2A: DOC Conservation Resources report on Tenure review of Lake Taylor Crown pastoral lease – CHCCO-31596- 5 February 2002

DOC CONSERVATION RESOURCES REPORT ON TENURE REVIEW OF LAKE TAYLOR CROWN PASTORAL LEASE

PART 1: INTRODUCTION

Lake Taylor Crown Pastoral Lease is located in North Canterbury, in the upper Hurunui River catchment. The lease covers 7300 hectares and is 50km north-west of Hawarden and 120km from Christchurch

The property lies between the two branches of the Hurunui River. The South Branch of the Hurunui River and Lake Mason form the southern and western boundaries. The northern and eastern boundaries are along the valley floor between Loch Katrine, Sisters Stream and the North Branch Hurunui River. The property adjoins Eskhead Crown Pastoral Lease to the southwest and The Lakes Crown Pastoral Lease to the northeast. To the northwest and across the North Branch of the Hurunui to the east is Lake Sumner Forest Park, which is administered by the Department of Conservation. Also adjacent to the lease are the DOC-administered Lake Taylor and Loch Katrine Recreation Reserves.

The lessees of Lake Taylor have a grazing license over part of the Lake Sumner Forest Park on the eastern bank of the North Branch. The lessees own a small area of freehold at the junction of the North Branch and The Sisters Stream.

The lease lies in the Sumner Ecological District, within the Puketeraki Ecological Region. There has not been a Protected Natural Areas survey carried out of the District. The Ecological District is characterised by moderately glaciated jagged mountains to 1898m a.s.l., intermontane basins and valleys. Minerals are greywacke and argillite with some glacial outwash and recent river deposits in valleys. There is a subhumid mountain climate with leached steepland soils. Vegetative cover includes extensive beech forests, mixed scrub, alpine vegetation, tarn and lake communities.

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

2.1 Landscape

Landscape Context

Lake Taylor Station lies in the middle of a large area known as the "Hurunui Lakes". This encompasses Lakes Sumner, Marion, Sheppard, Taylor and Mason and Loch Katrine and the surrounding ranges and valleys. Much of this area has been identified as Outstanding Natural Landscape at regional and district level.

At a local level, the landscape of Lake Taylor station can be considered with respect to three different landscape contexts ***(Map One)***. This relates to its physical structure and to the way it is experienced which largely relates to visual catchments:

(i) South Branch Hurunui Valley

- the west side of Woolshed Ridge, the adjacent valley terraces and river flats, and the south side of the Oronoko Range are a large part of the valley landscape of the South Branch Hurunui, enclosing it along its length on the true left forming the skyline, and comprising a large part of the valley floor. This landscape feels more remote, of larger scale and appears more natural with less farming development than the other two landscapes, and beyond Eskhead Station homestead, there is no formed road, and only musterers huts and yards.

(ii) Sisters Valley

- the east side of the Ridge and the north side of the Oronoko Range are the enclosing ranges for the southwest side of the valley landscape containing Loch Katrine, Lakes Taylor and Sheppard, and the Sisters Stream. This is a smaller scale, more intimate landscape than the South Branch. It is dominated by lakes, and is relatively highly developed on the low country. As well there is greater visual variety and presence of exotic and cultural elements than the other landscapes. The visual contrasts (eg, between lake and land, developed and undeveloped land) make it a dramatic landscape.

(iii) Hurunui River Valley

- the east side of Dog Hill and the eastern end of the Oronoko Range enclose the true right of the Hurunui River. This is an enclosed river valley landscape of high hills rather than mountains, with natural appearance. The formed road is the main cultural element and obvious modification. It is a less rugged and less dramatic landscape than the previous two landscapes.

Landscape Units

Twelve landscape units have been identified on the property ***(Map Two)***:

1. Woolshed Ridge East Side -

This unit consists of glacially steepened and smoothed slopes facing east over Lake Taylor, with a series of well-developed basins, a rugged top and much rock outcrop. The vegetation consists of large areas of beech forest, and extensive dracophyllum and snow tussock, with vigorous regeneration of manuka/kanuka, and no cultural features such as tracks and fences.

2. Woolshed Ridge West Side

This unit is similar to (1) above but it has a lot of "grey scrub" on lower to mid slopes. It is a large part of the South Branch Hurunui River valley landscape, facing west over the river and Lake Mason. The area of beech forest overlooking the lake is part of Lake Sumner Forest Park.

3. Munro Saddle

The basins either side of Munro Saddle are distinguished by a dominance of manuka/kanuka shrubland and dracophyllum with very few beech trees. A 4WD track and subdivision fence passes over the saddle.

4. Oronoko Range South Side

The south side of the Oronoko Range is steeper than the north side, is not recently glaciated and has more linear deeply incised drainage channels than the north side and some volcanic rock giving reddish ground. It faces south forming true left of deep V-shaped river valley of South Branch Hurunui. The vegetation is extensive manuka/kanuka with few "clear" faces, many scattered patches of beech forest, some quite large, and on top of the range, dracophyllum, hebes, short tussock and little snow tussock and a lot of bare ground. Some 4WD tracking and one vertical subdivisional fence at east end.

5. Oronoko Range North Side

The north side is not quite so steep, and has glacial smoothing of mid to lower slopes, which merge smoothly with adjacent valley floor moraine and fans. A fault trace exists at east end of range. The drainage pattern is more winding. Predominance of grassland especially towards east end probably due to greater degree of burning and grazing. At the west end there is a lot of manuka and pockets of beech remaining in deeper valleys. Some 4WD tracking and fences around lower slopes and at east end. North facing overlooking Lake Taylor and Sisters Stream valley.

6. Rough Stream

Rough Stream is a large, well defined, V-shaped stream valley at east end of Oronoko Range, running NW-SE for about 2.5km. Beech forest and manuka shrubland cover most of the true left and extends a short distance up true right slopes, which are mostly covered in sweet vernal and browntop/short tussock grassland. The true right forms one grazing block together with the southeast end of the Oronoko Range. True left fenced off at top end of valley only and is part of the Dog Hill grazing block. The forested area probably forms a natural boundary between the two grazing blocks.

7. Dog Hill

Dog Hill covers the lower north and east facing hill country below about 1000m asl, and is deeply dissected by stream valleys and small basins. Mainly "clear" slopes between valleys covered in sweet vernal and browntop grassland with patches of mature manuka, especially around rock outcrops and in the gullies, and extensive patches of bracken fern. Numerous small terraces along the Hurunui River. The main cultural features are some subdivisional fencing along lower slopes and terraces, Lake Sumner Road and a power line that passes around base of hill winding around terraces. Forms true right of Hurunui river for about 4km upstream of confluence with South Branch Hurunui.

8. Mason Flats

The lease includes part of the extensive outwash and moraine surfaces which cover the wide valley floor either side of the river, the greater part being on Eskhead. A well-defined, triangular, gently sloping outwash surface exists immediately south of Lake Mason bordered by hummocky to rolling moraine. The moraine is responsible for damming the lake, extending between the Crawford Range and Woolshed Ridge. Mason Stream has cut a sharply-defined, deep, steep-sided gully from the lake to the river, slicing through the moraine and emphasising the difference in altitude between lake and river. Down-cutting by the river has also given the outwash surface short, sharp, steep edges.

The moraine and outwash surface are covered in dense short tussock grassland and large patches of tall, dense "grey scrub" (predominantly matagouri) and manuka. The distribution of manuka on the outwash surface reflects a change in soil type. There are a few clumps and individual large beech trees forming impressive specimens. Closer to the river are flat, grassy floodplains with extensive matagouri and sedge wetlands. This area is harder grazed and "greened" by cattle and clover is evident. The river itself is a braided river in a wide flat shingle bed. There is little obvious modification to this area, limited to the Lake Mason hut, three 4WD tracks (two not well-used) and a couple of subdivisional fences. Lake Mason itself is a small tranquil lake in two parts with a shore varying from shingle to grass to wetland. Cattle have free access to the lake.

9. South Branch Hurunui Flats

This is an extensive alluvial floodplain some 2.5km long and 500m across at its widest point. It contains a large grassy wetland of sedges, and rushes surrounded by drier areas of short tussock grassland and often tall and dense matagouri. The area is extensively grazed and stock have free access throughout the wetland. The 4WD track from Munro Saddle upvalley skirts around its inner edge. No subdivision fences are apparent.

10. Dog Hill Terraces

To the northeast of Dog Hill there are high remnant outwash surfaces and lower alluvial terraces of mainly broad crescent shapes. A large surface also extends around the base of Dog Hill to Old House Gully. The edges are sharply defined and sheer with those of the higher outwash surfaces being over 100m high. They are usually curved along their length, following the meanders of the Hurunui River. They have a cover of dense short tussock grassland interspersed with manuka, grey scrub (to a lesser degree) and bracken fern. It is an extensively grazed area with few fences. A coniferous shelter belt exists along the north edge of the larger surface. The Lake Sumner road winds around the terraces.

11. Homestead Area

Between Old House Gully and Lake Taylor the lease includes about half of the valley floor comprising higher rolling moraine country to just over 700m asl and lower alluvial surfaces to 600m asl. This area is highly developed, being a patchwork of rectilinear paddocks for hay, intensive grazing and fodder crops, bordered by mature, coniferous shelter belts. The

homestead is located here. The steeper edges of the moraine areas have been left in a rough grass/manuka cover forming a sharp visual contrast with the cultivated areas.

12. Woolshed Ridge Flats

Between Lake Taylor and Loch Katrine alluvial fans have spread out across the valley floor, and there is a ridge of moraine forming a high point across the valley and causing drainage to fall to the north to Loch Katrine and south to Lake Taylor. The lease boundary runs about through the middle of the valley floor, which lies between 500-600m asl.

There has been no subdivision and cultivation of this area yet (as there has been on neighbouring The Lakes station) but the alluvial fans 2-3km north of Lake Taylor are well-grazed and "green" with exotic species. Short tussock, wetland sedges, matagouri and to a lesser extent manuka remain widespread. Over the moraine area and north to Loch Katrine the vegetation appears less disturbed with greater shrubland cover including bracken and other native broadleaf species. A 4WD track (the Lake Sumner Road) passes through the area.

Landscape Values

The following landscape values have been recognised on the property

(i) Hurunui River Margins

The margins of the Hurunui River are critical to its visual character and to the landscape experience of the river corridor by road users, anglers, picnickers and kayakers. The natural landforms (the terraces of varying heights, gullies, rock bluffs) and the mainly native vegetation, especially that along the road and along the edge of the river, make this a landscape of high value visually. Other factors in this high value are the relative absence of cultural features (such as cultivated paddocks, roadside fences, gravel pits, tracks, yards) and the virtual absence of gorse and broom so prevalent up the South Branch and further downstream, combined with the very easy access. The engorged portion of the river near the confluence of the two branches of the Hurunui, and the adjacent clearly defined, curving terrace landforms are notable natural landscape features.

The first views from the Lake Sumner Road of the high mountain ranges of Lake Sumner Forest Park are gained as the road climbs around the rocky bluff at the confluence. Similar views continue to be gained travelling upstream. Apart from the visually insignificant road and timber power poles, the general impression is of a natural landscape, particularly below the road. Further up the road, just before it winds down to the Sisters Stream, a high outwash terrace surface covered in dense short tussock grassland and native shrubs is crossed. This landscape experience is becoming less common as these areas are increasingly being fenced into paddocks, cultivated and sown in exotic pasture or fodder crops. Shelter belts and plantations planted often block expansive or distant views.

In general the easy access, low altitude and the flat topography of the terrace surfaces make the Hurunui river corridor vulnerable to agricultural development or tree-planting which could greatly reduce its natural character and/or interrupt views. Roading improvements and maintenance could also adversely impact on the natural character and experience of the river

valley, and any changes proposed need to be carefully considered. At present the narrow shingle road winds sympathetically around the landforms. It does not significantly intrude upon the landscape and indeed imparts a sense of respect for natural landform and contributes to the feeling of relative remoteness and "adventure in the backblocks".

The slopes of Dog Hill above the Hurunui River also contribute to the visual character of the river. Whilst the slopes themselves are not especially visually significant, the fact they appear natural with no visible fencelines or tracks, or exotic trees, is of importance to the overall river corridor character.

(ii) Woolshed Ridge - East Side and Oronoko Range - North End

The east side of Woolshed Ridge and the northern end of the Oronoko Range, in particular the last large spur, are very important visually. They provide the visual backdrop to views across Lake Taylor either from the road, the reserve and from the lake itself. They are the main visual context for the lake, determining to a large degree how the lake is perceived and experienced as a landscape feature. The Hurunui lakes collectively are highly valued at district and regional level as natural landscape features and this must include the visual catchment within which they lie, ie their context.

Further north, the second to last basin on the east side of Woolshed Ridge and the massive ice-smoothed convex slope adjacent overlook the reserve at the south end of Loch Katrine. For reasons similar to those outlined above, the natural appearance of the slopes is important to the values of this lake and the landscape experience of its users.

(iii) Lake Shorelines

The retention of natural-looking lake shorelines, with undisturbed landform (apart from where the road now is), native shrubs and trees, and short tussock grassland is similarly important. It also allows for shelter, shade and solitude and varying views of the lake

(iv) Woolshed Ridge - West Side and Mason Flats

The west-facing slopes of Woolshed Ridge are highly significant to views from Lake Mason (which lies within the Forest Park) and the hut there. Whilst this area is not generally publicly accessible and the hut is privately owned by the Station, it is a popular area with recreationalists such as anglers (the lake being notably good for fishing), mountain bikers and horse trekkers. The slopes are directly visible from bottom to top, and form one of the main views from the hut, the other view being across Lake Mason to Bell Knoll and the distant Dampier/Puketeraki Ranges on Eskhead Station. The steep, rugged mountainside and mosaic of native vegetation and bare rock form a visually dramatic outlook.

The rolling moraine and outwash surfaces to the east and south and extending up the true left of the South Branch of the Hurunui are also significant visually due to their natural appearance and clarity of the various landforms. They contribute much to the experience of natural high country landscape in this area, particularly the perception of Lake Mason as a remote, natural, high country lake. The rolling to gently sloping terrain, with its dense continuous cover of golden grassland, dotted with mature beech trees in clumps and

individual specimens has a high visual quality, almost park-like in places. Expanses of matagouri/coprosma and manuka scrub, set against the densely forested Crawford Range add to this effect. Masons Stream gully, a narrow, steep-sided gully cut down through the moraine from the lake to the South Branch Hurunui is a strongly-defined natural visual feature and natural process.

(v) Large Basin

A large basin headed by the highest peak on the Woolshed Ridge and just south of the area described above is also considered to have inherently high visual value due to its highly natural and dramatic appearance. It is a large, high, rugged basin with dense beech forest filling its centre.

(vi) Wetland - South Branch Hurunui valley

A large wetland on the floodplain below and just upstream of Munro Saddle is also visually notable. It is visible entirely from the track over the Saddle. It has been modified by grazing but its overall extent and shape seems unchanged and it still retains a natural appearance.

(vii) Gorge - South Branch Hurunui River

Further down the valley, about where the North Esk River enters the South Branch, a highly natural, deep, river gorge feature, overhung with native trees and shrubs, and a visually dramatic and impressive landscape feature.

(viii) Range Tops

The skylines enclosing the South Branch Hurunui River valley, the Hurunui River valley and the Sisters Valley are visually important. The eye is naturally drawn to and along this transition between sky and land.

There are superb views from the top of the Woolshed Ridge/Oronoko Range, taking in the broad valley of the South Branch Hurunui and enclosing ranges. Views into Lake Sumner Forest Park are also possible. An equally stunning view over Lake Taylor to the Nelson Tops of the Main Divide is gained from the track over Munro Saddle. These views are valuable for their visual drama and impact, their panoramic nature, and for the opportunity to interpret and understand the wider landscape particularly its geomorphology.

2.2 Landforms and Geology

The property comprises one major landform type, the mountain range of Oronoko Range-Woolshed Ridge, and minor areas of outwash gravel and river terraces and alluvial fans. The mountain range is a high, steep-sided minor mountain range formed by folding and faulting of sedimentary sand and siltstones (Torlesse greywacke and argillite). It rises from around 500m a.s.l. to nearly 1500m a.s.l. at its highest point. Broad valleys separate it from neighbouring ranges to the west and north (probably caused by down-faulting and enlarged by glaciation) and the narrower river-cut valleys of the South Branch Hurunui and Hurunui River to the

south and east. A low ice-scoured pass separates the range at its north end from the Crawford Range.

Major valley glaciers once filled the base of the two main valleys either side of the Woolshed/Oronoko Range, steepening and sculpturing the sides of the range, particularly at its northern end, forming the smooth, rectilinear mid-to lower slopes. At least two successive ice advances are evident on Lake Taylor – the Poulter and Blackwater. The youngest of the major glacial advances the Poulter advance, between about 13,000 and 16,000 years ago left morainic deposits between Loch Katrine and Lake Taylor, at the north and south ends of Lake Sheppard, and immediately below Lake Mason in the South Branch of the Hurunui. Down-valley from the glacier's terminal extensive outwash gravels were formed when water was abundant with glacial melt and the glacier-eroded material was carried downstream by rivers, building up gravels below the terminal moraines. These outwash gravels form the terraces around the Sisters Stream. Downcutting by rivers followed the retreat of the glaciers, resulting in river terraces on which alluvial fans of more recent origin have been deposited.

Soils are predominantly Tekoa Steepland soils with some Craigieburn and Cass silt loams in the valleys. Most of the lease is classified as Class VII and Class VIII with some Class IV and Class VI land in the valleys and on the northern slopes of the Ranges.

2.3 Climate

The climate on the Station is strongly influenced by the proximity to the main divide and is characterised by a rainfall gradient related to distance from the main divide, prevailing north-west rain-bearing winds and altitude. Precipitation increases from around 1200mm at the Seaward River just downstream from Lake Taylor Station to around 1500mm at the homestead and to 2000mm in the upper valley of the North Branch. At the homestead and further down valley south-westerly winds contribute to this overall rainfall figure. The rain is normally evenly spread throughout the year, although there is a wide seasonal and annual variability from year to year.

On the tops there is usually a brief winter snow cover. Freeze-thaw conditions occur all year round. Most winters are cold with generally cool summers. In summary the climatic conditions are variable and unreliable.

2.4 Vegetation

2.4.1 Vegetation History

McEwen (1987) described the former (pre-European) vegetation of the Lake Sumner Ecological District as predominantly extensive beech forest and alpine plant communities, with "prominent tarn and lakeside communities around the lakes". It is likely that all parts of Lake Taylor Pastoral Lease formerly supported beech forest, except for the high summits, valley floors, and lake and river margins.

2.4.2 Plant Communities

A1 Mountain Beech Forest:

Mountain beech (*Nothofagus solandri* var. *cliffortioides*) forest is the most extensive forest community remaining on the property. It covers a considerable proportion of Woolshed Ridge, parts of the Oronoko Range (especially on the south-facing slopes and incised gullies), and most of the Rough Stream catchment at the southeastern end of the property.

This forest community frequently grades to kanuka or manuka scrub (community B2) or *Coprosma*/matagouri scrub or shrubland (B1), representing areas where vegetation is recolonising after fire. At some low altitude sites it grades to mixed beech forest (A2). At higher altitudes mountain beech forest grades to snow tussockland/herbfield (C4). Otherwise it adjoins areas of grassland (C1 or C3).

The forest **canopy** is dominated by mountain beech (*Nothofagus solandri* var. *cliffortioides*) with the occasional presence of broadleaf (*Griselinia littoralis*). Mistletoe (*Peraxilla tetrapetala*) is also present but rare.
Subcanopy trees include broadleaf, *Coprosma linariifolia,* and occasionally putaputaweta (*Carpodetus serratus*), kohuhu (*Pittosporum tenuifolium*) and lancewood (*Pseudopanax crassifolius*).
Understorey is sparse. Species present include *Pittosporum divaricatum*, mingimingi (*Cyathodes juniperina*), *Coprosma microcarpa, Coprosma linariifolia,* bush lawyer (*Rubus cissoides*), lancewood, three-finger (*Pseudopanax colensoi*) and occasionally korokio (*Corokia cotoneaster*), *Olearia cymbifolia*, *Coprosma propinqua*, *Coprosma parviflora* (sp."t"), *Coprosma rubra* and *Rubus schmidelioides*.
At higher altitudes *Coprosma pseudocuneata*, *Coprosma ciliata*, *Olearia nummularia*, snow totara (*Podocarpus nivalis*), *Gaultheria antipoda,* and occasionally *Olearia lacunosa* and celery pine (*Phyllocladus alpinus*) are present.
Along streams within the forest *Olearia avicennifolia*, *Hebe traversii*, koromiko (*Hebe salicifolia*) and mountain ribbonwood (*Hoheria lyallii*) are occasionally present.
Ground cover is generally sparse. Species present include hawksbeard (*Crepis capillaris*), *Coprosma depressa*, *Ranunculus foliosus*, *Blechnum penna marina*, *Blechnum procerum*, *Asplenium richardii*, *Asplenium flabellifolium*, *Grammitis billardieri*, *Polystichum richardii*, mosses (notably *Dicranoloma robustum* and *Dendroligotrichum dendroides*), orchids (*Chiloglottis cornuta* and *Corybus* sp.), and occasionally *Cyathodes empetrifolia* (in the east), *Hebe canterburiensis*, *Anisotome filifolia*, *Blechnum fluviatile*, *Hypolepis millefolium*, *Histiopteris incisa*, hound's tongue fern (*Microsorum pustulatum*), *Grammitis magellanica* and prickly shield fern (*Polystichum vestitum*).

This forest community is generally in good condition. Feral animals are likely to have caused, and continue to cause, the loss of palatable species such as broadleaf and mistletoe. No significant weed species were observed within the forest.

Mountain beech forest is representative of the vegetation that formerly covered a large part of the ecological district. The most extensive remaining stands on the property are on Woolshed Ridge, contiguous with areas of protected forest on public conservation land. The large forest remnant in Rough Stream is representative of the drier eastern mountain beech forests of the

ecological district. Beech forest is regenerating rapidly at most undisturbed sites, notably on the south-facing slopes of the Oronoko Range.

A2 Mixed Beech Forest:

Mixed beech forest is present at only a few lower-altitude sites on the property, usually at warmer valley floor or lower gully sites. It was observed on the edge of the property near Lake Mason and in the lower reaches of Bull Stream on the eastern side of Woolshed Ridge. Regenerating mixed beech forest was observed on the shores of Loch Katrine.

This forest community grades to mountain beech forest (A1), and occasionally manuka or kanuka scrub (B2).

Dominant **canopy** species are mountain beech (*Nothofagus solandri* var. *cliffortioides*) and red beech (*Nothofagus fusca*), with silver beech (*Nothofagus menziesii*) also present at valley floor sites. Mountain totara (*Podocarpus hallii*) is present in regenerating lakeshore beech forest.
Important **subcanopy** trees are broadleaf, putaputaweta and *Coprosma linariifolia.*
Important **understorey** species are *Coprosma rhamnoides*, *Coprosma microcarpa*, prickly shield fern, and bush lawyer (*Rubus cissoides*).
Ground cover species present appear similar to those found in mountain beech forest, though only two small areas of mixed beech forest were sampled.

The small localised areas of mixed beech forest recorded on the property are representative of a formerly more widespread forest community. The valley floor forest sampled near Lake Mason is very open, presumably as a result of stock pressure and exposure to the wind. The area of red beech forest sampled in lower Bull Creek is in better condition, though is very localised.

The best examples of this forest community in the area are on adjoining lands in the upper South Branch Hurunui River and on the valley floor above Lake Sumner.

A3 Mixed Hardwood Forest:

Mixed hardwood forest is largely confined to riparian sites along river and lake margins on the property. The most extensive areas of this forest community are along the shores of Loch Katrine and along the Hurunui River, though areas of riparian forest that are grazed by Lake Taylor Station along the river appear to lie outside the pastoral lease.

This forest community is present in most areas as a narrow strip of vegetation between the river or lake and shrubland (B1 or B2) or grassland (C1).

Important **canopy** species include kowhai (*Sophora microphylla*), broadleaf, kohuhu, *Coprosma linariifolia*, lancewood, kanuka (*Kunzea ericoides*) and occasionally putaputaweta, mountain ribbonwood and fuchsia (*Fuchsia excorticata*).
Understorey or **forest margin** species include *Olearia avicennifolia*, *Hebe traversii*, matagouri (*Discaria toumatou*), koromiko, mountain wineberry (*Aristotelia fruticosa*), *Coprosma rugosa*, *Coprosma propinqua*, korokio, *Melicytus alpinus*, bush lawyer (*Rubus*

schmidelioides), scrub pohuehue (*Muehlenbeckia complexa*), and occasionally *Coprosma crassifolia* and native broom (*Carmichaelia* sp.). Shining karamu (*Coprosma lucida*) was observed in forest below rock bluffs near Loch Katrine.
Important **ground cover** species include prickly shield fern, tutu (*Coriaria sarmentosa*) and bracken (*Pteridium esculentum*).

This forest is a variable plant community, and is characterised by the dominance of hardwood species other than kanuka or beech. It is vulnerable to disturbance: both natural disturbance such as stream bank erosion, and induced disturbance such as browsing and trampling by stock, especially cattle.

Mixed hardwood forest is representative of the riparian forest communities formerly present alongside most major rivers and lakes in the ecological district. The best examples on the property are on the shores of Loch Katrine. The most extensive areas of this forest, along the main Hurunui River between Sisters Stream and the confluence of South Branch Hurunui River, appear to lie just outside the pastoral lease.

B1 *Coprosma*/Matagouri Scrub/Shrubland:

Coprosma/matagouri scrub is present at scattered mid-altitude locations throughout the property. The most extensive areas are on the valley floor and adjoining colluvial fans of the South Branch Hurunui River. On other parts of the property this plant community is generally confined to gullies and terrace risers (scarps) where it has presumably escaped fires. It is present as dense 1 to 2 m-high scrub in some areas and as a scattered shrubland in other areas.

This plant community most commonly grades to grassland (C1 or C3) or occasionally to other scrub communities (B2 or B4).

The shrubland **canopy** is usually dominated by matagouri (*Discaria toumatou*) with one or more of the following species: *Coprosma propinqua*, *Coprosma parviflora* (sp."t"), *Coprosma rugosa*, tauhinu (*Ozothamnus leptophylla*), *Hebe glaucophylla* and *Melicytus alpinus*. Other species commonly present include *Olearia bullata*, mountain wineberry, korokio, native broom, sweet brier (*Rosa rubiginosa*), bush lawyer (*Rubus schmidelioides*), scrub pohuehue and *Clematis hookeriana*.
Ground cover is as described for grassland communities (C1) with bracken, prickly shield fern, tutu, feathery tutu (*Coriaria plumosa*) and golden spaniard (*Aciphylla aurea*) occasionally present.

This plant community is representative of scrub and shrublands that would have formerly covered recently deposited river gravels on valley floors and colluvial slopes. The best examples of *Coprosma*/matagouri scrub/shrubland are on the river flats of the South Branch Hurunui River and on the valley-floor flats between Lake Taylor and Loch Katrine.

B2 Manuka and Kanuka Forest/Scrub:

Manuka (*Leptospermum scoparium*) and kanuka (*Kunzea ericoides*) dominate two plant community types: dense low scrub; a community that is frequently induced by fire, and a low forest with tall kanuka as the dominant canopy species. Manuka/kanuka scrub covers

relatively extensive areas in eastern parts of the property, notably on the lower slopes of the Oronoko Range. Kanuka forest is present along river and lake margins and on terrace risers.

Both communities grade to grassland (C1 or C3) and to other scrub or forest communities.

Manuka scrub/shrubland:
This is a seral community and ranges from dense manuka scrub to scattered manuka shrubland with open ground. Manuka dominates, with the following species occasionally present: tauhinu, korokio, matagouri and *Olearia cymbifolia*.
The ground cover is similar to that described for grasslands (C1).

Kanuka forest:
The forest **canopy** is dominated by kanuka, with the occasional presence of kohuhu, kowhai or lancewood.
Important **understorey** species are korokio, matagouri, *Coprosma propinqua*, *Coprosma rugosa*, mountain wineberry, *Melicytus alpinus*, *Myrsine divaricata*, *Hebe glaucophylla* and bush lawyer (*Rubus schmidelioides*).
Ground cover species include *Cyathodes empetrifolia*, tutu, prickly shield fern, kiokio (*Blechnum capense*) and bracken.

These two plant communities represent seral scrub and forest that probably formed a relatively minor part of the former vegetation of the ecological district. However these communities will, if undisturbed, eventually regenerate to beech or mixed hardwood forest.

B3 Tauhinu Shrubland on glacial outwash surfaces:

Tauhinu shrubland is present as a scattered plant community on glacial outwash surfaces and between Lake Mason and South Branch Hurunui River, in the western part of the property. It is not an extensive plant community, though is distinct from the other lower altitude scrub or shrubland communities. It grades to the grassland community (C2).

Tauhinu shrubland is also present at scattered locations on eastern parts of the property, and is described as part of *Coprosma*/matagouri scrub/shrubland (B1).

The **dominant species** in this plant community is tauhinu (*Ozothamnus leptophylla*), with scattered fescue tussock (*Festuca* sp.). Occasionally present are matagouri, *Melicytus alpinus*, korokio, *Hebe glaucophylla*, *Dracophyllum uniflorum* and *Olearia nummularia*.
The **ground cover** is dominated by woolly moss (*Racomitrium lanuginosum*), *Raoulia subsericea*, cotton daisy (*Celmisia spectabilis*), blue tussock (*Poa colensoi*), *Leucopogon colensoi*, *Leucopogon fraseri*, *Pimelea* sp. (*sericeo-villosa*?), *Celmisia discolor*, catsear (*Hypochoeris radicata*) and *Pentachondra pumila*. Other species present include browntop (*Agrostis tenuis*), sweet vernal (*Anthoxanthum odoratum*), coral lichen (*Cladia retipora*), *Celmisia gracilenta*, *Brachyglottis bellidioides*, snowberry (*Gaultheria depressa* var. *novae zealandiae*), red woodrush (*Luzula rufa*) and mouse-ear hawkweed (*Hieracium pilosella*).

This plant community is probably representative of the slow shrubland development that occurs on harsher infertile sites in this part of the ecological district. It is likely that it is a seral community, though the transition to scrub or forest may be quite slow.

Tauhinu shrubland on poorer soils, such as the Lake Mason moraines, was not observed elsewhere on the property and it is likely to be relatively uncommon in the ecological district.

B4 Mid Altitude Mixed Scrub/Shrubland:

Mid-altitude mixed scrub/shrubland is present at scattered locations throughout the property, but most commonly on the mid to upper slopes of the Oronoko Range. It generally occupies gullies or sites on shaded slopes where it is less vulnerable to fire. It grades to mid-slope grassland (C3) and, at its upper margin, to tussockland/herbfield (C4).

Dominant shrub species are *Dracophyllum uniflorum*, tauhinu, matagouri, *Hebe glaucophylla* and *Coprosma rugosa*. Occasionally present are *Dracophyllum longifolium*, manuka, *Hebe pinguifolia* and slim snow-tussock (*Chionochloa macra*).
Other **important species** are golden spaniard, fescue tussock, bristle tussock (*Rhytidosperma setifolium*), blue tussock, *Raoulia subsericea*, *Gaultheria crassa* and cotton daisy.

Mid-altitude scrub/shrubland is a seral community, representing a transition from grassland to forest. Its component species are common in the area, and mostly present in other plant communities. The plant community is representative of mid-altitude seral shrublands in the ecological district.

B5 High Altitude *Dracophyllum* Scrub/Shrubland:

Dracophyllum scrub/shrubland is present at higher altitude sites, at or about the upper forest margin. It dominates at high altitude sites formerly occupied by mountain beech forest, especially sites that have escaped recent burning. This plant community is most extensive on the upper slopes of Woolshed Ridge, and also present on parts of the Oronoko Range. It usually grades at its lower margin to mountain beech forest (A1) and at its upper margin to high altitude tussockland/herbfield (C4).

Dominant species are *Dracophyllum uniflorum*, *Dracophyllum longifolium*, *Dracophyllum* aff. *filifolium* (?), *Hebe pinguifolia* and slim snow-tussock. Also occasionally present are snow totara, tauhinu, golden spaniard, *Hebe rakaiensis*, *Hebe lycopodioides*, *Gaultheria crassa, Olearia nummularia* and *Coprosma pseudocuneata.*
Important **ground cover** species are *Dracophyllum kirkii*, *Coprosma perpusilla*, *Coprosma cheesemanii*, *Melicytus alpinus*, blue tussock, cotton daisy, tutu, *Raoulia subsericea*, *Pentachondra pumila* and woolly moss. Other species present include *Anisotome aromatica*, *Leucopogon fraseri*, *Pimelea oreophila*, *Pimelea traversii*, red woodrush, *Brachyglottis bellidioides*, *Lycopodium fastigiatum*, *Blechnum penna marina*, *Exocarpus bidwillii*, *Helichrysum bellidioides* and harebell (*Wahlenbergia albomarginata*).

This plant community is representative of subalpine scrub/shrublands in the ecological district. On the property it may even be present over a larger area than it formerly occupied, as it has successfully colonised upper-montane sites that formerly supported mountain beech forest.

C1 Valley Floor Grassland:

Valley-floor grassland occupies recent alluvial surfaces throughout the property. It is most extensive on the river flats of the South Branch Hurunui River, on flats between Lake Taylor and Loch Katrine, and on the terraces along the Hurunui River, but is present at other lower altitude sites throughout the property. This plant community is variable, depending on location, rainfall and drainage. It adjoins all other low and mid altitude plant communities and its component species are frequently present in other plant communities.

These grasslands generally comprise a dense **sward of pasture grasses** (sweet vernal, Yorkshire fog and browntop) **with the following species**: creeping pohuehue (*Muehlenbeckia axillaris*), *Raoulia subsericea*, woolly moss, *Leucopogon fraseri*, snowberry, *Helichrysum filicaule*, *Geranium sessiliflorum*, mouse-ear hawkweed, white clover (*Trifolium repens*), harebell, sheep's sorrel (*Rumex acetosella*), *Brachyscome sinclairii*, *Anisotome aromatica*, *Celmisia gracilenta*, catsear, *Blechnum penna-marina*, *Polytrichum juniperinum*, red woodrush, *Myosotis arvensis*, *Brachyglottis bellidioides*, *Scleranthus uniflorus*, *Pimelea* sp., *Coprosma petriei* and *Coprosma perpusilla*.
Scattered through this pasture, in varying densities, are fescue tussock, silver tussock (*Poa cita*), blue tussock, bristle tussock, bracken, Scotch thistle (*Cirsium vulgare*), matagouri, korokio, sweet brier and occasionally tutu.

This plant community has been substantially modified by the establishment of introduced pasture species and by the grazing of domestic stock, especially cattle. Stock continue to modify this community through grazing, tracking, and pugging. Fire may also have influenced the distribution of this plant community. Changes to the course of the rivers during flooding is a natural influence that continues to affect the distribution of this community.

It is representative of valley floor grassland communities that are present, usually in a modified condition, at sites throughout the ecological district.

C2 Grassland/herbfield on glacial outwash surfaces:

This grassland/herbfield community is present on infertile glacial outwash surfaces. It has similar component species to the valley floor grassland community, but is distinguished by the dominance of certain species. It was sampled near Lake Mason and on glacial outwash surfaces between Lake Taylor and Loch Katrine. It frequently grades to tauhinu shrubland (B3) or matagouri scrub (B1).

Dominant species are woolly moss, *Raoulia subsericea*, cotton daisy, blue tussock, *Leucopogon colensoi*, *Leucopogon fraseri*, *Pimelea* sp. (*sericeo-villosa*?), *Celmisia discolor*, catsear and *Pentachondra pumila*. Other species present include browntop, sweet vernal, coral lichen, *Celmisia gracilenta*, *Brachyglottis bellidioides*, snowberry, red woodrush and mouse-ear hawkweed.

This plant community is representative of grassland/herbfield that was formerly present on infertile valley floor sites, such as moraines. It is modified by the presence of introduced

grassland species but still retains a dominance of native species. It is probably the most intact lower-altitude grassland community remaining on the property.

The best example of this plant community is on the glacial outwash surfaces between Lake Mason and the South Branch Hurunui River.

C3 Mid-Slope Grassland:

Mid-slope grassland is one of the most widespread and variable plant communities on the property. It is an induced community and covering montane sites that formerly supported beech forest.

These grasslands are dominated by Yorkshire fog (*Holcus lanatus*), sweet vernal, browntop, blue tussock, bristle tussock and fescue tussock. They are similar in composition to the valley floor grasslands described above, but with a greater component of fescue tussock and bristle tussock, and with the following **additional species**: *Elymus rectisetus*, *Pimelea oreophila*, *Gnaphalium luteo-album*, *Plantago spathulata*, golden spaniard, *Gaultheria crassa*, *Kelleria dieffenbachii*, and occasionally slim snow-tussock. Woody species frequently colonising this plant community include matagouri, manuka and tauhinu.

This plant community has been induced, and is maintained, by regular burning and continued grazing. It occupies sites that formerly supported forest, and would eventually regenerate to shrubland and then forest if undisturbed. These grasslands are not representative of the original vegetation of the ecological district, but have high potential for the restoration of shrubland and forest through natural regeneration.

C4 High Altitude Tussockland/Herbfield:

High altitude tussockland/herbfield occupies sites above or near the natural timberline on Woolshed Ridge and the Oronoko Range. It frequently grades to high altitude scrub (B5), rockland (D) or, at modified sites, to induced grassland (C3).

The community is **dominated by** slim snow-tussock (*Chionochloa macra*) with varying densities of bristle tussock, fescue tussock, blue tussock and *Raoulia subsericea*.
Other important species include *Hebe lycopodioides*, *Pratia macrodon*, cotton daisy, snowberry, *Phyllachne colensoi*, woolly moss, *Kelleria dieffenbachii*, *Lycopodium fastigiatum*, harebell, *Pentachondra pumila*, *Pimelea oreophila*, *Coprosma cheesemanii*, *Celmisia sessiliflora*, *Celmisia angustifolia*, *Raoulia grandiflora*, *Helichrysum bellidioides*, *Anisotome aromatica*, *Anisotome flexuosa*, and red woodrush.
Woody species, such as *Dracophyllum uniflorum*, tauhinu, snow totara and *Dracophyllum kirkii*, are often present.

This plant community is representative of tussocklands that formerly occupied high altitude sites. At most sites the community is somewhat modified by the presence of introduced species.

D1 Rock Ridge, Pavement, Bluff and Scree:

These communities are present on Woolshed Ridge and the Oronoko Range, particularly on exposed or eroded ridge crests, spurs and bluffs. They only cover a relatively minor proportion of the property. Several distinct plant communities are present, though they are generally characterised by the following species.

Rock ridge and pavement:
This is a variable and relatively minor community. It frequently grades to high altitude tussockland and herbfield (C4), or montane scrub or grassland communities. Typical species include *Hebe pinguifolia*, edelweiss (*Leucogenes grandiceps*), woolly moss, *Kelleria dieffenbachii*, blue tussock, *Poa novae-zelandiae*, *Acaena glabra*, *Helichrysum intermedium*, *Heliohebe raoulia*, *Colobanthus acicularis*, *Vittadinia australis*, *Pimelea traversii*, red woodrush, and sheep's sorrel. Vegetable sheep (*Raoulia bryoides*) were observed at the eastern end of Woolshed Ridge.

Rock Bluff:
Most rock bluff communities on the property are montane or low alpine (subalpine) and cover a relatively small area. Typical species present include: *Hebe cheesemanii*, *Helichrysum intermedium*, golden spaniard, red woodrush, bristle tussock, *Geranium sessiliflorum*, *Brachyglottis bellidioides*, *Pyrrosia eleagnifolia*, *Asplenium terrestre*, *Pimelea traversii*, *Heliohebe raoulia*, *Exocarpus bidwillii*, *Hebe pinguifolia*, snow totara, cotton daisy and *Leucopogon fraseri*.

Scree:
Screes are poorly developed on the property; there are no extensive screes and all small screes surveyed were relatively stable. Important species present include: *Epilobium pycnostachyum*, *Wahlenbergia cartilaginea*, creeping pohuehue, *Geranium sessiliflorum*, *Blechnum penna marina*, sheep's sorrel and *Myosotis* sp.

D2 Riverbed:

There are no extensive areas of riverbed on the property. Smaller areas of riverbed edge and stream bed are present, mostly in the South Branch Hurunui valley.

This community comprises a sparse plant cover (c.10% cover) with the following **common species** *Raoulia tenuicaulis*, *Raoulia haastii*, *Raoulia australis*, *Epilobium melanocaulon*, creeping pohuehue, *Parahebe decora*, *Colobanthus strictus*, harebell, sheep's sorrel and suckling clover (*Trifolium dubium*).

This plant community is representative of the former plant communities on recently-deposited gravel. It is relatively intact, though vulnerable to invasion by a range of herbaceous and woody introduced species.

E Wetland and Turf:

The most extensive areas of wetland and turf on the property are those on the valley floor beside the South Branch Hurunui River. Smaller areas of wetland are present in moraine

hollows near Lake Mason, on the valley floor between Lake Taylor and Loch Katrine, on terraces along the North Branch Hurunui River, and along the upper reaches of Old House Gully Stream. The extensive wetland areas along Sisters Stream are not on the property.

Important species in **wetland communities** include *Carex virgata*, *Carex secta*, *Carex coriacea*, *Carex pyrenaica* (?), *Juncus articulatus*, soft rush (*Juncus effusus*), *Schoenus pauciflorus*, *Uncinia* sp. *Bulbinella angustifolia*, flax (*Phormium tenax*), toetoe (*Cortaderia richardii*), *Blechnum minus*, *Nertera scapanioides*, *Mimulus moschata*, *Myosotis discolor*, *Ranunculus glabrifolius*, Yorkshire fog, selfheal (*Prunella vulgaris*), *Sagina procumbens*, *Epilobium chionanthum* and *Linum catharticum*.

Important species in **turf communities** include *Leptinella dioica*, *Coprosma perpusilla*, *Gnaphalium traversii*, *Celmisia gracilenta*, *Hypsela rivalis*, *Sagina procumbens*, *Hydrocotyle tripartita*, *Polytrichum juniperinum*, *Ranunculus glabrifolius*, *Carpha* sp., browntop and white clover. Lake shore turfs are dominated by *Leptinella squalida*, *Acaena caesiiglauca*, *Scleranthus uniflorus*, *Gonocarpus micranthus*, *Crassula peduncularis*, suckling clover, and selfheal.

All wetland communities observed were modified by the presence – an in some cases the dominance – of introduced species. The wetland areas near the South Branch Hurunui River are substantially modified by domestic stock, though may recover if fenced from cattle. The relatively extensive areas of turf in that area appear to be more resilient, though have suffered from trampling by cattle.

Small wetland areas along upper Old House Stream and on the North Branch Hurunui River terraces just above the confluence of Rough Stream are in better condition.

2.4.3 Introduced Plants

Naturalised plants that have a potentially significant effect on indigenous plant communities on the property, and that can be controlled or contained, are listed and discussed below. Other ubiquitous naturalised species for which containment of control is probably impractical, such as mouse-ear hawkweed and naturalised grasses, are not discussed here but are listed in the vegetation descriptions.

Wilding conifers

Wilding conifers (*Pinus* spp.) are present as scattered trees on the northwestern slopes of Dog Hill, above upper Old House Gully Stream. Eradication of this infestation would be feasible. Other infestations are possibly present in the vicinity of Lake Taylor Homestead.

Broom (*Cytisus scoparius*)

Broom poses the most serious threat of any woody weed species on the property. There are extensive infestations of broom along the North Branch Hurunui River and the lower part of the South Branch Hurunui River. Broom infestations on the property are relatively minor due to previous control efforts. The continued containment of broom is a key management issue.

Eradication of broom from the area is unlikely to be feasible. However, containment to prevent any further spread of broom onto the property is feasible and probably essential.

Sweet brier (*Rosa rubiginosa*)

This species is present as scattered plants in most eastern parts of the property, usually within shrubland communities. It does not appear to be aggressive in this area; control is probably not necessary or justified.

Gorse (*Ulex europaeus*)

Gorse was observed only as a localised infestation on the toe slopes of the Oronoko Range just west of Lake Taylor Homestead. However, it is possibly present elsewhere on the property. Eradication of the observed infestation is feasible.

Hawthorn (*Crataegus monogyna*)

Hawthorn was observed at two locations on the property: Old House Gully; and, in the lower part of the South Branch Hurunui River (just above the confluence of the North Branch Hurunui River). This species poses a significant threat to the eastern part of the property, as its seeds can be carried considerable distances by birds. Removal of existing infestations is probably feasible, so containment or control of this species is possible provided the seed sources are located and removed.

2.5 Fauna

2.5.1 Birds

The following bird species have been observed on the property (listed in alphabetical order):

bellbird	throughout
black swan	Lake Mason
blackbird	throughout
brown creeper	throughout
chaffinch	throughout
fantail	throughout
grey warbler	throughout
kakariki (parakeet)	throughout (in good numbers)
karearea (NZ falcon)	Oronoko Range
kea	throughout
magpie	Oronoko Range
morepork	Lake Mason Hut
paradise shelduck	South Branch Hurunui River
pied stilt	Lake Mason
redpoll	throughout
rifleman	throughout
skylark	Oronoko Range/Woolshed Ridge
song thrush	throughout

South Island robin	Lake Mason/Woolshed Ridge area
South Island tit	throughout
spur winged plover	Lake Mason area

weka have been recorded in the Loch Katrine area (Geoff Spiers, DOC, *pers.comm.*)

2.5.2 Invertebrates

There are four notable invertebrate communities on the lease. They are the Mason Stream Area, Sisters Stream, a wetland in the South Branch and the Woolsheld Ridge and Oronoko Range.

Mason Stream Area: This area of short tussock grassland and old glacier terminal moraine is south of the two lakes of Mason and on the true right of Mason Stream. The common insects species were well present here: *Phaulacridium marginale* (a lowland grasshopper), *Lycaena* complex (Copper Butterflies), Black Field Cricket, andCicada.

This area was also rich in fauna of Odonata (Dragonfly and Damselfly) as four species were found within the area - *Uropetala chiltoni* (Mountain Giant Dragonfly), *Xanthocnemis zealandica* (Redcoat Damselfly), *Procordulia grayi* (Yellow Spotted Dragonfly) and *Austrolestes colensonis* (The Blue Damselfly). Several diurnal (day time) moths were seen flying over the open ground and thirteen species of moths were recorded from the light trapping.

Mason Stream was in good condition with a variety of habitats (runs and riffles) and substrate (fine and coarse gravel with some large rock throughout the stream bed). Species of damselflies, stoneflies, caddisflies and mayflies were all seen near the stream.

Sisters Stream: Sisters Stream follows the northeast boundary of the pastoral lease for only a short time before flowing into the main Hurunui River. The stream is fast flowing, with a variety of habitats (runs and riffles) and substrate (fine and coarse gravel). The stream is in very good condition with wetland vegetation for 10 to 20m from both sides of the stream.

Because of the good condition and the vegetation along the stream, this section of the stream is a key section for breeding and refuge for the aquatic insects.

Wetland of the Hurunui River South Branch: on the true left of the Hurunui River South Branch upstream of Munros Saddle.

The area was rich for Odonata, three species being found *Xanthocnemis zealandica* (Redcoat Damselfly), *Procordulia grayi* (Yellow Spotted Dragonfly) and *Austrolestes colensonis* (The Blue Damselfly). There were several dryer open pan located near this wetland. These areas are also very rich for diurnal Lepidoptera (Moths and Butterflies) community, with five species of diurnal moths collected. The Copper Butterflies (*Lycaena* sp.) were in large numbers also.

Woolshed Ridge and Oronoko Range: Ninety percent of the pastoral lease is made up of both the Woolshed Ridge and Oronoko Range. Woolshed Ridge is the highest point on the lease.

Native forest remnants are found throughout both Woolshed Ridge and Oronoko Range (see Forests remnants for more detail) and hold good invertebrates communities.
Three species of grasshopper were found on Woolshed Ridge and Oronoko Range, *Phaulacridium marginale, Brachaspis nivalis* and *Paprides 'furcifer'* (Morris, Database unpublished). The moths *Asaphodes clarata, Hydriomena deltoidata* and *Utetheisa pulchelloides*) were all recorded from Woolshed Ridge

Forests Remnants: The ground cover within the steep forested slopes are in good condition, providing deep leaf litter and suitable living habitat for ground living invertebrates. Five or six carabid (Ground Beetle) species were collected. Most carabid beetles species are predator, living under logs in the bush during the day and emerging at night to search for small invertebrates.
One species of Stag Beetle was also collected. Both beetles and larvae live and feed on decaying wood and can be found together under or in dead logs. Other wood boring insects were seen, which indicate a very rich native boring invertebrates community.

Many other invertebrates were observed in this area:- Cockroaches, Earwigs, Darkling beetles, Crane Flies, Weevils Click Beetles and ants. They are all indications of a good functional community dominated by native insects.

Other observations: Three species of grasshopper were found on the pastoral lease. On the lowland the grasshopper *Phaulacridium marginale* is common throughout the lease. The other two species are alpine species *Brachaspis nivalis* and *Paprides 'furcifer'*. The grasshopper *B. nivalis* lives on scree and a record of this species on the Woolsheld Ridge is on its most eastern range of it distribution (Morris, Database unpublished).

Four species of Caddisflies (Psilochorema bidens, *Psilochorema tautoru, Philorheithrus lacustris* and *Pycnocentria sylvestris*) were found on the pastoral lease. They are all endemic to the South Island and are commonly found throughout. The caddisfly *Pycnocentria sylvestris* was recorded for only the second time on the eastern side of Alpine Fault Line. All the other records east of the Alpine Fault Line are around Cass, Craigieburn Range.

2.5.3 Introduced Animals:

Red deer (*Cervus elaphus scoticus*)

Red deer sign was observed on most parts of the property, notably in beech forest and at the western end of the Oronoko Range. This species appears to be present in reasonable numbers.

Feral pig (*Sus scrofa*)

Pig sign was observed in lower Rough Stream, upper Rough Stream and at the western end of the Oronoko Range. Pigs are likely to be present at other locations on the property.

Brushtail Possum (*Trichosurus vulpecula*)

Possums and possum sign were observed at several locations throughout the property. This ubiquitous species is likely to be widespread in the area.

Other introduced animals include chamois, hares and rabbits/

2.6 Historic

The route through the Hurunui Gorge and over the saddle at the top of the Hurunui River was used frequently by Maori to traverse between the east and west coasts searching for greenstone. In 1857 Leonard Harper (son of the Bishop) and M. Locke, accompanied by Ihaia Tainui and two other Maoris, were the first Pakeha to cross the divide and the pass became known as Harpers Pass. When gold was discovered on the West Coast in the 1860s miners were lured across the divide using both the route through the Hurunui Gorge from Canterbury and the Kiwi Saddle route from Marlborough and Nelson. Enterprising Canterbury farmers drove thousands of head of stock through the Harpers Pass route to feed the hungry gold miners. All along the way accommodation houses sprung up, one of which was close to the eastern end of Lake Taylor.

Land was first taken up for grazing in 1855 when J.W. Mallock and E. Mason applied for "20,000 acres (8093 hectares) situated between the north and south branches of the Hurunui River, and bounded to the west by the Snowy Mountains" (Cresswell, 1952). H. Taylor and Mason took up land in 1857 and, although there is some confusion over who had what initially, the land was then subdivided into two blocks. The subdivision fence ran between the Oronoko Range and the Woolshed Ridge across the north end of Conical Hill and from Lake Mary to the Hurunui River at the south end of the Brothers Range. To the west of the subdivision was "Lakes Station" run by Taylor and Mason with a homestead above Lake Sumner.

After Taylor's death in 1868 Archdeacon Mathias's sons (G. and V.M.) farmed Lakes Station until 1880 when it was sold to W. Parkenson. When Parkenson acquired the land to the east of the subdivision in 1885 the runs were amalgamated. In 1918 the Crown subdivided the property again, this time along east-west lines. Lake Taylor Station, to the south of the new subdivision, was created and farmed by the Munro family until 1952. C.A. Nurse took on the lease in 1952 after being involved with The Lakes Station. Today Mr Nurse's daughter and son-in-law run the property.

2.7 Public Recreation

2.7.1 Physical Characteristics

As Lake Taylor is predominantly semi-natural grasslands under extensive grazing and is accessible by roads, off-road vehicles and foot tracks it would be mainly within an "open space" recreational experience zoning (FMC guidelines),

According to the Department of Conservation's recreation opportunity descriptors Lake Taylor has the primary characteristics of a back-country environment – primarily "4 x 4 drive

in". This means that the property is a modified environment but one that is generally dominated by natural vegetation or landscapes and is natural looking. It is accessible to all terrain vehicles and is traversed mainly by ungravelled roads, or 4 x 4 access. Obvious elements of modification include roads and areas of farming or forestry.

2.7. 2 Legal Access

The Lake Sumner Road borders the lease on its eastern and northern boundaries. The road mainly follows the legal roadline and is a well-maintained gravel road as far as Lake Taylor. Around Lake Taylor the road is rough and suitable only for 4wd vehicles. Between Lake Taylor and Loch Katrine the road has recently been upgraded but from Loch Katrine onwards the road is very rough. A locked gate close to the northwestern corner of the lease prevents further access up the road apart from users who obtain permission from the Department.

A legal roadline also crosses the northeastern corner of the lease, presumably following the old coach road. There is little sign of the old formation however. Marginal strips follow both branches of the Hurunui River and there are marginal strips around Lake Taylor and Lake Mason.

2.7.3 Activities

A wealth of recreational activities is carried out on, or immediately adjacent to, the lease.

Access is gained across the lease to the Hurunui River for kayaking and rafting. A campground with a toilet has been provided on the lease particularly for river users. At Lake Taylor there is a recreation reserve managed by the Department of Conservation immediately adjacent to the lease. Camping is allowed on the reserve and it is a popular area for water sports. Motor bike riders based at the reserve can cause problems on the lease. Further around the lake there is a bach on the lake edge, which seems to be there at the pleasure of the lessee.

Fishing is a popular activity on the river and around the lakes. Access to Lake Mason is with the permission of the lessee. The track across Munro's Saddle from Lake Taylor to the south branch of the Hurunui River and to Lake Mason is also popular with trampers, mountainbikers and horseriders, both commercial and private. The lessee uses a locked gate to control the use of the track. The lessee owns a hut at Lake Mason, which is used for farming purposes and by recreational users.

Hunting on the property is also undertaken with the permission of the lessee. Hunting, tramping, mountainbiking and horseriding are carried out in conjunction with the use of adjacent Conservation Areas and The Lakes Crown Pastoral Lease.

PART 3

CONSULTATION AND OTHER PLANS

3.1 Consultation

At an early warning NGO meeting in Christchurch on 12 December 2000 the following comments were made:

- Mountainbiking access across Munro's Saddle from Lake Taylor to Lake Mason would be good. Extending the track to create a circuit through The Lakes Station would also be an excellent asset.
- The Munro's Saddle track is also important for tramping and 4wd access for fishing and hunting.
- The highest values on the property are from the edge of Lake Taylor through to Loch Katrine, including the flats. It is an outstanding landscape in the District Plan.
- The wetlands/matagouri/ shrublands in the corner of the lease near Lake Mason are very important.
- There is a concern that broom is encroaching on the area from the South Hurunui.

A comprehensive written submission from the Federated Mountain Clubs of New Zealand (Inc) recommended that most of the high land on the Woolshed Ridge and two-thirds of the Oronoko Range be allocated to the public estate. Land to the east of upper Lake Mason was recommended for protection. The submission recommended that the flat on the North Hurunui opposite Jolliebrook Stream be made a Recreation Reserve. Easements recommended included one across Munros Saddle to Lake Mason for foot, horse and mountainbike use and one up Old House Gully for foot access to the Oronoko Range.

3.2 District Plans (Matters of National Importance)

Lake Taylor Station is in the Hurunui District. The proposed Hurunui District Plan was notified in 1995 and was modified by decisions on submissions, minor amendments and Environment Court Determinations to November 2000. The Hokakura (Lake Sumner) and Hurunui Catchment, which includes the lease, is recognised as an area of outstanding landscape value (subject to reference). As an outstanding landscape area earthworks (including the construction of roads or tracks but excluding tracks providing foot access) shall be limited to cumulatively less than $1000m^3$ within any three year period. Clearance of indigenous vegetation (including by burning) shall be limited to clearance for (i) maintenance or construction of foot access less than 3 metres wide and (ii) maintenance of existing drains, ponds and vehicle tracks. There is also a restriction on the visibility of buildings from the Lake Sumner Road.

The outlet of Lake Mason is recognised as a significant natural site and there are a number of rules associated with this recognition including:

- No feature, tree or vegetation shall be damaged, removed or destroyed except for exotic vegetation.

- Any work or activity undertaken in accordance with a relevant Reserve Management Plan, covenant or other method of formal protection is permitted.
- Any new planting, habitat restoration or enhancement work shall use locally occurring indigenous plant species, soil and rock.

The application of this rule will only apply for a period of two years.

The Hurunui Lakes Area is recognised in the plan as an environment of special concern and an objective is outlined for this area being "the maintenance and enhancement of the natural values of the Hurunui Lakes Area while providing for compatible activities". There are a number of policies associated with this objective that are relevant to the lease:

- To protect the special features of the Hurunui Lakes Area, including its natural landscape, ecological and habitat values and recreational amenity values from adverse effects.
- To promote the integrated and consistent management of the Hurunui Lakes Area.
- To avoid or mitigate the adverse effects of increased public access by providing for rubbish disposal and toilet facilities throughout the Hurunui Lakes area.

3.3 Conservation Management Strategies

Lake Taylor is in the Hurunui Unit of the Canterbury Conservation Management Strategy. The strategy includes a separate section on the Lake Sumner Forest Park and Hurunui Lakes Management and the objectives for this section are:

To manage the natural and historic resources and recreation values of Lake Sumner Forest Park.

To advocate to avoid adverse effects on the remote character and ecological values of the Hurunui lakes area.

In implementing the objectives the Conservancy will:

1. Support the findings of the Hurunui Lakes Working Party, which recognise the area's semi-wilderness and high ecological values.
2. Maintain a network of public recreation facilities, including tracks, huts, toilets and bridges.
3. Advocate to the Hurunui District Council for methods that avoid, remedy or mitigate the adverse effects of off-road vehicles on natural and historic resources and recreation values.
4. Liase with The Lakes, Lake Taylor, Esk Head and Poplars Stations over management issues in the area.

PART 4

4.1 Maps

Landscape Context map 1 & Landscape Units map 2
Cadastral
Values

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