taking into account the steepness and sheer ruggedness of the catchment and the impressive fan and associated landcover.

Evaluation summary - Lake Wanaka Faces

Intactness/ Naturalness on	Patterns and processes intact upper slopes
but	-vegetation modified on lower slopes emerging shrubland is
improving naturalness	-overall rating medium
Coherence	medium - burnt over bracken disrupts coherence
Distinctiveness elsewhere	typical landform and landcover to within Wanaka Basin
Visibility public	high visibility from lake, low from roads and places
Significance Lake Wanaka	highly significant in terms of landscape

Unit 2 : Summit Ridge and northern and eastern mountain slopes

Characteristics and Attributes

This large unit includes, the summit ridge which stretches from Isthmus Peak to Mount Burke and all the steep mountain slopes from the Neck around to the southern boundary at Mount Burke Creek (it includes the north faces below Isthmus Peak, Dinner Creek and the northern tributaries, and all of the Craig Burn catchment).

The Summit Ridge is characterised by an extensive area of smooth undulating landform. Snow tussock is the predominant vegetation and is in good condition. On the Hawea side a series of distinctive, very rugged and craggy spurs lead off the summit ridge. The steeply dipping and faulted ridge topography is very characteristic of the Mount Burke area, and appears contiguous with a similar land type in the McKerrow Range and mountains north east of Lake Hawea. Bluffs and rock outcrops are a feature. The gullies are narrow and steeply incised.

The pattern of vegetation cover is variable, with intact relatively uniform snow tussock on the summit ridge and upper ridge and gully system, and extensive areas of beech forest in the steep gullies. There is a marked variation in the degree of modification between sunny and dark faces. Shrubland is extensive particularly on dark faces and patchy in other areas. Sunny faces (for example in Long Gully) are primarily pasture and bracken.

The north faces below Isthmus Peak between the Neck and Halls Creek are very steep and rocky with scattered shrubland notably

manuka and kanuka and scattered cabbage tree with also bracken fern and exotic grasses. The lower reaches of Halls Creek and the unnamed creek between Halls and Dinner Creek are incised within rock gorges and contain shrubland and beech. Remnant shrubland also occurs at the lake edge. These remnants are significant in terms of preserving local landscape character.

The Neck is hummocky, gnarled, ice worn landform with extensive bracken and scattered shrubland. A wetland area nestled within the ice worn landform close to the Glen Dene boundary and state highway supports flax, toi toi, carex, and manuka and other wetland species. The wetland is a significant and important landscape feature.

Visual and Scenic Values

Visual and scenic values of this unit in summary include

- extensive tussock covered summit ridge and upper slopes retaining a high level of uniformity and naturalness
- the distinctive rocky ridge and gully system characteristic of the Craig Burn catchment including remnant beech and shrubland
- spectacular views obtained from the summit ridge to both lake basins and to the Southern Alps
- much of the unit forms the visual enclosure and backdrop to Lake Hawea
- distinctive ice gnarled landform and associated wetland of the Neck
- pockets of remnant beech and shrubland associated with watercourses e.g. Halls Creek Dinner Creek and the lakeshore. These are significant visual features (as well as contributing to landscape character)

The bracken and pasture dominated north facing slopes of the Craig Burn catchment are highly modified.

Evaluation Summary -summit ridge and north and east mountain slopes

Intactness/ naturalness	-high on summit ridge, upper ridge and gully and dark shady faces and beech gullies
	-low on modified sunny faces
Coherence	-as above.
coherence	-heavily burnt and grazed areas disrupt
Distinctiveness	-medium
tussock are a landform/landscape feature	-rugged craggy spurs and associated distinctive
Visibility	-large areas visible from the lake -
lesser area visible	from state highway

Significance summit ridge and upper ridge and
gully system and remnant beech and
shrub within gullies contain significant
landscape values

Unit 3 Hawea fans, foothills and alluvial flats

Characteristics and Attributes

This comparatively small unit refers to the low hills, fans and alluvial flats on the east face above Lake Hawea. It includes the foothill front face which sits forward of the main range and separates the Craig Burn from Lake Hawea, as well as Dinner Flat, and the ice sculptured landform on the lake edge and peninsular below Dinner Creek (Trig 10781)

It also includes the area of developed fans north of the Glen Dene homestead.

Overall the unit is the most modified and developed area on the property with extensive pasture and bracken fern. The fan north of the homestead is deer fenced with shelterbelts and planting associated with the farm buildings.

Pockets of beech (associated with watercourses) and patches of kanuka / manuka shrubland occur. The most significant occur at the northern end of the unit (Dinner Creek area). A large remnant of manuka / kanuka occurs between the Haast Highway and Dinner Flat.

Visual and Scenic Values

Much of the unit has been developed for farming or is in a transition phase of being developed from scrub to pasture. This transition phase gives rise to a sometimes scruffy and raw appearance.

In other areas remnant vegetation (especially riparian vegetation) associated with waterways and other pockets and patches of shrubland reinforce natural pattern, diversity and local identity in the landscape.

The Wanaka / Haast highway, a major tourist road traverses the unit and most of the unit is visible from the highway. Most of the unit is also visible from Lake Hawea.

Evaluation Summary -Hawea fans and foothills and flats

Intactness / Naturalness	low overall
Coherence	low to medium
Distinctiveness	low (indistinct)
Visibility highway	high from lake and Haast
Significance remnant	low, apart from pockets of beech and shrubland which

are
regional character

significant to local

2.2 Landforms & Geology

The following summary had been adapted from Robertson & Blair (1980) and Mortimer (1993).

The property is underlain by rocks of the Otago schist group which is a metamorphic rock laid down in the late Paleozoic or early Mesozoic time as part of the New Zealand Geosyncline. Mountain building forces deformed the sediments and folded the bedding planes and changed the texture of the rock, to a point where the original sedimentary structure has become almost unrecognisable.

The western portion of Glen Dene comprises Chlorite Subzone 4 which is a coarsely foliated schist. There is a sharp distinction between Chlorite Subzone 4 and Subzone 3 which occurs on the tops between Lakes Wanaka and Hawea. Chlorite Subzone 3 is a finely foliated schist occurring from the Glen Dene Ridge crest eastwards as far as Longslip, except for a wide zone of Chlorite Subzone 4, above, on the eastern slope of Lake Hawea. The boundary between the two schist types can be seen in a series of spectacular knife edged ridges along the crest of the property. A zone of Subzone 2, phyllite, semi schistose, greywacke and non-foliated schist occurs along the western shore of Lake Hawea."

The area's geomorphology has been heavily influenced by glacial activity during the Quaternary. Glacial features include remnant terraces, and small areas of hummocky moraine underlain by a bouldery till on the lower slopes above Lakes Wanaka and Hawea and ice worn bedrock at the Neck. Deposits result from the transport of schist and some greywacke from the mountains to the north and west by a glacier that filled the lake basins 15,000 to 20,000 years ago. Before this event, within the last 100,000 years giant valley glaciers from the Hawea and Wanaka Basins submerged much of the lower part of what now comprises Glen Dene Station. The event most important in shaping the present form of Lakes Wanaka and Hawea was the Hawea Advance, when two glaciers which joined at the Neck, deposited massive terminal moraines that pond the present day lakes. Copious amounts of melt water following the glaciation incised through the terminal moraines lowering the lakes to their present day levels, leaving beach deposits high on the hillsides.

On the Lake Hawea foreshore there are small areas of recent outwash gravels from morainic deposits and, stream beach and estuarine deposits.

2.3 Climate

Climate is typical of the Lakes/Central Otago region with warm summers and cold winters. Winters usually bring intermittent snow to lower parts of the property. Snow can lie for up to four

months at higher altitudes. Rainfall at the homestead is in the vicinity of 750mm and rises with altitude and from south to north.

2.4 Vegetation

Four land units are identified for the purpose of describing the vegetation. These are the Craig Burn catchment, Lake Hawea faces, Lake Wanaka faces, and The Neck to Isthmus Peak.

Craig Burn catchment

Headwaters and main stream

Several small unnamed streams discharge into the main stream of the Craig Burn from very steep-sided catchments. Their small, active alluvial terraces and stream banks are mostly shrub covered with *Aristotelia serrata*, *Coprosma rugosa*, *C. propinqua*, *Olearia avicenniaefolia*, *Hebe salicifolia*, *Melicytus* aff. *alpinus* and matagouri (*Discaria toumatou*). Shield fern (*Polystichum vestitum*), short tussocks, and tussock hawkweed (*Hieracium lepidulum*) are common groundcover. Larger terraces of the main stream have manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*), tutu (*Coriaria sarmentosa*), toetoe (*Cortaderia richardii*), bracken (*Pteridium esculentum*) and occasional cabbage tree (*Cordyline australis*). Pasture grasses and weeds are frequent especially sweet briar and Californian thistle.

Lower slopes have mountain beech (*Nothofagus solandri* var. *cliffortioides*) and silver beech (*Nothofagus menziesii*) with occasional broadleaf (*Griselinia littoralis*) and marbleleaf (*Carpodetus serratus*). A sparse understorey includes saplings of the canopy species, *Pseudowintera colorata* and *Helichrysum lanceolatum*. A sparse groundcover includes the orchid *Chiloglottis cornuta*, and weeds *Hieracium lepidulum* and *Mycelis muralis*. Rock outcrops and bluffs support *Helichrysum intermedium*, *Gingidia montana*, *Gnaphalium ruahinicum*, *Vittadinia australis*, *Stellaria gracilentia*, *Centella uniflora*, *Muehlenbeckia axillaris* and *Asplenium flabellifolium*.

Manuka forms a dense monospecific shrubland over large areas where fires have previously eliminated the taller beech forest and sub-alpine shrublands on dry slopes. This is particularly evident to low elevations along the true right of the main stream.

Above about 900 metres above sea level, tall *Chionochloa rigida* grasslands predominate with patches of browntop (*Agrostis capillaris*) sometimes present between the upper limit of manuka and lower limits of tall tussockland. Apart from *Chionochloa rigida* other native grass species include *Festuca novaezelandiae*, *F. mathewsii* and *Elymus solandri*. Small inter-tussock shrubs and herbs include *Pimelea oreophila*, *Leucopogon fraseri*, *Raoulia subsericea*, *Anisotome aromatica*, *Celmisia lyallii* and *Aciphylla aurea*. Tussock hawkweed is generally at moderate density but dominates some disturbed areas near the bushline.

Taller shrubs are also a common component especially on shady faces and around steep watercourses. Common species include *Dracophyllum pronum*, *D. longifolium*, *Carmichaelia crassicaule*, *Coprosma rugosa*, *Olearia cymbifolia*, *Ozothmanus vauvilliersii*, *Melicytus* aff. *alpinus*, *Aristotelia fruticosa* and *Coprosma cheesemani*.

Small stable boulderfields have a distinctive flora dominated by *Anaphalioides bellidioides* and *Blechnum pennamarina*. Other common species are *Parahebe decora*, *Aceana saccaticupula*, *Epilobium* spp. and *Stellaria gracilentia*.

Wet herbfields comprised of many prostrate species line the margins of the steep alpine watercourses. These are variously comprised of *Coprosma perpusilla*, *Plantago triandra*, *Gunnera dentata* and *Hydrocotyle* spp often in association with the sedges *Carex coriacea* and *C. petriei*.



Photo 1. The Craig Burn. Note Kanuka/Manuka colonising areas where beech forest has been burnt.



Photo 2. Intact Narrow leaved snow tussocklands in the head of the Craighburn.

Long Valley Creek

This large tributary valley has a deeply incised stream bed. The shady south-facing aspect has reasonable *Chionochloa rigida* grasslands at higher altitude with shrubby lower slopes (mostly *Dracophyllum longifolium*) grading into regenerating forest on very steep slopes and in the creek gorge. There are small silver beech remnants tucked away in gullies. Common species around the creek are broadleaf, *Olearia avicenniaefolia*, *Coprosma rugosa*, *Hebe salicifolia*, *Pittosporum tenuifolium*, *Carmichaelia petriei* and mountain flax. Tussock hawkweed tends to dominate the understorey.

The true right of the valley has been extensively modified for farming and comprises mostly bracken, pasture grasses and scattered matagouri, manuka and sweet briar (*Rosa rubiginosa*). Cabbage trees are dotted around the slopes.

Mt Burke Creek

Mt Burke Creek enters the Craig Burn near its mouth. Only the true left of the valley falls within Glen Dene. A large tributary (known locally as the Big Redand) enters Mt Burke Creek from the north-west.

The lower slopes are covered in mountain beech forest with silver beech in the upper reaches and near the tree line. Sunny west facing slopes which have been subject to fire are clothed in a

dense cover of manuka/kanuka. Dense sub-alpine scrub is a feature of the upper valley slopes on wet, shady faces while manuka is common on the sunny rocky faces. Mountain toatoa (*Phyllocladus alpinus*) is present in several gully heads above the extent of silver beech. These are significant occurrences of a species with a localised distribution in the ecological district.

Tussock grasslands above the bushline have a diverse range of shrub species. At 1100 m common species include: *Dracophyllum uniflorum*, *D. pronum*, *Ozothamnus vauvilliersi*, *Coprosma ciliata*, *Olearia cymbifolia*, *O. nummulariifolia*, *Leucopogon suaveolens*, *Hebe subalpina*, and *H. buechananii*. Sub-shrubs and herbs as ground cover include *Coprosma perpusilla*, *Lycopodium fastigiatum*, *Raoulia subsericea*, *Celmisia gracilentia*, *Anisotome aromatica* and *Pentachondra pumila*. Tussock hawkweed invasion is significant but few other weeds are present. Occasional sweet briar are present at unusually high altitude.

Tussocklands in the upper basins near the range crest are comprised of moderate density, low stature *Chionochloa rigida* with abundant *Celmisia lyallii* and *Raoulia grandiflora*. Other species include *Dracophyllum pronum*, *Rytidosperma pumilum*, *Poa colensoi* and *Lycopodium fastigiatum*. Weeds are virtually absent.

Rock outcrops have abundant *Helichrysum intermedium* and, at much lower density, *Brachyglottis haastii*, *Asplenium terrestre*, *Celmisia angustifolia* and *Hebe buechananii*.



Photo 3. Beech forest and kanuka/manuka shrubland in the North Branch of Mount Burke Creek (Big Redand)

Lake Hawea faces

Halls Creek

This is a very steep ravine with mountain beech forest giving way to tall tussock in the headwaters at about 900 m. The lower reaches are virtually inaccessible to stock. Immediately above the main highway is a forest dominated by cabbage trees, *Pittosporum tenuifolium*, broadleaf, kanuka and *Hebe salicifolia*, before the ubiquitous beech is reached. intact *Chionochloa rigida* grasslands are present in the upper valley. Shady aspects have a high incidence of shrubs such as *Dracophyllum prunum*, *D. uniflorum*, *Ozothamnus vauvilliersi* as well as mountain flax and giant spaniard (*Aciphylla scott-thomsonii*).

Drier tussocklands have *Raoulia subsericea*, *Leucopogon fraseri*, *Muehlenbeckia axillaris*, *Poa colensoi*, *Aceana* spp., *Celmisia gracilentata* and *Wahlenbergia albomarginata*.

Wet bluffs surrounding small cascades are draped in *Dolichoglottis lyallii* and *Gingidia montana*. Turfy streambanks below are mossy with *Plantago novaezelandiae*, *Hydrocotyle* spp., *Anaphalioides bellidioides* and *Carex petriei*. One of the few introduced plants present is the wetland herb *Mimulus moschatus*.

Dry bluffs have tutu, *Gaultheria crassa*, *Coprosma rugosa*, *Olearia cymbifolia*, *Helichrysum intermedium*, *Meliccytus* aff. *alpinus*, *Gingidia montana*, and *Brachyglottis haastii*.



Photo 4 – Mountain Beech Forest and Narrow Leaved Snow Tussock Grasslands – Unnamed Catchment Between Dinner and Halls Creeks



Photo 5 – Native shrublands dominated by cabbage trees at the base of Halls Creek near SH6

Dinner Creek

This has similar vegetation to Halls Creek, although with a more open profile and greater farming influence on the lower slopes. As with all the beech forest there is little understorey apart from occasional *Coprosma* spp. and shield fern ground cover. Of particular note at the tree line is abundant red mistletoe, *Peraxilla tetrapetala*, semi-parasitic on mountain beech. This is a category B species (Molloy & Davis) of very local distribution in Otago.

Tall tussocklands near the bushline have a high incidence of tussock hawkweed, while at the head of the creek it is a rare component.

Remainder of Lake faces above highway

These have generally been developed for farming, particularly lower and mid slope, and little native vegetation of conservation interest remains. A fragmented tall tussockland with some associated native inter-tussock species exists at higher elevations.

Lake faces below highway

These have mostly been highly disturbed and have lost tall forest cover. Some areas of native regenerating shrublands exist and in the absence of fire and other clearance can be expected to progress to beech forest. A good example exists at the mouth of Craig Burn. Common native species include kanuka, bracken, cabbage tree, *Coprosma propinqua* and tutu. Briar and willow (*Salix* spp.) are the most common exotic plants.

Lake Wanaka faces

Lower Faces (280 - 700 m.a.s.l).

The vigour of native shrubland/forest regeneration on these faces reflects their forested state prior to Polynesian and pastoral burning. Pastoral burning appears to have occurred less recently along the southern portion of the faces. The vegetation composition reflects the moderating influence of Lake Wanaka over temperatures. More recently burnt areas support a dense cover of bracken (*Pteridium esculentum*) with a mass of native shrub seedlings and native grasses including plume grass (*Dichelachne crinita*), *Deyeuxia avenoides* and blue tussock. Areas not burnt for 20 years or so support a vigorously regenerating native shrubland dominated by tutu (*Coriaria arborea* and *Coriaria sarmentosa*), cabbage trees, *Coprosma propinqua* and karamu (*Coprosma robusta*). Other shrub species present include tree daisy (*Olearia avicenniifolia*), manuka, kohuhu (*Pittosporum tenuifolium*), mountain flax (*Phormium cookianum*) broadleaf and lancewood (*Pseudopanax crassifolius*).



Photo 6. Regenerating shrublands on the Wanaka Faces near Stony Creek
- note willows and hut.

Lake Margin Large sections of the immediate lake margin (mostly within the marginal strip) have not been burnt in recent times. Here there is a similar vegetation mix to that described above except that mature broadleaf, marbleleaf, kowhai, Hall's totara and in some sites southern rata are present.



Photo 7. Southern Rata in flower on the shores of Lake Wanaka.

Bluff sites near lake. These bluffs are open and support more drought tolerant light loving species including *Corokia cotoneaster*, blue tussock and *Gaultheria antipoda* pine.

Gully Forests A series of gullies originating from the range crest bisect the Wanaka Faces at regular intervals. Many of these support mature forest remnants dominated by mountain beech with a diverse native understory. A catchment visited which originates from Isthmus Peak contained a diversity of species including mountain beech, marbleleaf, koromiko, mahoe, *Coprosma propinqua*, wineberry (*Aristotelia serrata*), southern rata (*Metrosideros umbellata*) growing in a bluffy gorge, niniao (*Helichrysum lanceolatum*), three finger, fuchsia, kohuhu, cabbage trees and tree daisy. Fern species included prickly shield fern, kiwakiwa (*Blechnum fluviatile*) mountain kikio (*B. novae-zelandiae*), crown fern (*B. discolor*), *Hypolepis millefolium* and *Asplenium richardii*.

Mid Wanaka Faces 700m - 900m. The mid faces between the bracken/shrubland belt and tall tussock grasslands at higher altitudes are relatively modified through grazing and burning. Short tussock species (blue tussock and hard tussock) are interspersed with numerous exotic grasses and herbs including brown top, sweet vernal and chewings fescue. The native grass/herb component includes *Leucopogon fraseri*, *Gaultheria depressa*,

Deyeuxia avenoides and *Dichelachne crinita*. Bracken and native shrub regeneration is occurring in the lower part of this belt although at a slower pace than near the lake. In the upper part of the belt there is a significant component of snow tussock of other species which dominate on the upper Lake Faces.

Upper Lake Faces above 900m. This zone supports intact snow tussock grasslands of a similar composition to those described in the above 900m zone in the Craig Burn except there is a little more bare ground and a greater predominance of false Spaniard (*Celmisia lyallii*) reflecting the sunnier drier nature of these west facing slopes. In general, these grasslands are in good condition and contain few exotic species.

The Neck to Isthmus Peak

The Neck wetlands

Several peaty wetlands occur in depressions amongst the basement rock at about 380 metres a.s.l. These occur in distinct steps with a significant stream linking the largest two. The higher rocky ground surrounding the wetlands shows evidence of repeated fire and now supports a dense cover of bracken, tutu, *Leucopogon fraseri*, exotic grasses and the odd exotic broom (*Cytisus scoparius*).

The upper wetlands have scattered shrubs of *Coprosma propinqua* and manuka, and occasional cabbage trees around the margins. As is common with wetlands at this relatively low altitude, the flora is a diverse mixture of native and exotic plants. Common native plants include mountain flax, toetoe, *Carex maorica*, *C. sinclairii*, *C. secta*, *Schoenus pauciflorus*, *Eleocharis acuta*, *Epilobium pallidiflorum* and raupo (*Typha orientalis*). Ferns present include *Pneumatopteris pennigera* and *Blechnum chambersii*.

The lower wetland is far more strongly dominated by raupo with some concentrations of large (up to 1.5 m tall) *Carex secta*. Although many exotic plants are present, the wetlands retain a high degree of natural character. Common weeds include *Juncus effusus*, *J. articulatus*, *Lotus pedunculatus*, *Cirsium arvense*, *Myosotis laxa* subsp. *caespitosa*, *Trifolium pratense*, *Ranunculus trichophyllus* and *Mentha spicata*.



Photo 8. The Neck Wetlands.

North-facing slopes below Isthmus Peak

For the most part these slopes are very steep and bluffy with much outcropping rock. Vegetated areas are mainly in bracken fern, sometimes interspersed with pasture. Remnant native species are mostly confined to bluffs and to areas of highest altitude. Isthmus Peak itself is a popular stock camp with a highly modified flora.

Crown Land Between State Highway 6 and Lake Wanaka to the North of Glen Dene.

The Neck wetland extends into this area immediately north of the Glen Dene boundary. Botanical values are as described for the section of The Neck within Glen Dene pastoral lease. Above the Neck wetland, vegetation grades into a shrubland containing broadleaf, *Coprosma* spp's, kanuka and cabbage trees. Below SH6, immediately north of The Neck wetland, a number of Eucalyptus and mountain beech trees emerge from a cover of tall bracken and broad leaved shrub species. These trees appear to have been planted in the area.

Most of the steep faces between Lake Wanaka and SH6 support a successional shrubland comprising kohuhu, kanuka, koromiko, *Olearia avicenniifolia* (tree daisy) on talus, lancewood, tree tutu, cabbage trees and karamu which becomes dominant on bluffs and rock knolls.

Wet steep gullies support tree tutu which is co-dominant with wineberry.



Photo 9. Native shrublands within an area of Crown land lying between The Neck and Boundary Creek Scenic Reserve

PROBLEM PLANTS

A relatively small number of problem plants were identified. Of most concern is the widespread tussock hawkweed which dominates the ground cover in areas of high disturbance. Sites where it is prevalent include alluvial stream terraces and steep eroding ground immediately below more gentle tussock slopes. No practical control measures currently exist. Maintenance of an intact closed tall tussock cover may help prevent its further spread into that community.

Sweet briar is occasionally present in areas of high inherent value at low to mid elevations. Isolated plants were observed to 1000 m in the head of Mt Burke Creek. Broom is present on dry sites surrounding The Neck wetlands. Both species are easily controlled at current densities.

Willow is present as a particularly conspicuous element of the lakeshore riparian vegetation. While it may have some utility at picnic sites, this needs to be reconciled with its spreading habit. Control at current densities would be easily achieved.

Wilding pines are a problem on the Lake Hawea faces in the vicinity of the motor camp; however they do not extend into the upper lake faces.

There are a handful of wilding pines on the Lake Wanaka faces.

Eucalyptus trees around The Neck represent an unnatural component to the environment and have potential to spread.

Significance of Vegetation

Catchments Flowing into Lake Wanaka

The Craig Burn catchment (excluding the true right of Long Valley Creek, Halls Creek catchment, mid-upper Dinner Creek, unnamed catchment between Halls Creek and Dinner Creek) retain a predominantly indigenous vegetation cover on a range of landforms. They exhibit vegetation sequences reflecting the range in altitude from lakeshore (279 m a.s.l) to range crest (1455 m asl). Vegetation includes beech forest, mixed broadleaf forest, kanuka/manuka shrublands, sub-alpine shrublands, tall tussock grasslands, alpine herbfields and wetlands. These large areas have a high degree of representativeness and naturalness, with good long-term ecological viability. The upper beech forest of Dinner Creek contains a large population of the category B threatened mistletoe, *Peraxilla tetrapetala*.

Mount Burke Creek

The upper reaches of this catchment essentially contain an intact cover of native vegetation ranging from beech forest in the valley floor to mixed sub-alpine shrublands to tall tussocklands near the headwaters. The upper catchment forms an important biological corridor with large areas of intact tussocklands, shrublands and forest to the south. The headwaters of Mt Burke Creek contain pockets of mountain toatoa (*Phyllocladus alpinus*) at the treeline. This tree species has a discontinuous distribution in the ecological district and has declined as a result of its susceptibility to fire.

Lake Hawea Foreshore

Regenerating shrublands between the highway and Lake Hawea shoreline contribute significantly to the overall quality and functioning of this lakeshore buffer zone. This contribution may increase as the shrublands progress towards forest in the future.

Lake Wanaka Faces

Diverse forest remnants in gullies are of high inherent value as they are representative of native vegetation communities prior to Polynesian and pastoral burning. Regenerating shrublands and bracken country are also of high inherent value as they are

rapidly progressing towards an intact native forest cover. Elsewhere on the shores of Lake Wanaka most forest and shrublands have been converted into farmland and semi-modified grasslands.

Southern rata present along the margins of the lake shore and in some protected gullies, is near its eastern distributional limit in inland Otago. This species is primarily confined to wetter more temperate locations near to and West of the Main Divide.

Tall tussock grasslands above 900m are of high inherent value as they are in an intact state, support an essentially native inter-tussock flora. Intact snow tussock grasslands epitomise the natural qualities of the South Island High Country.

The Neck Wetlands

The botanically diverse Neck wetlands have high representative and ecological importance given the paucity of wetlands of this quality, on this landform, in the ecological district. The peat sequence is of scientific interest as it represents a time profile within which pollen and wood fragments help interpret the regions climatic and vegetative history for a large part of the Quaternary period.

Crown Land Between State Highway 6 and Lake Wanaka to the North of Glen Dene.

Biologically this area (in conjunction with the Boundary Creek Scenic Reserve to the North) represents an example of rain shadow vegetation in the lee of the Southern Alps. Although fire has altered the vegetation, the patterns of shrubland re-establishment is interesting in itself. The succession generally goes from bracken to kohuhu to mixed low forest, the composition of which depends on recent fire history, and type of site.

2.5 Fauna

2.5.1 Herpetofauna.

“Site locations of rare and endangered herpetofauna are recorded in the original report. Herpetofauna of this nature is at risk of illegal activities including damage and removal through unlawful interference and disturbance. Accordingly, information regarding the locations of any such herpetofauna has been deleted from this version of the report. The Department of Conservation has put in place mechanisms to ensure that such information can be released for genuine scientific and research purposes. Please contact the Department of Conservation directly to determine whether the information can be released.”

Surveys for lizards was carried out on 30-31 January and 6 April 2001. Previous lizard surveys in western Otago have not included this property, although the rare Grand skink (*Oligosoma grande*) has been found to the east of the property across Lake Hawea (Kappers and Tocher 2001).

Hawea Faces. This area contains relatively poor lizard habitat. No rock tors are present at low to mid-altitude, and eroding rocks tend to be thick blocks rather than slabs under which lizards are typically found. The weather conditions were good for detecting lizards (fine, warm light north westerly conditions).

The lakeshore shrubland at southernmost end of property was surveyed for *Naultinus gemmeus*. Many *Coprosma robusta* were fruiting heavily. No lizards were seen.

At two other locations streams were followed uphill - one through open bracken and shrubland, and the other up a streambed to a remnant of beech forest in a small gorge. No lizards were seen.

Although the low altitude shrubland habitat appears suitable for common skinks and perhaps geckos, none were found.

Dinner Creek/Summit Ridge

No inspection was carried out in the low altitude country due to its highly modified state; however beech forest remnants in mid altitude gorges do support populations of *Hoplodactylus* spp.

One pregnant female McCann's skink (*O. maccanni*) was found beneath a rock slab at 1000 m asl.

Two juvenile McCanns skinks and one gecko were found on the ridge crest at the northern end of the property. Geckos (*Hoplodactylus* 'Southern Alps') and a common skink (*O. maccanni*) were found on the ridge at the headwaters of Long Valley Creek.

The rugged, rocky ridges leading down to the east appear to provide good habitat for lizards, especially the sections adjacent to deeply incised gorges where forest cover is still relatively

intact. These sites are difficult to survey due to the nature of the terrain. Because of the proximity, altitudinal and geological similarity to other sites where grand skinks (*Oligosoma grande*) have been found these areas were searched for giant skinks; however none were seen and no other evidence of their presence was detected.

The wetland at The Neck was inspected but no lizards were observed. The blocky hard nature of the rock does not represent ideal lizard habitat.

2.5.2 Birds

The only previous work that can contribute to this report is a compilation of field observations concerning kea and New Zealand falcon distribution on the property.

Keas have been recorded from the gully systems to the east of Isthmus Peak, the head of Halls and Dinner Creeks and from a large tributary on the north of Mt Burke Creek at the southern end of the property. New Zealand Falcon have been recorded from the same tributary of Mt Burke Creek, the next tributary north, the middle section of the Craig Burn, the middle to headwaters of Halls Creek and the moderate sized gully to the west of Isthmus Peak. This latter record has been confirmed as a breeding pair.

Notes of birds seen on the property are summarised in Appendix Two. The record of NZ falcon is from the tributary to the south of Long Valley Creek.

Native birds recorded on the property are species normally associated with beech forest and grassland habitats. The species list for forest areas is characteristic of montane beech forest patches elsewhere with the absence of brown creeper. In contrast to NZ falcon and kea, the forest birds (fantail, tomtit, bellbird, grey warbler and riflemen) on the property are sedentary and restricted to the patches of forest found on the property.

2.5.1 Invertebrates

A list of insects collected and identified is attached as Appendix Three. Twelve sites on the property ranging from 350 metres at the northern boundary to 1325 m along the main ridge of the property were sampled.

Collections were made of the predatory carabid beetle *Megadromus sandageri* at the head of Halls Creek, along the main ridge at 1200m. Other carabids were collected along the main ridge. The presence of a range of predatory insects indicates an intact native insect ecosystem.

The grasshoppers *Sigaus australis* were collected at all sites in *Chinonchloa* sp. grasslands along the main ridge and in head basins. Grasshoppers are the primary native herbivore in grasslands. The presence of grasshoppers through the grassland areas inspected on this property indicates an intact ecosystem.

A range of moths (Lepidoptera) were collected from all parts of the property. In particular the grass moth *Orocrambus ordishi* was collected from a full range of altitudes on the property. Moths generally indicate intact grassland and forest ecosystems. The presence of the predatory Tachnid fly *Protohystricia* sp. indicates healthy ecosystems across the property at a range of altitudes.

2.5.3 Aquatic Fauna

The NIWA Freshwater Fisheries Database holds no records for the streams on the property.

Thirteen sites were fished using the back-pack electric fishing machine: eight in the headwaters of streams feeding into Lake Hawea, one in the mid-reaches of one of these streams, four just above the Makarora-Lake Wanaka highway and one in a stream draining the Lake Wanaka faces.

Three fish species were recorded from the thirteen sites sampled, one native and two introduced. The native koaro (*Galaxias brevipinnis*), was the most widespread species encountered and populations were found at six sites: lower Hall's Creek, Craig Burn Forks, Long Valley Creek, Big Redand Creek, Little Rough Gully and Stewart's Creek. Brown and rainbow trout were found at one site: Craig Burn (just above its junction with Long Valley Creek), while fish were absent from the other sites surveyed. The most abundant population of koaro was found in Stewart's Creek, but this species was also common at four of the other sites where it was found (lower Halls Creek, Craig Burn Forks, Big Redand Creek, Little Rough Gully), while at the sixth site, upper Long Valley Creek, it was ranked as "occasional".

The koaro population found in Little Rough Gully on the Lake Wanaka faces was notable for the fact that these fish were just as abundant above a 3-metre vertical waterfall as they were below it and the full range of age-classes (juveniles 70mm-adults 150mm) were present. This species is migratory and spawns at the lower reaches of the streams it inhabits, with the juveniles being washed to the lake (or, more commonly, the sea for coastal populations), to rear for about six months. They return and migrate upstream as "lake whitebait", to adult habitat in tributary streams, exhibiting prodigious climbing ability while doing so.

Poor weather made it impossible to survey other sites on the Lake Wanaka faces. However, it is likely that koaro populations exist in most of the small streams on the lake faces of this property, limited in distribution upward only by the steep grade of the streambeds (koaro are able to climb considerable obstacles, but cannot negotiate vertical overhangs).

The koaro population in Stewart's Creek also contained all age classes (50mm juvenile-150mm adults) and was also found above a considerable number of significant barriers (falls and chutes).

Lower Hall's Creek (100-160mm long) and Craig Burn Forks fish were all adults (100-210 mm in length), as were those from upper Long Valley Creek (150-170mm), and Big Redand Creek (160-180mm).

The site where both species of trout were found (Craig Burn just above the Long Valley Creek junction) is obviously a juvenile rearing area as fry (30-40mm) and fingerlings (c.100mm) were very abundant there.

No fish were found in upper Hall's Creek, the 3 Dinner Creek sites, Big Rocky Creek and the headwaters of Mount Burke Creek.

The upper Hall's Creek site was very steep and appears to contain no fish.

The upper Dinner Creek site appeared to be contain good fish habitat and had moderate quantities of invertebrate bottom fauna. A downstream barrier(s) is probably preventing upstream fish passage. This was confirmed at the mid-catchment site, just above the deer yards, where the stream was observed to be dry approximately 20 metres below the sampling site (which had large quantities of aquatic invertebrates present). However there were no fish found at the lower Dinner Creek site either and the it is possible that there may well be a barrier preventing fish access between that site and the lake. It was also observed that there are yards situated near the bank of the stream just above the lower site and that there is a strong possibility that run-off of foot rot treatment chemical to the stream has occurred at times, which may have effected any fish attempting passage. The low levels of bottom fauna found at this site tend to confirm this view, as the riparian vegetation was relatively thick here, shading the stream and water temperatures were cool. Normally bottom fauna at such a site, without fish present would be extremely abundant.

It was assumed that there were barriers preventing fish access up Big Rocky Creek and Mount Burke Creek (which at the site fished was very unstable, slip-prone country).

Trout were only found in the Craig Burn mainstream at lower levels and it appears that either barriers, or other in-stream conditions (shallow water, high summer temperatures?) are sufficiently adverse to keep them from the streams containing koaro. These conditions, no doubt, have a considerable beneficial effect on the size and health of the koaro populations in the streams they inhabit on this property and are important attributes to retain.

2.5.3 Problem Animals

A variety of feral animals inhabit the property. Red deer, chamois, pigs are concentrated in rough undeveloped areas, whilst possums and hares are widespread. Rabbits have historically reached high numbers on parts of the property. At present high rabbit numbers are confined to localised "hotspots", primarily on sunny aspects on lowland adjacent to Lake Hawea.

Significance of Fauna.

Herpetofauna

Although the only lizards found on this property were the relatively common gecko *H. 'Southern Alps'* and McCann's skink; there are several locations where the habitat, although not intact, is regenerating or could regenerate to a state where several species of lizards may recolonise. The most important potential sites are rock tors adjacent to intact beech forest or shrubland in the steep catchments on the eastern part of the property which represent potential habitat for grand and Otago skinks.

The wetland adjacent at the Neck provides potential habitat for green skinks *Oligosoma chloronoton*, which is found only in Otago, Southland and Stewart Island. Regenerating shrublands along the shore of Lake Wanaka could support populations of common skinks (*O. nigriplantare polychroma*, *O. maccanni*) and jewelled geckos (*H. naultinus*).

Birds

Keas are a Category B threatened species. Their usage of the middle part of the property is an extension of their range. The next nearest populations are in the McKerrow Range to the North and the mountains to the West of Lake Wanaka. The type of land where they have been recorded is a mixture of beech forest shrub margins and alpine grasslands. Such a matrix of habitats can be expected to supply keas with the range of habitats and food sources necessary to support them.

New Zealand Falcon are also a Category B threatened species. They are present on this property and through out the Central Otago region. Similarly to kea, the mix of forest shrub and grassland provides a mix of habitats that falcon can utilise throughout the year. The presence of a breeding pair to the west of Isthmus Peak is notable. Falcon are present in the mountains to the east of Lake Hawea and to the north and west of Glen Dene. Falcon records to the south of this property are more in grassland habitats rather than the mix of forest grass and shrub habitats present on Glen Dene and the Mount Burke property to the south. While not a distributional limit such a change is a marked habitat difference.

For rifleman and tomtit the forest patches present on this property in association with those on the adjacent Mount Burke form an eastern distributional limit. For the other native and endemic forest birds recorded on Glen Dene the edges of their distribution extend further into Central Otago.

Invertebrates

The key invertebrates recorded on this inspection suggest all the features of an intact functioning invertebrate community. The property has a full range of vegetative browsers (mainly grasshoppers, moths and butterflies), scavengers (flies), and predators that indicate an intact ecosystem.

Aquatic Fauna

Koaro is a Category C species (Molloy and Davis- Tisdall, 1994). There were no other aquatic species recorded on the property which are of note.

2.6 Historic

Maori Sites: There were a number of locations around Lakes Wanaka and Hawea which were repeatedly occupied by southern Maori on their seasonal visits to the lakes to take weka, eels and gather other resources from the surrounding area. The village of Manuhaea was located at the Neck, the narrow neck of land between the two lakes. Despite the presence of this known village site nearby, there is only one known Maori archaeological site on Glen Dene. This is an oven site (NZAA site no. G40 208) at the southern end of the lease, immediately north of the Hawea camping ground. Unfortunately there is no information on the site record form to allow this site to be relocated.

European sites: In 1860 the land between the two lakes was taken up by Brittain and Burke as the Forks or East Wanaka run. By the mid 1860s it had become part of the large Wanaka station (Angus 1981: 17-19). In 1880 Glen Dene saw one of the last gold rushes in Central Otago. In early 1880 three prospectors (Jones, Fitzgerald and Price) reported payable gold in what was then known as Panama Creek or Long Valley. They were reported to have obtained 16 ounces of gold per man over a period of 9 weeks (Cromwell Argus 13 July 1880 p.5). By July there were 120 men in the valley and by August perhaps as many as 300 were present. Not all of them were miners; by August there were 3 stores and a butchery to supply the miners needs (ibid 31 August 1880p.5). Later Richard Cayford opened the Panama Hotel and store.

However the gold was patchily distributed and the deeply entrenched valley meant there was little ground available for mining. Warden Jackson Keddell reported that gold from the area was of inferior quality; incorporating some base metal alloy which lowered the value (Appendices to the House of Representatives 1882: H17 p.31). By the end of the year the mining population had declined to about 50 miners although by this time 5 stores, including a butchery and bakery, were said to be present (ibid. 7 December 1880). Finally by the winter of 1881 the mining population was 2 and the Long Valley rush was over (Roxburgh 1977:148).

Sites located: The Craig Burn, as the stream is now called, is entrenched in a deep steep sided gully. The sides of the gully are covered in thick bracken fern and in some places manuka. This made access and site visibility difficult.

It is clear from the available historic information that there was little development of the gold field. Articles in the Cromwell Argus newspaper indicate that most miners were simply using a gold pan and a few long toms (or sluice boxes) were employed. At least

one water race was built and an application made for one other. This scale of mining would not leave a lot of evidence on the ground, as confirmed by this survey.

The three sites located are typical of similar small scale mining sites elsewhere in Central Otago. The first of these was at grid ref. NZMS 260 Series G39 106 245. This location is where the access road crosses the stream. Immediately downstream of the bridge, on the true left, a low terrace on a bend of the stream has been thoroughly worked (although the thick vegetation cover made it impossible to gain a clear picture of the workings). Tailings piles are present as well as a small sluice hollow. The tailings consist of rocks and boulders from fist to head size.

This site continues on the other side of the stream and upstream of the bridge where another bend in the stream has been worked. Again thick cover limited visibility to part of a short tail race with tailings stacked on either side. On the true right of the stream high above the workings is a small water race which probably supplied water to these sites. It seems to have its origins in the unnamed watercourse to the east of the airstrip. At a point above the lower set of workings there is evidence of it being run down the hill for a short distance before all trace of it is lost in the bracken fern.

The second site was further upstream at NZMS 260 Series G39 GR 105 247. It consists of mounds of finer tailings on the first terrace above the stream, on the true right.

The last site located was on the large high terrace above the confluence of the Craig Burn with the Long Valley Creek (GR 101 247). At the western end of the terrace there is a reservoir with an earth wall about 35m long by 1m high. It was fed by a water race coming in from further up the Long valley. The reservoir seems to have fed water in a dry gully at the eastern end of the terrace but thick manuka scrub cover made it difficult to determine the ultimate destination of the water.

East of the reservoir scattered artefacts were located on the surface over a wide area. These included the base of a "black beer" bottle, parts of two clear glass bottles, and metal matchboxes (marked Bryant & May London). The accepted date range for the use of black glass bottles is 1860s - 1880s. Available research suggests a date of 1880 for the Bryant & May matchboxes (Ritchie 1986: 169 & 345). This evidence suggests that they were deposited at the time of the gold rush.

Significance of Historic Values

The sites found are typical of small scale mining sites that can be found in many parts of Central Otago. What limited significance they do have lies in their association with one of the last gold rushes in Otago. Because they date from before 1900 they are protected under the provisions of the 1993 Historic Places Act. In addition, their location in a steep sided stream gully means there is little likelihood of their being compromised by future agricultural development.

2.7 Public Recreation

2.7.1 Physical Characteristics

In 1992 DOC compiled a Recreation Opportunity Spectrum for the entire conservancy whereby all areas regardless of land tenure, were classified and mapped according to setting, activity and recreational experience characteristics.

Classifications on Glen Dene reflect the rugged and inaccessible nature of much of the property.

Predominantly developed country adjacent to the Hawea-Makarora Road is zoned Backcountry Drive—which includes "areas where good road access allows visitors into pockets or corridors which afford a sense of relative remoteness".

The balance of the property is zoned "Backcountry 4WD Drive In" which "is characterised by a feeling of relative remoteness from populated areas". "The highly natural setting is a valued part of the experience and may be associated with motivations of "escape from town", education and nature appreciation". "Four wheel drive vehicles are desirable to give access to high country tussock grasslands and block mountains and more rugged remote areas."

2.7.2 Legal Access

Lake Wanaka is subject to a continuous 20 m marginal strip for its entire boundary with the property. SH 6 (Makarora to Lake Hawea Road) provides vehicle access along the eastern and northern property margins.

A legal roadline joins SH6 near the outlet of Dinner Creek and climbs onto the crest of property and extends southwards as far as point 1325m. Much of this road lies on or close to a formed farm track along the crest section; however in the vicinity of Dinner Creek it lies some 500 metres to the north of the formed track.

Lake Hawea foreshore since the raising of the lake for hydro electric development has had no marginal strip laid off. However, a margin of at least 20 metres from the lake's maximum control level remains Crown Land under the Land Act.

2.7.3 Activities

Glen Dene has approximately 32km of shoreline bordering Lakes Wanaka and Hawea. Although the Wanaka shoreline is remote and somewhat exposed it does receive some use from picnickers, fishermen and water skiers. The Hawea shoreline due to its close proximity to SH 6 receives regular recreational use, especially in the vicinity of the Hawea Motor Camp. A small Bay south of Trig

10781 receives regular use by boat owners due to its sheltered nature from winds from north west winds.

Mountain bikers and four wheel drivers periodically complete a high level traverse of Glen Dene and neighbouring Mount Burke via a track which runs between Dinner Creek on Glen Dene and the Maungawera Road end on Mount Burke Station.

Hunters are periodically granted access to hunt pigs in the Quartz Creek/Mount Burke Creek area.

A lookout on the east side of SH 6 at GR NZMS 260 G39117 265 receives a high level of visitation from tourists including numerous tourist buses.

PART 3

OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

The property was briefly discussed with conservation/recreation orientated NGO's on April 26 1993 in relation to the Land Act 1948 tenure review process.

A further meeting was held in relation to the CPLA tenure review process on December 12 2000.

A written report has been prepared by Federated Mountain Clubs based on members knowledge of the property and an aerial reconnaissance. FMC has reserved the right to submit further information after they have been permitted to conduct an on the ground property inspection. The FMC report covers all issues raised by NGO's at the two consultation meetings.

Areas FMC have recommended for protection include the following:

Restoration To Full Crown Ownership

- (i) Forest and shrubland areas in some of the gullies running off the main Mt Burke-Isthmus Peak ridge including Mt Burke Creek, Craig Burn, Dinner Creek and an unnamed creek just north of Dinner Creek which can be seen from the Haast Highway. These areas are described as having high ecological and scenic/landscape values. They are seen as an important backdrop to the lake and its surroundings.
- (ii) Shrubland and scrub on the steep craggy slopes at the northern end of the property above The Neck and including the small pockets of wetlands on the lower slopes of Isthmus Peak.
- (iii) All the open tops consisting of tussock grasslands and sub-alpine communities on the main Mt Burke-Isthmus Peak ridge.

Freehold Subject to Landscape Conservation Covenant

- (i) FMC wish to see the front faces of Glen Dene above Lake Hawea protected from the potentially adverse effects of inappropriate subdivision and developments such as afforestation, tracking and erection of structures. It seems that the landscape provisions of the proposed District Plan may not be sufficiently robust to provide adequate protection.

Reserving Comment Until an Inspection has been completed

- (i) FMC believes that inherent values of the Wanaka lake faces are high and this side needs to be considered for return to full Crown ownership and control. However, they reserve any final comment until such time that they have been able to complete an on-site inspection.

Access Requirements

- (i) An easement for foot and mountain bike use of the access track up the lake face adjacent to Dinner Creek and along the main Mt Burke/Isthmus Peak ridge as far as the Glen Dene/Mount Burke Boundary (or adoption of the formed track as a legal road).
- (ii) An easement for walking and mountain bike access over the airstrip access road from near the mouth of the Craig Burn, up to the airstrip, along the ridge and down to the Haast Highway some 5km north of the Craig Burn delta.
- (iii) Parking for vehicles in the vicinity of the Dinner Creek yards to enable recreational users to park their vehicles off the busy Haast Highway for safety and security reasons.
- (iv) If the Lake Wanaka faces become conservation land, public access to, and public use of the hut on the lakeside near the mouth of an unnamed creek draining from Isthmus Peak would be desired.
- (v) Walking access to historic gold workings in the Long Valley and use of this route as an escape route off the tops for use in bad weather and also to create a greater variety of trips including shorter and round trip options.

3.2 Regional Policy Statements & Plans

(a) 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:

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

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

In respect of landscapes and natural features it includes the following policy and method:

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 natural features and landscapes that are regionally significant."

3.3 District Plans

Glen Dene lies within the Queenstown Lakes District, which is currently subject to the amended Proposed Queenstown Lakes District Plan (1998). The 1995 version of the Proposed Plan was amended in 1998 to incorporate the Council's decision on submissions received and heard. The amended Proposed Plan is now the principal planning document in the Queenstown Lakes District except where provisions are subject to appeals lodged to the Environment Court. The Minister of Conservation has appealed provisions in respect of significant natural areas. Appeals are currently in the process of being heard or negotiated and will take at least another 12 months. The plan will not become fully operative until these appeals have been resolved..

Under the amended proposed plan (1998), Glen Dene lies within Rural General Zone. The Rural General Zone includes the majority of the District's rural lands and is characterised by farming activities, diversification to activities such as viticulture and includes the vast majority of the District's natural areas.

Section 6(c) of the Resource Management Act 1991 requires the Council to recognise and provide for the following matters of national importance:

- (a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development.
- (b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development
- (c) The protection of significant areas of indigenous vegetation and significant habitats of indigenous fauna

The amended Proposed Queenstown Lakes District Plan includes the following policies:

- (i) To promote the long term protection of sites and areas with significant conservation values.
- (ii) To encourage the protection of sites having indigenous plants or animals with significant nature conservation values
- (iii) Encouraging the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.
- (iv) To maintain or enhance the natural character and nature conservation values of the beds and margins of lakes, rivers and wetlands.

The amended plan includes the following objective for landscapes:

- (i) Subdivision, use and development being undertaken in the District in a manner which avoids potential adverse effects on landscape values.

Controlled activities (which require consent that the Council must grant with or without conditions) include buildings, retail sales and mineral exploration. Discretionary activities include residential units on sites between 4 & 20 hectares, mining, forestry activities and a breach of site standards for significant indigenous vegetation and forestry and shelterbelt planting. Non complying activities include power generation facilities, residential units on sites of less than 4 hectares and commercial activities. There are no prohibited land based activities within the zone. There are also no rules protecting outstanding natural features and landscapes, clearance of indigenous vegetation in general and significant natural areas in the interim (ie those areas that have not been identified in the plan yet).

Only those significant natural areas with current formal protection have been identified as areas of significant natural value in the amended proposed plan. The plan does not identify outstanding natural features and landscapes. For these reasons no such areas on Glen Dene are recognised in the amended Proposed District Plan.

3.4 Conservation Management Strategies & Plans

The Otago Conservancy of DOC has prepared a Conservation Management Strategy (CMS) which was approved by the Minister of Conservation in August 1998.

The CMS identifies 41 special places of conservation interest in Otago Conservancy. Glen Dene pastoral lease lies within the Wanaka Special Place.

The CMS objectives for the Wanaka Special Place is:

"To protect and enhance the native vegetation and animals on the islands and to recognise and provide, where appropriate, for increased visitors use of them and of the lands administered by the department around the Wanaka outlet.
To identify and negotiate protection for areas of significant indigenous vegetation, significant habitats of indigenous fauna, and outstanding landscape in the wider area."

The key implementation methods relevant to Glen Dene are:

- (a) Pastoral lease tenure reviews will be used to endeavour to negotiate for the protection of areas that are of high landscape value, are significant for nature conservation or secure access for short and long walks.

- (b) The sensitive development of the Wanaka lakeshore will be advocated to maintain landscape and recreational values.

(c) The protection of riparian margins of rivers in the area will be advocated.

(d) The protection of significant natural resources will be advocated through Resource Management Act and other statutory processes.

PART 4

MAPS ETC.

4.1 Bibliography

Appendices to the House of Representatives Cromwell Argus
Newspaper

Angus, J H 1981: *Aspiring Settlers*, McIndoe Dunedin.

Bennett E.H and Russell H. 1993. Wanaka - Hawea - Makarora.
Planning for Landscape Change. Visual Landscape Assessment.
Prepared for Queenstown - Lakes District Council.

Harper R.K. 1992. Otago Recreation Opportunity Spectrum.
Department of Conservation Miscellaneous Series #10.

Kappers, B. and Tocher, M. 2001. Otago and grand skink surveys
in the Lindis District (1982 - 1999). Report for the
Department of Conservation (CAS Note in prep.)

Johnson P.N (1984). Wanaka Reserves : Botanical Report. Botany
Division DSIR.

McFarlane, L. M. 1999. Morven Hills Station Otago Skink
(*Oligosoma ottagense*) Survey Nov. - Dec. 1998 & Feb. - Mar.
1999. Unpublished report, Otago Conservancy, Department of
Conservation.

Molloy, J. and Davis, A. 1994: Setting priorities for the
conservation of New Zealand's threatened plants and animals.
Department of Conservation.

Mortimer, N. 1993: Geology of the Otago Schist and adjacent
rocks. Scale 1:500 000. Institute of Geological & Nuclear
Sciences geological map 7. 1 sheet. Institute of Geological
& Nuclear Sciences Geological Ltd, Lower Hutt, New Zealand.

**Ritchie, N A 1986: Archaeology and History of the Chinese in
Southern New Zealand during the 19th Century.** Unpublished PhD
dissertation, Department of Anthropology, University of
Otago, Dunedin.

Robertson B.T & Blair I.D (editors). The Resources of Lake
Wanaka. Lincoln Papers in Resource Management No.5 -1980.
Published by the Guardians of Lake Wanaka by Tussock
Grasslands & Mountain Lands Institute, Lincoln College.

Roxburgh, I 1977: *Wanaka Story*. Capper Press, Christchurch

RELEASED UNDER THE OFFICIAL INFORMATION ACT

4.2 Illustrative Maps

4.2.1 Topo/Cadastral Glen Dene Pastoral Lease

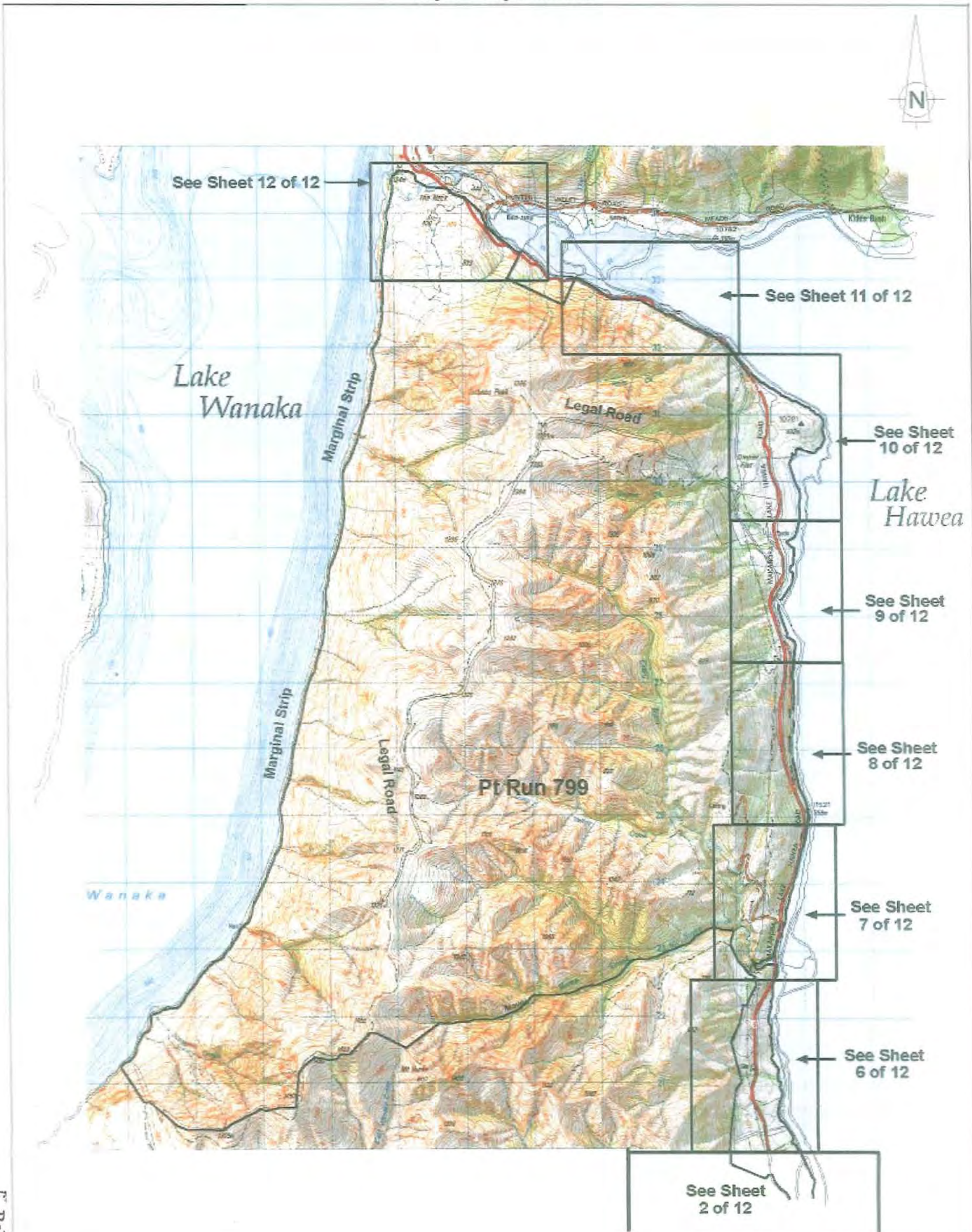
4.2.1a Cadastral Map of Crown Land between Glen Dene and Boundary Creek Scenic Reserve

4.2.2 Values – Landscape

4.2.2a Values – Ecological / Recreational

4.2.2b Ecological Values on Crown Land between Glen Dene and Boundary Creek Scenic Reserve

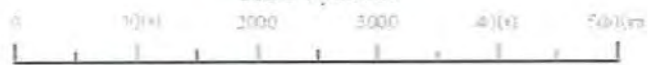
Map 4.2.1 Topo/Cadastral



Marginal Strip Subject to Sec 24 (9)
Conservation Act 1987 - - - - -



Glen Dene
Scale 1 : 50000



Version	1	2	3	4	5
Otago Land District	Sheet 1 of 1				
	Date 22/11/2000				
NZMS 260 F39, F40, G39&G40					

Graphics by :
TL Survey services Ltd DUNEDIN

Released under the Official Information Act

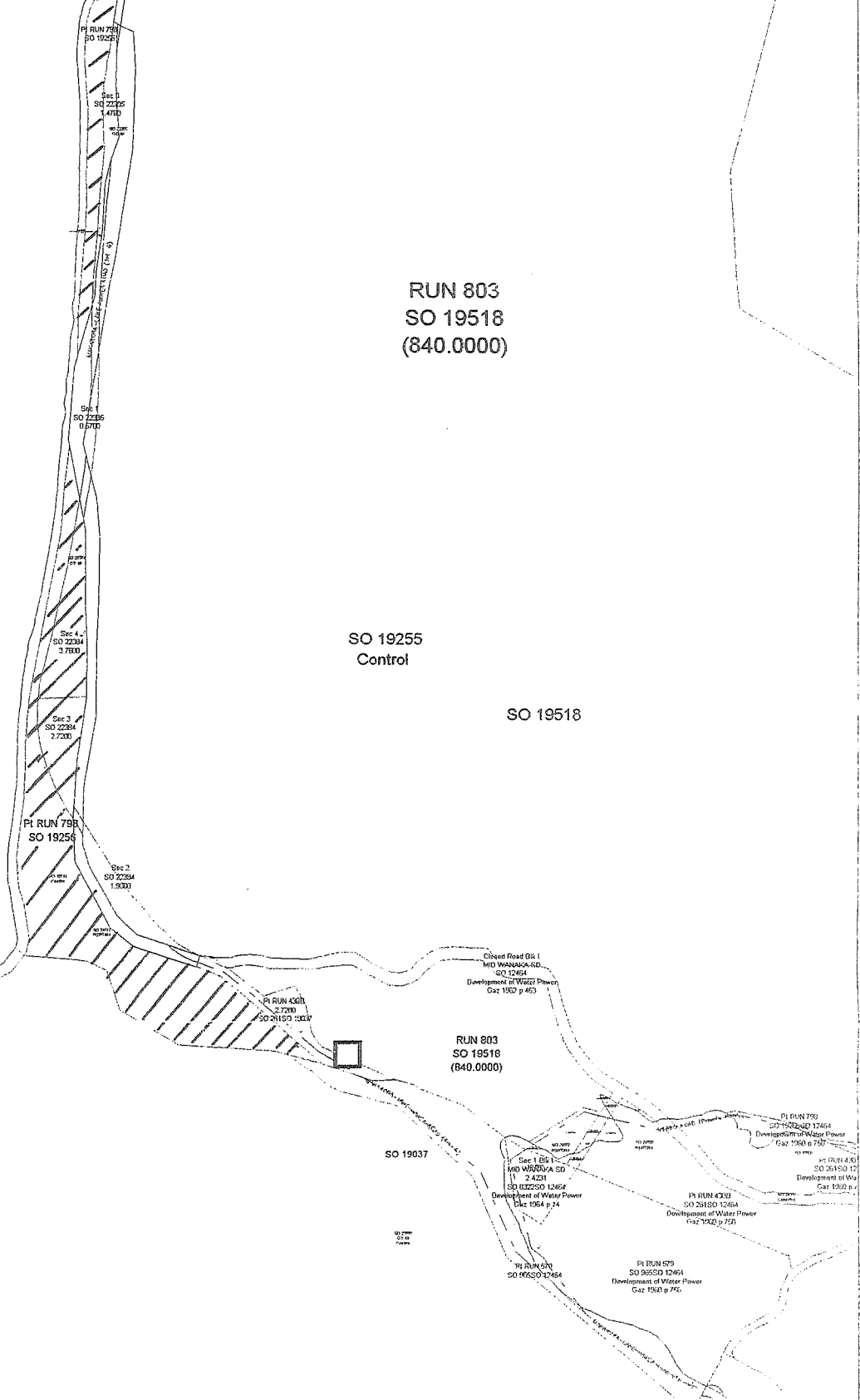
MAP 4.2.1(a) Cadastral Map Depicting Crown Land Proposed For Inclusion

//// = Crown Land Proposed For Inclusion.

RUN 803
SO 19518
(840.0000)

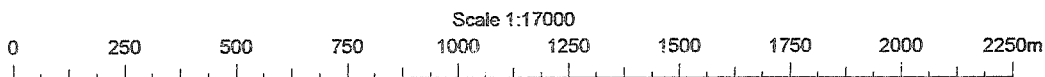
SO 19255
Control

SO 19518



4719
Tahu

Released under the
Official Information Act



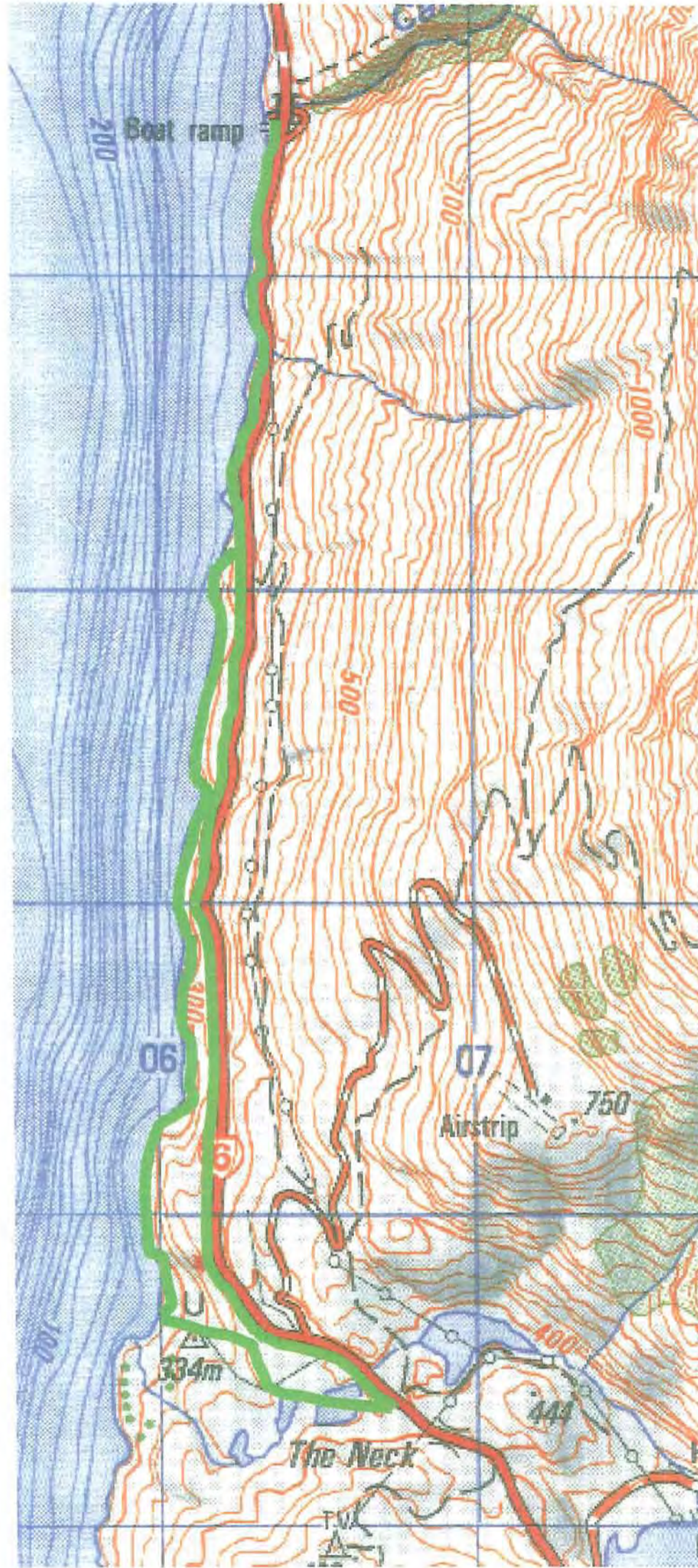
The Neck



Released under the
Official Information Act



Released under the Official Information Act



4.2.2b. Ecological Values of Crown Land Between The Neck and Boundary Creek Scenic Reserve.

 Native Shrublands, regenerating shrublands and wetlands.

Released under the
Official Information Act

APPENDICES

Appendix One

“Site locations of rare and endangered herpetofauna are recorded in the original report. Herpetofauna of this nature is at risk of illegal activities including damage and removal through unlawful interference and disturbance. Accordingly, information regarding the locations of any such herpetofauna has been deleted from this version of the report. The Department of Conservation has put in place mechanisms to ensure that such information can be released for genuine scientific and research purposes. Please contact the Department of Conservation directly to determine whether the information can be released.”

Description of gecko found

Male, light cream with dark brown bands on dorsal and lateral surfaces, darker on tail which had been removed and regrown. Mouth pink, eye green, 3 orange ectoparasites, Snout - vent length = 4.5cm, snout - tail = 11.0 cm.

APPENDIX TWO

BIRD LIST GLEN DENE

Birds recorded from 31 January -2 February 2001.

SPECIES	LOCATION	STATUS	CONSERVATION ASSESSMENT
Bellbird	bush edge in gully, wetland edge	Endemic	
Blackbird	Wetland	Introduced	
Chaffinch	bush edge in gully	Introduced	
Fantail	bush edge in gully	Native	
Goldfinch	bush edge in gully	Introduced	
Grey Warbler	bush edge in gully	Native	
Harrier Hawk	leading spur, head basin, ridge top wetland	Native	
NZ Falcon	bush edge in gully	Endemic	Threatened
Pipit	leading spur, head basin, ridge top	Native	
Redpoll	bush edge in gully, head basin,	Introduced	

RELEASED UNDER THE OFFICIAL INFORMATION ACT

	wetland		
Rifleman	bush edge in gully	Endemic	
Silvereye	leading spur, wetland	Native	
Song Thrush	bush edge in gully	Introduced	
Tomtit	bush edge in gully, shrub edges in gully,	Endemic	
Yellowhammer	Wetland,	Introduced	

APPENDIX THREE: INVERTEBRATE LIST

The altitude column list at which heights on the property the species was collected.

ORDER & Family	GENUS	SPECIES	COMMON NAME	ALTITUDE (M)
	Celatobl atta	quinquemaculata	cockroach	940
	Scopodes	sp.		1200
COLEOPTERA				
	Agonum	sp.		1200
Family CARABIDAE	Megadrom us	sandageri		920, 1200
	Megadrom us	sp.		1200
Family SCARABIDAE	Pyronota	Festiva		1200
DIPTERA				
	Melangyn a	Novaezealandiae	Hover Fly	646
	Neoitam s	Melanopogon	Robber fly	1070, 1200, 1300
	Protohys tricia	Sp1.	Tachid	646
	Protohys tricia	Sp2.	Tachid	1070
HOMOPTERA				
Family TIBICINIDAE	Maoricic ada	Sp.	Cicadas	485, 709, 760, 940
LEPIDOPTERA				
	Argyroph enga	Antipodium	Tussock Moth	646, 709, 1070
	Dasyuris	Sp.		920
Family CRAMBIDAE	Orocramb us	Ordishi		485, 646, 760, 940
Family GEOMETRIDAE	Asaphode s	Clarata		1115
Family LYCAENIDAE	Lycaena	Salustris		646
	Lycaena	Boldenarum		709, 1070
	Zizina	Labradus	Common Blue	485
	Zizina	Labradus	Common Blue	350, 1319
Family PIERIDAE	Pieris	Rapae	Cabbage white	350
ODONATA				
	Uropetal a	Chiltoni	Dragonfly	709, 760, 940

	Uropetal a	Chiltoni	Dragonfly	1319
	Xanthocn emis	Zealandica	Red Damsel fly	350
ORTHOPTERA				
Family ACRIDIDAE	Sigaus	Australis		1200, 1115, 1319

APPENDIX FOUR: SITES FISHED

F39 088 3314-Halls Creek

F39 091 298-Dinner Creek
F39 093 279-Craig Burn forks
F39 078 271-Big Rocky Creek
G39 101 254-Craig Burn
F39 076 254-upper Long Valley Creek
F39 072 239-Big Redand Creek
F39 060 219-headwaters, Mount Burke Creek
F39 055 305-Little Rough Gully
G39 107 322-lower Halls Creek
G39 113 294-Dinner Creek(mid)

G39 110 310-Stewart's Creek
G39 116 292-Dinner Creek(lower near stock yards)