
Conservation resources of St James Pastoral Lease, Canterbury

Department of Conservation, Canterbury Conservancy, Pastoral Lease tenure review report to Knight Frank Limited

January 13, 1998

PART 1 - INTRODUCTION

1.1 St James

St James pastoral lease consists of 76,550 ha of land in the north-western corner of the Canterbury Conservancy. It is on average 25 km across (east to west) and 35 km long (from north to south). It includes the headwaters of two major river valleys - the Waiau and Clarence Rivers, and four mountain ranges - Spensers, St James, Opera and a small part of the Crimea Range. The altitude ranges from 540m (1850 ft) in the lower Waiau to Mt Una at 2,300m (7550 feet) with 8 other peaks over 2,100m (7,000 feet), all in the Spenser Mountains.

Land adjoining to the north-west is Lewis Pass National Reserve, to the west and south-west Lake Sumner Forest Park, to the south Glenhope Pastoral Lease, to the north is Nelson Lakes National Park, to the north-east Conservation land in the Paske River (formerly Rainbow Station) to the east Molesworth Station and to the south-east Hamner Forest Park.

The property lies across three ecological districts - Lewis, Balaclava and a small part of Miromiro. The Balaclava Ecological District was surveyed as part of the Molesworth Ecological Region PNAP survey during the summer of 1987/88 (Courtney and Arand 1994). Six whole RAPs and part of one other were identified on St James pastoral lease during the survey. They are BAL (for Balaclava) 2 Belvedere (3520ha), BAL 8 Edward-Muntz (partly on Molesworth, approx. 2000 ha on St James), BAL 10 Fowlers-Duncans (1915 ha), BAL 11 Glenrae (317 ha), BAL 12 Guyon-Stanley (3872 ha), BAL 17 Muddy (3410 ha), BAL 22 Tennyson (1134 ha), a total area of 16,168 ha.

Within the boundary of St James there are three other land tenures - scenic reserve, freehold and Crown Land. The two scenic reserves - Lake Guyon (66 ha), and Lake Tennyson (239ha) cover the lake beds only. There are two areas of freehold - one around Ada Homestead (Ada Flat) at the junctions of the Ada and Waiau Valleys, made up of 3 sections totalling 1127.44 ha, and the second around Stanley Vale/Lake Guyon consisting of 2 sections totalling 372.5 ha. The two pieces of Unoccupied Crown Land are in the southern quarter of the property - one in the lower Waiau near the footbridge (22.44 ha); another near the confluence of Edwards and Cow Streams (18.86 ha).

PART 2 - CONSERVATION RESOURCE DESCRIPTION

2.1 Landscape

St James Station encompasses the formerly glaciated headwaters of the Waiau and Clarence Rivers. It lies in the middle of a large tract of Crown Land which extends almost continuously at this latitude from the Tasman Sea to the Pacific Ocean. To the west and north these Crown Land areas are protected in National Reserve or National Park. To the east are large areas of pastoral lease and Crown Land leased for farming (Molesworth Station). Bordered by these land uses, and high mountains the property has remained relatively unmodified and isolated.

The majority of the property is characterised by steeply rising range and valley topography with pastoral land use and development occurring primarily on the valley floors of the Clarence and Waiau Rivers and their major tributaries, along with the more accessible and warmer side-slopes. It includes large areas dominated by natural features and processes, virtually unmodified by land use practices or, if modified, are regenerating. As a result the property is predominantly natural in landscape character.

Within short distances the property displays considerable diversity. In the north and west, the mountains are high, have very steep side-slopes with areas of permanent snow, and characteristic glacial landforms such as cirque basins, tarns, hanging valleys and arete ridges. The natural vegetation sequences of beech forest and alpine tussockland are virtually unbroken. In the south and east the mountain ranges are lower (mainly under 1800m) with glacial landforms resulting from older ice advances less well defined. These landforms have been modified more recently by glacio-fluvio processes resulting in more pronounced river terracing, alluvial fans and floodplains. Side-slopes, while still steep, are more rounded. The vegetation is a mixture of scrub and tussock with isolated forest remnants, resulting from past fires modifying natural sequences.

Each of the two main river valleys, the Waiau and the Clarence have a character different from the other as a result of their geomorphology, elevation, climate and vegetation. The Waiau valley floor appears relatively confined because of the greater vertical difference between the tops of the mountains and the valley floors compared with the Clarence. Unlike the Clarence valley, much of the vegetation of the upper Waiau mountain slopes is in original forest cover. As the upper Waiau begins to open out south of the Ada River, the loss of forest cover and the replacement by shrublands become apparent on both sides of the river.

The Canterbury Regional Landscape Study (by Boffa Miskell and Lucas Associates, 1993) identifies the entire property as outstanding as the area is one of the best examples of the classic mountain range landscapes within the region.

2.2 Geology and landforms

The basement rocks on St James are greywacke and argillite. A tectonic zone with basic volcanics runs in a northeast-south-west direction between the Ada and Waiau Rivers, north and south of Mt Stanley, near Malings Pass, and near Red Hill (Timms Stream). Valley floors and major basins are covered in till and outwash gravels of Otiran and Waimean Age with some areas of post-glacial alluvial and landslide deposits.

The landforms on St James are strongly influenced by glacial, fluvial, and tectonic processes.

- *Glacial* - Landforms resulting from glacial activity are well defined in the north-western sections of St James. The upper Clarence and the Waiau River valleys are classic U-shaped glacial valleys with very steep and bluff side-walls, cirques at the heads of side valleys, arete ridges, hanging valleys, tarns and associated waterfalls.

In both the Waiau and Clarence River valleys moraines have been deposited over several glacial periods. Some of the more obvious are around Lakes Tennyson and Lake Guyon, both moraine dammed lakes occupying formerly glaciated valleys. The moraines at Lake Tennyson are south of the lake and are a series of arc-shaped loops with intervening hollows. At the southern end of Lake Guyon, a terminal moraine blocks the lake, and at the northern end a younger lateral moraine from the Waiau glacier dams the other end of the lake. Other much older moraines have been deposited around the Edwards/Peters Pass area, in the Henry just west of Delta Stream and in the Waiau about where the Henry River flows into the Waiau around the Downs and Muddy Lakes.

In the Opera and St James Ranges glacial features are less obvious - cirques are only weakly-developed with occasional small tarns at high altitudes, and some older glacial advances have left minor moraines at lower altitudes with ice-moulded slopes along the mid Waiau valley.

- *Rivers/fluvial activity* - the lower sections of the Waiau and Clarence are v-shaped, reflecting river rather than glacial processes. Terracing is common on the Clarence and Waiau and the main tributaries, with alluvial fans from side-streams a common feature in the Waiau valley.
- *Faults* - There are a number of areas on St James where tectonic landforms are a feature. The main trace of the Awatere fault crosses Lake Tennyson, Princess Stream, Malings Pass and down into the Waiau Valley through to the head of the Ada. Earth movements and quakes along the fault have displaced the lateral moraines west of Lake Tennyson and probably triggered the landslide on the eastern slopes of Mt McCabe.

The Clarence Fault crosses the property in a east-west direction along the Edwards valley and part of the lower Waiau. The fault zone is marked by a

fault trace, fault-tilted terraces, offset stream terraces and fans, small fault scarps, fault depressions with associated wetlands, sag ponds and a low relief fault pass (Edwards Pass).

Around Fowlers Pass - and through to Lake Guyon is a minor transcurrent fault between the Clarence and Awatere Faults marked by scarps on the true left of Pass Stream.

2.3 Climate

The prevailing wind on St James is northwesterly, which usually brings rain and sometimes snow to the northwest and western parts of the property. As a consequence there is a strongly developed rainfall gradient from around 5,000 mm in the north-west around the tops of the Spencer Mountains to 1750 mm at Jacks Pass and Edwards Valley/Clarence Valley in the south-east. Occasional southwest fronts also bring rain, and frequent snow in winter, although snow may fall any time of the year.

In the lower Clarence around Peters Stream the climate is continental-like with warm summers and cold winters. Being in the relative rainshadow of the western ranges the area has high sunshine hours but frosts probably exceed 150 per year. These decrease significantly in the west and north-west.

2.4 Vegetation

2.4.1 Introduction

Because of the property's location, aerial extent and topography there is a wide range of environmental conditions. These conditions along with the history of disturbance are reflected in a diversity of vegetation types on the property.

The most obvious changes in vegetation are between the north-west and south-east parts of the property as rainfall decreases towards the south-east. The major difference between these two parts are the relatively intact expanses of forest in the west, compared with the largely tussock and shrubland landscape to the east of the Waiau River. The vegetation in the far west and north-west of the property is in particularly good condition with the "original" vegetation sequences still remaining from forested valley sides with a natural bushline to alpine grasslands and cushionfields, bare rock and permanent snow as altitude increases. Some of the valley floor grasslands in these upper valleys also remain comparatively natural - dominated largely by indigenous species with comparatively few introduced plants, unlike the valley floor grasslands in the lower parts of the Waiau and the Clarence below about 900m. The Waiau River valley and major tributaries are also very distinctive for their valley floor matagouri shrublands on alluvial fans - most are still intact with tall dense cover.

West of the Waiau River where the forest cover on valley sides has been broken, shrublands are the predominant vegetation cover, although grasslands replace

shrublands on some north facing slopes such as in the Henry and above the natural timberline at about 1400m. These shrublands are either dominated by *Dracophyllum* on upper-mid valley side slopes, "grey scrub" on steep rocky lower altitude slopes or manuka/kanuka on mid to lower altitude colluvial slopes downstream of the Henry River.

On the east side of the Waiau the shrublands are more diverse and more extensive than the west and include manuka/kanuka, grey scrub, and shrublands dominated by *Dracophyllum*, mountain tauhinu, *Hebe* species, snow totara and *Bracyglottis cassinioides* - normally as a mix of species rather than a continuous cover of one shrub. Manuka is particularly prevalent in the Stanley River and Waiau valley sides south of Lake Guyon. Mixed species shrublands are more common on shady faces and at higher altitudes up to about 1300m particularly in the upper Stanley, Edwards Stream tributaries, and the side catchments and headwaters of the Clarence River. Tall tussocklands are the dominant vegetation type at higher altitudes (above about 1300m) although they occur throughout mixed species shrublands below this - to about 1100m. Areas of red tussockland remain on poorly drained river terraces and moraines at low altitudes (below 1200m) in both the Clarence and Waiau valley systems. Short tussocklands occur throughout the property mainly on valley floors and lower valley sides below about 1300m and are dominated by a variety of species, both indigenous and exotic. Grasslands dominated by exotic grasses, with or without scattered short tussocks or shrubs are the most common vegetation type on valley floors in the Waiau below Malings Pass, the Ada and Henry River valleys.

2.4.2 Vegetation types

2.4.2.1 Forest

On the western side of the Waiau River extensive intact tracts of forest remain on mountain slopes, particularly in the upper reaches of the Waiau above Malings Pass, in the Boyle, upper Henry, Ada and Jones River catchments.

Mountain beech is the principal forest species and is dominant above 1150m forming the timberline at about 1350m. Below 1150m mountain beech is co-dominant with silver beech in the Ada, mid to lower Boyle and the Waiau south of Caroline Creek down to and including the Jones River catchment. In the Ada, lower Boyle (up to about 970m), and the Waiau south of Malings Pass red beech is also present on side-slopes.

As distances away from the main divide increase the forests change. The altitudinal limit of the timberline increases eastward reaching 1400m in the Jones and Muddy Stream. Also moving east silver beech is restricted to lower altitudes (below about 1050m) and eventually disappears just east of the Waiau River. Red beech becomes rare in the Waiau River catchment south of the Ada River and is not known on St James east of the Waiau. Mountain beech expands to fill the niche vacated by these species. The influence of past fires is also more pronounced in the east, with

Except where there has been windfall or snow damage these forests are in healthy condition with abundant regeneration particularly on the periphery. On flatter sites on valley floors or lower side slopes with easy access, cattle grazing is obvious with very little understorey and pugging of seeps and small water-courses.

Silver beech

On St James silver beech is never a pure stand, but comprises a mixture of silver and mountain beech and sometimes red beech. Its distribution is generally limited to the more favourable sites for forest growth at mid-slope (810m to 1180m) in the higher rainfall zone in the north-west of the property near to the main divide. A few isolated silver beech are known to be above the river gorge in the Lower Waiau block, and around Glenrae Saddle east of the Waiau but these are exceptional to the overall pattern of north-west distribution. Prickly shield fern (*Polystichum vestitum*) is very common in the ground cover. Other species common in the understorey are *Coprosma* "tayloriae", wall lettuce, *Coprosma pseudocuneata*, *Blechnum penna-marina*, the hookgrass *Uncinia uncinata* and occasionally also broadleaf (*Griselinia littoralis*), *Coprosma linariifolia*, *Hebe odora*, mountain toatoa, *Myrsine divaricata*, the clubmoss *Lycopodium scariosum*, and thousand leafed fern *Hypolepis millefolium*.

Red beech

Red beech on St James is normally on sites shared with silver and mountain beech. In some areas it occurs as just a few individuals of red beech amongst mountain beech such as in the Henry but this is not the norm. Where silver beech and red beech are co-dominant there are similar understorey species as silver beech stands.

2.4.2.2 Shrublands

Shrublands are the dominant vegetation type on the eastern part of St James. They are widespread and very variable.

The main shrublands are extensive manuka and kanuka in the middle and lower stretches of the Waiau and Stanley Rivers, (formerly beech forests), matagouri on fans, and mixed shrublands and tussock shrublands widespread throughout, particularly in the east and south.

Manuka and or kanuka

Manuka shrublands are the most common vegetation type on mid to lower altitude slopes in the middle reaches of the Waiau and in the lower Stanley. It commonly forms a dense cover on steep and rocky terrain, or eroding loess slopes. They are induced communities which have arisen after the loss of mountain beech forest to fire. Mountain beech is in places slowly invading the shrublands from remnants in gullies and shady slopes.

forests becoming discontinuous, remaining only as sporadic localised remnants with large areas of shrubland and tussock grasslands.

In more detail these forest types are:

Mountain beech

West of the Waiau River, where mountain beech is dominant and is the sole canopy species the shrub and ground cover vegetation is dominated by beech seedlings and a few other species. Other than young beech, the most common plants that occur in the understorey are mountain toatoa (*Phyllocladus alpinus*) and prickly shield fern (*Polystichum vestitum*). Other species that may also be present are *Coprosma pseudocuneata*, *C. "tayloriae"* (*C. sp. 't'*), wall lettuce (*Mycelis muralis*), and the little ground fern *Blechnum penna-marina*. Occasionally also there are a small number of the now threatened mistletoes - *Peraxilla tetrapetala* and *Alepis flavida*. This type of vegetation occurs on a wide range of sites forming the lowest altitude forest bordering grassed alluvial river flats in the Henry, Ada, Boyle and Upper Waiau and forms the upper bushline throughout the property.

In the western parts of the property silver, and sometimes red beech are mixed with mountain beech below about 1150m (see below for fuller description). Above this silver beech belt, mountain beech is again the sole canopy species, but the shrub and ground vegetation tends to be more diverse and there is usually a greater representation of sub-alpine species than at lower altitude. These include *Hebe odora*, *Gaultheria crassa*, snow totara (*Podocarpus nivalis*), mountain flax (*Phormium cookianum*) *Coprosma pseudocuneata*, *Hebe subalpina*, *Astelia nervosa*, *Lycopodium fasciculata* and *Dracophyllum uniflorum*.

In the drier south-eastern part of the St James the forests are small localised remnants and are mainly restricted to steep shady slopes such as in Muddy, Emilys, Catley, Duncans Streams, Glenrae Saddle, northern side of Lake Guyon and tributaries of the Edwards Stream. Occasional fingers of beech also survive in gullies along glacially scoured slopes in the Waiau - between Malings Pass and the Edwards, and as scattered small pockets amongst manuka scrub in the Stanley.

In all these eastern forests mountain beech is the dominant tree cover, although one silver beech tree and numerous seedlings were found in a mountain beech remnant at Glenrae Saddle during the PNA survey. Occasionally peripheral areas of celery pine and mountain ribbonwood will occur. The understorey is commonly open with a moderate diversity of species. Beech regeneration under 1m is frequently thick on the edges and in canopy gaps but saplings are not common. Other species most frequently in the understorey are snow totara, mountain toatoa and prickly shield fern, *Hebe canterburensis*, *H. vernicosa*, *Coprosma propinqua* and ground cover species of bidibids (*Acaena anserinifolia* *A. profundeincisa*), small daisies of *Laginifera strangulata* and *L. pinnatifida*, wall lettuce (*Mycelis muralis*), *Ourisia lactea*, the ferns *Blechnum penna-marina* and *Hypolepis millefolium*, *Oxalis magellanica* and in places abundant *Hieracium lepidulum* and exotic grasses (cocksfoot, meadowgrass and browntop).

These shrublands are dominated by either a mixture of manuka and kanuka, or are "pure" stands of manuka. There is however, often scattered through these heaths a range of minor species such as matagouri, *Hebe venustula*, *Cyathodes juniperina*, tauhini (*Cassinia vauvilliersii*), the broom *Carmichaelia arborea* and shrub tutu (*Coriaria sarmentosa*). The understorey and ground cover does not tend to have a diverse range of species, although this partly depends on canopy density, and substrate i.e where the stands have a dense canopy the understorey and ground cover are typically sparse with much bare ground. The ground cover species are generally a mix of heaths, moss and exotic species such as snowberry (*Gaultheria 'novae-zelandiae'*), *Leucopogon fraseri*, woolly moss (*Racomitrium lanuginosum*), wall lettuce, hawkweed (*Hieracium pilosella*), sweet vernal and browntop with variable amounts of bare ground. In areas of rocky or gravel ground there can also be the clubmoss *Lycopodium scarisosum*, *Gaultheria antipoda* and bracken fern although these are not specific to rocky ground.

Grey scrub

On gravel or talus slopes with scattered bedrock outcrops on lower altitude slopes of the Waiau valley grey scrub is common, particularly on sunny slopes. "Grey scrub" is a name given to mixed species shrubland with small leaves mostly obscured by twigs and dominated by shrubs such as *Coprosma* and matagouri. The most common species are matagouri, *Coprosma propinqua*, and *Corokia cotoneaster* with lesser amounts of the native broom *Carmichaelia arborea* and *Hebe traversii*, mountain wineberry (*Aristotelia fruticosa*), porcupine scrub (*Melicytus alpinus*) and *Corokia cotoneaster*. In some areas, particularly on the more bouldery talus sites there might also be bracken, mountain flax and ribbonwood. Kowhai is also sometimes scattered amongst areas of scrub, and in at least two areas, there is also the threatened plant *Hebe cupressoides* (one in the Boyle River and one in the Henry). Ground cover in these areas is usually a mix of grasses and herbs - both exotic and native as well as bare rock, boulders and gravel.

Matagouri

Matagouri on alluvial fans and terraces are a feature of St James in the Waiau, Ada and Henry valleys. Most of the side creeks draining into the Waiau or its main tributaries have a covering of matagouri - some bushes are between two and three metres high, but many areas have matagouri of three to four metres tall. These shrublands are normally solely dominated by matagouri with only occasional *Coprosma propinqua*. Underneath the ground cover is dominated by a thick sward of introduced grasses of browntop and sweet vernal along with *Hieracium praeltum*, white clover and occasional foxglove, yarrow, ragwort and cleavers. The main indigenous species are scattered bidibids, and prickly shield fern (increasing in less accessible areas).

Mixed scrub and tussock shrubland

This type is widespread and variable. It is found mainly on south-facing mountain slopes at most altitudes throughout St James but is particularly common east of the

Waiau River in catchments such as the upper Stanley, and in the tributary streams of the Edwards and Clarence Rivers. It is also found in the heads of valleys near to bush line or between broken patches of beech. Some are fire-induced, although most, are long-standing communities which have not been burnt for some time.

These shrublands are always of mixed species but are usually dominated by one or other of either turpentine shrub (*Dracophyllum uniflorum*), snow totara, mountain tauhinu (*Cassinia vauvilisiri*), *Hebe anomala*, *H. venustula*, mountain celery pine, or *Brachyglottis cassinioides*. Commonly associated with these shrub species are snow tussocks, particularly between 1100-1400m and a variety of other shrub species such as matagouri, *Hebe glaucophylla*, *H. rakaiensis*, *Olearia cymbifolia*, mountain wineberry, *Leucopogon colensoi*, *Coprosma propinqua*, and *Astelia nervosa*. Ground cover is variable and may include significant areas of bare ground, but more typically it comprises short tussocks and herbs such as hard tussock (*Festuca novae-zelandiae*), Matthews tussock (*Festuca mathewsii*), bristle tussock (*Rytidosperma setifolia*), blue tussock (*Poa colensoi*), cotton daisy (*Celmisia monroi*), bidibids (*Acaena* spp), the little ground fern *Blechnum penna-marina*, dwarf snowberry (*Gaultheria 'novae-zelandiae'*), harebell (*Wahlengergia albomarginata*) and *Anisotome filifolia*. On sunny aspects *Raoulia subsericea* and exotics such as *Hieracium lepidulum*, *H. pilosella*, catsear (*Hypochoeris radicata*), brown top (*Agrostis capillaris*) and sweet vernal (*Anthoxanthum odoratum*) may dominate.

One other shrub that is present on St James, but is uncommon, is bog pine. It occurs in two places east of the Waiau River, but may occur elsewhere on wetlands within forest clearings in the west. In the Edwards Basin it occurs on dry ridges amongst open shrublands dominated by low growing *Dracophyllum uniflorum*, mountain tauhinu *Leucopogon colensoi* and woolly moss. On the moraines south of Lake Tennyson it is scattered amongst the red tussock.

2.4.2.3 Tussockland

Over the last 1000 years grasslands in the high country have expanded their range below the climatic tree limit since large areas have been deforested. This is particularly evident east of the Waiau River where successive fires have reduced most of the forest cover to remnants on shady faces and in gullies. After the loss of forest cover *Chionochloa* tussocks and shrublands would have been the dominant vegetation over most of the eastern part of the property in Pre-European times. However, 140 years of burning and grazing have depleted or eliminated these tall tussocks from wide areas. The range of these tall tussocks has now contracted towards moister localities and higher altitudes and the tall tussocks have been replaced by short tussocks and small forbs such as *Celmisias*.

This next section describes in more detail grassland vegetation types including areas dominated by exotic grasses and herbs.

Short tussock grassland (800-1200m)

This is a very common vegetation type throughout the lower altitude parts of St James occurring on lower mountain slopes on most aspects, and also on fans, terraces and moraines. In most instances this type appears to be induced as a result of loss of woody vegetation and tall tussock after repeated fires through the area. The degree of open ground and invasion by exotic species is variable, with increasing cover and naturalness with increasing altitude and also towards the higher rainfall areas in the north and west.

It is variously dominated by hard tussock (*Festuca novae zelandiae*) in the lower Clarence River sides and in the Waiau, and by Mathews tussock (*Festuca matthewsii*) and/or bristle tussock (*Rytidosperma setifolia*) throughout the rest of St James (tending to be at slightly higher altitudes). Silver tussockland (*Poa cita*) is uncommon but can be found on alluvial terraces and fans in the Clarence and Waiau Valleys.

Remnant slim snow tussocks and matagouri or other shrubs are sometimes sparsely scattered through the tussocklands depending on altitude and substrate. Typical associates on mountain slopes include blue tussock, snowberry, cotton daisy, *Leucopogon fraseri*, *L. colensoi*, *Raoulia subsericea*, bristle tussock, *Geranium sessiliflorum*, *Viola cunninghamii*, the bidibids *Acaena caesiiglaucula*, *A. fissistipula*, harebell, *Pimelea oreophila*, *Hieracium pilosella*, sweet vernal, browntop, sheeps sorrel, white clover and catsear. These exotics increase in cover and the short tussocks decrease on footslopes, terraces and fans, especially at the lowest altitudes. Bare ground can also be significant on some low altitude sunny slopes. These latter, more modified areas, are on lower altitude mountainslopes in the lower Clarence (downstream of Pass Stream), on north facing slopes in the Edwards Valley and on most river terraces in the Waiau below about 800m.

Shrub-short tussockland

Often mixed in with this short tussockland is a significant shrub component. It is relatively common throughout the eastern part of St James, typically on low to mid altitude mountain slopes (over 1000m).

Mathews and bristle tussock are dominant with various combinations of snow tussock, turpentine shrub, golden speargrass, matagouri, *Hebe anomala*, *H. venustula*, *Gaultheria crassa*, *Leucopogon colensoi*, mountain tauhinu, and snow totara. Ground cover components are very similar to that of short tussockland described above, but with much less exotic species.

Exotic grassland

River terraces and some lower altitude mountain slopes are covered in grasslands dominated by introduced species. This is particularly the case in the Waiau River flats and its tributaries below 800m. The main species are browntop and sweet vernal with herbs of hawkweed, and catsear. There is usually a number of

indigenous plants mixed in with the exotic including *Leucopogon fraseri*, *L. colensoi*, *Ranunculus foliosus*, *Geranium sessiliflorum*, *Celmisia gracilentia*, harebell, bidibids and *Raoulia subsericea*.

Tall or snow tussocklands - Chionochloa species

Chionochloas tend to have distinctive ecological preferences. *C. conspicua* grows on stream banks and recent slips, and also in forest and scrub, especially where disturbance has created openings in the montane and subalpine belt. It occurs on St James in the Boyle and upper Henry River valleys, but may be more widespread than this. *C. flavescens* tends to grow on crumbling bluffs, stony and coarse-textured recent colluvium and other sites with better than usual nutrient status, often sharing dominance with shrubs. It is not extensive on St James but occurs throughout the property on these types of sites.

Chionochloa pallens is the most widely distributed tussock on St James. It is abundant on moist, well-drained, weakly weathered colluvium throughout the property particularly in the west. *C. crassiuscula* is a short tussock with leaves that curl spirally when dead and dry. It is not common on St James but does occur in the north-west where it grows in deep, wet hollows and gullies and on shallow, leached soils at high altitudes. Snow patch grass or *C. oreophila* forms turf in late-snow hollows at high altitude throughout the tops of St James. Carpet grass (*C. australis*) mainly grows on leached, well-weathered, shallow soils on rounded or flat penialpine surfaces - throughout St James on the Opera and St James Ranges and parts of the Spenser Mountains.

Slim snow tussockland (Chionochloa macra)

This is an alpine tall tussockland found on eastern parts of St James between the Waiau and Clarence Rivers at mid to high altitudes and usually on south-facing mountain slopes. It normally forms dense stands on relatively stable substrates.

Slim snow tussock is sometimes the sole canopy component, although on St James it is more often associated with midribbed and broadleaved snow tussocks and scattered shrubs such as turpentine scrub, tauhinu, Hebe sp. and *Astelia nervosa* as well as lower statured species such as carpet grass, bristle tussock (*Rytidosperma setifolia*) and Mathews tussock (*Festuca matthewsii*). The most common intertussock species are blue tussock, cotton daisy (*Celmisia spectabilis*), snowberry (*Gaultheria novae-zelandiae*), *Pimelea oreophila*, harebell, *Oreomyrrhis colensoi*, *Epilobium atriplicifolium*, bidibids *Acaena fissistipula*, *Blechnum penna-marina*, *Luzula rufa*, and *Microseris scapigera*. The exotics sweet vernal, brown top and *Hieracium pilosella* may also be present at lower altitudes.

Midribbed snow tussockland (Chionochloa pallens)

This is the most commonly occurring tall tussockland in the district. It occurs from mid to high altitudes covering extensive areas mainly on south-facing mountain slopes which are relatively stable.

It typically forms uniform, dense stands of midribbed snow tussock as the sole canopy component. Slim and broadleaved snow tussock may sometimes be present as may very scattered *Hebe* aff. *rigidula*, *H. anomala*, mountain tauhinu, mountain inaka, snow totara and *Astelia nervosa*. Lower statured associates include bristle tussock and Matthews tussock as well as carpet grass in zones of gradation between this type and carpet grass turf. Ground cover species are very similar to slim snow tussockland with additions of *Epilobium chlorifolium*, *Coprosma cheesemanii*, the buttercups *Ranunculus insignia*, *R. verticillatus*, *R. foliosus*, *Galium perpusillum*, and the mat speargrass *Aciphylla monroi*. (check some of these)

Broadleaved snow tussockland (Chionochloa flavescens)

At mid to high altitudes this vegetation type is largely restricted to north-facing, semi-stable mountain slopes throughout St James or just above bush-line as a component of tussock shrubland.

It is dominated by broadleaved snow tussock of varying density but usually forming open stands. Usually associated with the snow tussock are short tussocks - bristle tussock, hard tussock, blue tussock and Mathews tussock. Ground cover is typically loam, gravel or litter. Scattered intertussock plants include, *Luzula rufa*, *Viola cunninghamii*, snowberry, *Raoulia subsericea*, clubmoss (*Lycopodium fastigiatum*), sheeps sorrel, *Leucopogon fraseri*, *L. colensoi*, willowherb *Epilobium atriplicifolium*, catsear, as well as *Hieracium pilosella*, golden speargrass, cotton daisy, harebell and *Blechnum penna-marina*. There can often be a major shrub component mixed in with the tussocks especially *Dracophyllum*, *Olearia cymbifolia* and *Hebe* sp.

Carpet grass (Chionochloa australis)

This is the most common vegetation type at high altitudes (1400-1950m) throughout St James. It grows on all aspects, covering extensive alpine areas of stable, relatively gentle topography such as the broad ridges of the Opera and St James Ranges and the cirque basins of most of the tributaries and headwaters of the Waiau and Clarence catchments. It is usually buried under snow in winter and is subject to late snow lie.

It typically comprises extensive turflands dominated by carpet grass, although midribbed snow tussock, turpentine scrub, prostrate turpentine, snow totara, and *Hebe lycopodioides* are typically scattered throughout. Other characteristic species of this type are generally low statured and include *Celmisia incana*, *C. alani*, cotton daisy, *C. viscosa*, *C. laricifolia*, *Gentiana* aff. *montana*, *C. sessiliflora*, *Aciphylla monroi*, *Gaultheria novae-zelandiae*, *Anisotome aromatica*, *Coprosma perpusilla*, hookgrass *Uncinia nervosa*, *Pratia macrodon*, *Kelleria laxa*, and on the more exposed sites *Pentachondra pumila*, *Lycopodium fastigiatum* and *Raoulia grandiflora*. In the wetter western areas there may also be *Astelia linearis* and *A. nivicola*.

On exposed ridge crests, margins of cirque floors and other sites with shallow soils there will often be a significant shrub component amongst the carpet grass. Characteristic shrub species are turpentine scrub, prostrate turpentine, snow totara and cotton daisy. On shady steep slopes kept damp by melting snow, amongst carpet grass turflands particularly in the west and north there can be a number of additional species such as *Dolichoglottis lyalli* and *D. scorzonerioides*, *Geum parviflorum*, *Marsiperrnum gracile*, *Asteliea linearis*, *A. nivicola*, *Schoenus pauciflorus*, and *Ourisia*.

Snowbank vegetation (1650-2100m)

This is a very distinctive, high altitude type usually occupying depressions in cirque basins, ridges and mountain slopes with a southerly aspect where snow accumulates and lies until very late in the season. It is found scattered throughout many of the tributary headwater basins of the Waiau River.

Characteristic species include snow patch grass (*Chionochloa oreophila*), emergent alpine rush (*Marsippospermum gracile*), *Celmisia viscosa* and *C. haastii*, over a mat herbfield and cushionfield of *Celmisia sessiliflora*, *Abrotanella caespitosa*, *Kelleria croizatii*, *Raoulia subulata*, *R. grandiflora*, *Phyllachne colensoi*, *Gaultheria nubicola*, *Carex pyrenaica*, *Agrostis muscosa*, *Psychrophila obtusa* (formerly *Caltha obtusa*), *Celmisia alpina*, *Gnaphalium traversii*, the bidibid *Acaena saccaticupula*, *Coprosma perpusilla* and *Pentachondra pumila*.

Red tussockland (C. rubra)

This vegetation type usually grows on damp ground on broad river terraces, fans, old flood plains and moraines. It dominates all the poorly drained sites in the Edwards basin area between the Clarence River and Edwards Pass and is scattered along the Clarence River terraces from the headwaters above Lake Tennyson to Peters Pass and in the upper Henry/Anne River catchment. It also covers much of the Tennyson moraine systems, as well as the moraine north-west of Lake Guyon and in some forest clearings on flat land in the Ada River.

The composition of the inter-tussock plants seems to be related to the drainage conditions and degree of modification. In the wetter areas some of common associates are the same as the herb components of *Carex*, *Schoenus* and comb sedge wetlands (see the descriptions below).

In the Edwards Pass basin, areas of red tussock are relatively extensive and occur mainly along meandering stream channels and amongst a mosaic of hollows and small rises with mixes of wet and drier ground. There is in places a significant proportion of exotic grasses and herbs such as Yorkshire fog, red clover, *Hieracium praelatum* browntop and soft rush (*Juncus effusus*) (common name). In the wetter sites, *Schoenus pauciflorus* and a number of sedges are common amongst the red tussock.

Some of the most extensive and natural areas of red tussock are around Lake Tennyson including dense stands amongst the depressions and tarn margins on the moraines south of the lake, as well as the low meander terraces of Princess Stream, the toeslopes of Mt Southey and other areas of impeded drainage. Often associated with the red tussock are plume sedge (*Carpha alpina*), sphagnum, *Schoenus pauciflorus*, *Carex gaudichaudiana*, *C. echinata* and comb sedge all of which can be locally dominant depending on drainage and fertility. Other plants in this community are *Celmisia alpina*, *Hebe pauciramosa*, the plantain *Plantago uniflora*, bladderwort, *Centrolepis ciliata*, the sedges *Carex sinclairii* and *C. flaviformis*, the willowherb *Epilobium komarovianum*, the sundew *Drosera arcturi*, as well as a cudweed *Gnaphalium traversii*, *Gonocarpus micranthus*, *Gentiana grisebachii*, *Hydrocotyle 'montana'*, various species of moss and occasional speargrass (*Aciphylla subflabellata*). On drier sites there is often also turpentine scrub, or dwarf turpentine and bog pine is locally scattered amongst red tussock both on the moraines and on the bedrock hill adjacent to the eastern set of tarns.

2.4.2.4 Wetlands

Distinct wetland community types, like most vegetation communities, are difficult to recognise in mountain environments because of the small-scale variations in depth and drainage. Distinctions between wetland and wet grassland or herbfield are also blurred, with many wetlands merging into red tussocklands and other snow tussocks, or, at very high altitudes into grassland or fellfield kept wet by melting snow. On valley floors wetlands often merge into grasslands and are normally dominated by exotic grasses and herbs. For the purposes of this exercise I have, however, distinguished seven different wetland 'types'. It just has to be remembered that on the ground they are not necessarily distinct but may merge into one another or form mosaics with grasslands or other wetlands.

Schoenus pauciflorus wetland (800-1700m)

This is the commonest wetland vegetation type on St James. It is typically found as headwater and side stream flushes on gentle to steep slopes, as well as throughout areas of poor drainage along valley bottoms, and basins and moraines such as those which occur in the Edwards Basin, around Lakes Tennyson and Guyon. In places it has also colonised seeps on bluffs.

Schoenus pauciflorus is the dominant species in this community, but there is normally a diverse range of other species associated with the *Schoenus*. The common ones are the sedge *Carex gaudichaudiana*, buttercups (a number of *Ranunculus* species), *Poa dipsacea*, the cudweeds *Gnaphalium laterale*, and *G. traversii*, *Schizeilema nitens*, marsh pennywort (*Hydrocotyle sulcata*), *H. microphylla*, *Viola cunninghamii*, *Gentiana bellidifolia*, and the "daisies" *Lagenifera barkeri*, *Helichrysum bellidioides*, *Leptinella 'mediana'*, *Craspedia 'short hairs'*, *Microseris scapigera*, sphagnum and other moss species, the water plant blinks (*Montia fontana*), Maori onion, willowherbs (*Epilobium* species) and the exotics white clover, Chewings fescue, Yorkshire fog, browntop, soft rush,

jointed rush, selfheal and pearlwort. Sometimes also associated with the *Schoenus* are overtopping plants of *Hebe pauciramosa*, red and snow tussocks.

This wetland type generally has a large exotic component at lower altitudes, and, as cattle actively seek out flushes, pugging can be a feature.

Carex wetland

This wetland type is similar to the *Schoenus* wetland type but is dominated by *Carex* sedges (i.e. Carexs are common in other wetland types, but this is describing wetlands that are dominated by *Carex*). It is only a minor wetland type on St James, occupying wetter sites than the *Schoenus* wetland, and may include areas of standing water, and is largely restricted to fault sag ponds and moraine hollows in the Edwards Pass basin and in some cirque basins.

The main sedge species include *Carex sinclairii*, *C. gaudichaudiana*, *C. coriacea*, *C. echinata* with occasional patches of the moss *Sphagnum cristatum*, the buttercup *Ranunculus glabrifolius* and the rush *Schoenus pauciflorus*. Jointed rush may line stream channels in places. In the cirque basin floor at the head of Timms Stream the sedge wetland was dominated by a uniform low cover of *Carex gaudichaudiana* with associates of *Schoenus pauciflorus*, *Celmisia* aff. *gracilentia*, *Juncus novae zelandiae*, *Ranunculus foliosus*, and *Poa dipsacea* (check).

Comb sedge wetland

This cushion wetland type is not very common on St James and is largely confined to the hollows and tarn margins of the Lake Tennyson moraine complex and the Edwards Pass basin, often forming mosaics with *Schoenus pauciflorus* and red tussocklands.

The cushion-forming comb sedge (*Oreobolus pectinatus*) is the dominant species, and is commonly associated with *Celmisia alpina*, the sundew *Drosera arcturi*, the sedges *Carex gaudichaudiana*, *C. sinclairii*, *C. echinata*, and the moss *Polytrichum juniperinum*.

There is often also scattered red tussock through this type and other associates may also include *Abrotanella caespitosa*, *Centrolepis ciliata*, *Gonocarpus micranthus*, *Isolepis aucklandica*, *Nertera balfouriana*, *Epilobium komarovianum*, *Luzula leptophylla*, *Coprosma perpusilla*, *Gnaphalium laterale*, *G. mackayi*, *Plantago uniflora*, *Celmisia sessiliflora*, plume sedge, bladderwort and *Pratia angulata*.

These communities are normally highly natural with very few exotics, although fouling by Canada geese and pugging by cattle in Princess Stream, and in the Edwards Pass basin is gradually decreasing their naturalness and on drier margins there may also be areas of browntop, sweet vernal and Yorkshire fog.

Wire rush bog

This is a very localised vegetation type on St James and the only known area on the property occurs on the margins of kettle holes on the peaty ridges of the terminal moraines below Lake Tennyson. It may also occur around some other low altitude bogs further west which were not seen during the field visits.

The community is permanently wet. It is 'perched' around the perimeter of the tarns and appears to be slowly infilling them. The dominant species is wire rush (*Empodisma minus*), with emergent red tussock and scattered *Hebe pauciramosa*, mountain tauhinu and bog pine. Other typical associates include: plume sedge, *Carex echinata*, *C. gaudichaudiana*, *C. sinclairii*, *C. coriacea*, *Schoenus pauciflorus*, *Celmisia alpina*, *C. aff. gracilentia*, sphagnum, sundew (*Drosera arcturi*), *Craspedia* 'short hairs' and *Gentiana bellidifolia*.

Sphagnum bog

This type is very uncommon in the east of St James, but is possibly more common around bogs in forest openings on riverflats in the west. It seems to be restricted to the mountain beech forest margins and openings, and moraine depressions, near Lake Tennyson, Guyon and Lake Paget (in the Christopher/Ada River valley). It occupies sites of poor drainage or slowing draining seep water, and is usually partially shaded by beech.

Sphagnum cristatum is the main species, with scattered red tussock and *Carex coriacea*, and typical associates of *Carex gaudichaudiana*, *Oxalis magellanica*, *Hypolepis millefolium*, *Coprosma depressa*, *Blechnum penna-marina*, *Leptinella* 'mediana', *Isolepis habra*, *Lagenifera pumila*, *Pratia angulata*, *Oreomyrrhis ramosa*, *Helichrysum bellidioides*, *Hydrocotyle* 'montana', *Ranunculus foliosus*, *Viola cunninghamii*, *Ourisia lactea*, plume sedge (*Carpha alpina*), and sometimes also the exotics wall lettuce, soft rush and white clover.

Seasonal wetland herbfield (1100-1700m)

These are very rare communities on St James, comprising small mat herbs. They only occur in wetlands that are regularly inundated, but dry out seasonally, such as margins of tarns with fluctuating water levels. The only places known are around the tarns at the northern end of the St James Range, although other occurrences are likely.

Characteristic species are: *Crassula sinclairii*, *Limosella lineata*, *Lilaeopsis ruthiana*, *Hypsela rivalis*, *Epilobium komarovianum*, *Myriophyllum votschii*, *Leptinella* 'mediana', *Hydrocotyle sulcata*, *Gnaphalium mackayi*, and *Plantago uniflora*. Canada geese are a serious threat to this vegetation type by their disturbance, eutrophication and importation of weeds.

Aquatic herbfield (1100-2050m)

A very localised vegetation type which is confined to shallow parts of permanent water bodies, namely Lake Tennyson and its associated morainic tarns, Lake Guyon, Edwards Pass tarns, and the few cirque tarns at tributary heads in the western and northern parts of the property.

The community is very simple, being comprised of one or more of the milfoils (*Myriophyllum pedunculatum*, *M. triphyllum*), red pondweed, quillwort, oxygen weed or *Juncus bulbosus*.

2.4.2.5. Alpine areas

Above about 1500-1550m much of the ground is rock or fellfield and scree with a sparse cover of cushion plants, prostrate herbs or specialised scree plants. These areas can be distinguished into three groups, mainly by their substrate, although many of the plants will grow in more than the one type of area. For the purposes of this exercise the three main communities are described as two types - summit shrub herbfields on loamfields on gravel substrate, and secondly as scree and high altitude rockland communities.

(a) Summit shrub herbfield (1500-2000m)

Above 1500m on the St James Range and parts of the Opera Range there is a very distinctive, but not extensive, open community dominated by prostrate shrubs, herbs and grasses. This community is restricted to very exposed loamfields and gravel 'pavement' on mountain shoulders and summits, and some cirque moraines. Soil creep and wind erosion have resulted in very patchy cover, usually in stripes across the ridge.

Characteristic species are prostrate turpentine (*Dracophyllum prunum*), blue tussock, bristle tussock, the daisies *Celmisia allanii*, *C. viscosa*, the sub-shrubs *Leucopogon colensoi*, and *Pimelea sericeo-villosa*, and the cushion plants *Kelleria dieffenbachii*, *K. villosa*, *Anisotome prostrata*, *Chionohebe pulvinaris*, *Phyllachne colensoi*, *Raoulia grandiflora* and snowberry (*Gaultheria 'novae-zelandiae'*).

(b) and (c) Scree and high altitude rockland communities

The fine scree areas, more typical of eastern Marlborough and Canterbury are not extensive on St James. They may be more common than this, but because of the limits of the inspection many of the high altitude areas west of the Waiau River were not visited. Plot records from areas of scree on Mts Southey and McCabe as well as the southern parts of the St James Range indicate the eastern part of the property has a good range of typical scree species including the willowherbs *Epilobium pycnostachyum*, *E. porphyrium*, *E. crassum*, penwiper, *Lobelia roughii*, *Poa buchananii*, *Leptinella dendyi*, *Myosotis traversii*, *Hebe epacridea*, *Stellaria roughii*, *Lignocarpa carnosula*, *Acaena glabra* and the less common *Celmisia lateralis*, and Haasts buttercup (*Ranunculus haastii*). At higher altitudes, on

shallow scree and rocklands are scattered cushion plants of the vegetable sheep *Haastia pulvinarus* and *Raoulia eximia*.

On rocky ridges bedrock outcrops, and bluffs at high altitude there is typically a range of shrubs and herbs that are scattered over these rocklands including edelweiss (*Leucogenes grandiceps*), *Helichrysum parvifolium*, *Hebe decumbens*, *H. ciliolata*, *Phyllachne colensoi*, *Anisotome prostrata*, *Gingidia decipiens*, *Colobanthus acicularis*, *Schizeilema haastii*, and *Celmisia bellidioides*.

2.4.2.6 Other minor vegetation types

Mid-altitude rocky bluffs

At mid altitudes rocky bluffs in the drier parts of St James can be extensive and usually support scattered shrubs and rupestral plants such as *Helichrysum intermedium*, *H. parvifolium*, *Heliohebe raouli* ssp. *raoulii*, *Exocarpus bidwillii*, *Pimelea traversii*, *Hebe decumbens*, and sometimes also *Coprosma 'alpina'*, *Celmisia semicordata*, *Hebe tumida*, *Colobanthus acicularis*, *Raoulia bryoides* and golden speargrass.

River and lake gravelfields

This is a vegetation type which is restricted to floodplains of fresh gravel and silt along aggrading parts of the lower Waiau and Clarence Rivers. Such areas are frequently flooded and therefore are largely occupied by small statured or fast growing herbs, many of which are exotic.

Characteristic native species include: *Epilobium melanocaulon*, *E. microphyllum*, *E. brunnescens*, *E. macropus*, *Muehlenbeckia axillaris*, *Raoulia australis*, *R. tenuicaulis*, *R. hookerii*, *Helichrysum depressum*, *Acaena inermis*, *Parahebe decora*, *Poa lindsayi*, and silver tussock. *Gingidia decipiens* is locally common. Many exotic herbs are common, especially: vipers bugloss, pearlwort, scarlet pimpernel, *Epilobium ciliatum*, selfheal and sheeps sorrel.

An unusual dry gravel lake shore community occurs near the outlet of Lake Tennyson and is characterised by small herbs and short lived annuals of *Plantago triandra*, *Oreomyrrhis rigida*, *Colobanthus strictus*, *Myosotis 'minutiflora'*, *Galium perpusillum*, *Luzula 'albicomans'*, *Leptinella pusilla*, *Aphanes arvensis*, *Myosotis discolor* and *Veronica arvensis*.

Racomitrium mossfield (800-1100m)

A lower altitude vegetation type of well-drained sites mainly restricted to the gentle hill country of the Edwards Pass area, and the moraines of the Tennyson and Guyon land systems. It is dominated by woolly moss (*Racomitrium lanuginosum*) with typical associates of a number of low growing herbs and sub-shrubs including snowberry (*Gaultheria novae-zelandiae*), clubmoss (*Lycopodium fastigiatum*), *Pentachondra pumila*, *Pimelea sericeo-villosa*, *P. concinna*, *Brachyglottis*

bellidioides, *Celmisia allanii*, cotton daisy, *Bulbinella hookeri*, *Rauoulia subsericea*, *Coprosma petriei*, blue tussock, *Gentiana corymbifera*, *Hieracium pilosella*, *Anisotome aromatica*, harebell, sweet vernal and up to 30% bare ground. There is usually also sparsely scattered throughout a number of taller statured species such as mountain tauhinu, manuka, *Olearia cymbifolia*, *Leucopogon colensoi*, turpentine scrub, bog pine, slim snow tussock, red tussock, Mathews tussock, bristle tussock, hard tussock and *Coprosma cheesemanii*.

2.4.3 Flora

The PNA survey recorded 482 indigenous species in the Balaclava Ecological District. Around one-tenth of these were not recorded on St James, but probably a similar number of species occurs in the Lewis District - on the western side of the Waiau River which were not recorded in the Balaclava District. An intensive survey such as was carried out for the PNA survey has not, however, been done in the Lewis Ecological District to confirm this. A number of these plants are threatened and have conservation rankings developed from criteria which assess their distinctiveness, threat, vulnerability and value. On St James these include:

Hebe cupressoides. Conservation status: category B, the second highest priority. This is a whip-cord hebe with a very patchy eastern South Island high country distribution from Marlborough to Otago. It has been previously recorded from the upper Waiau areas, its northern limit in the upper Wairau. It was found in the Henry River near the walkway swingbridge and in the Boyle midway between the Boyle and Rokeby Huts.

Peraxilla tetrapetala: Conservation status, category B. A red flowered mistle-toe which parasitises beech species. It is known from mountain beech remnants in Cat Stream and around the western shore of Lake Tennyson and occasionally in the Waiau forests. Nationally this species is now very rare because of possum browsing.

Alepis flavida: Conservation status, category B. A yellow-flowered mistle-toe which is usually parasitic on mountain beech. It is known to be growing on beech trees in the Boyle River, and main Waiau Valley at low altitudes. Similar to *Peraxilla* it is now nationally rare.

Pittosporum patulum: Category B. This is an understory tree of beech forests and is very patchily distributed in North Canterbury, most occurrences comprise only juveniles. The adults are very rare, presumably due to possum browsing. On St James it has been recorded from four sites - Horrible Stream, Lake Guyon, the base of Malings Pass and the Williams Valley.

Carmichaelia corrugata: regionally rare. A mat broom which is restricted to alluvial flats in the eastern South Island. On St James it was found in a few scattered colonies along the terraces of the Clarence River.

Gunnera densiflora: regionally rare. This is a robust creeping herb of subalpine tussockland seepages and flushes, and is only known from South Marlborough and inland Canterbury where it is sporadic. It is known on St James from the headwaters of the Clarence River.

Brachyglottis greyi: regionally rare. This shrub daisy, although relatively common in the lower North Island is very local in Marlborough and Canterbury. It is known on St James from near Lake Guyon

Hebe salicornioides: regionally rare. This whipcord hebe has a sporadic distribution in western Marlborough and Canterbury. It reaches its northern limit in the Wairau Gorge, its type locality and is typically a shrub of areas of impeded drainage such as the red tussocklands near Lake Tennyson (checking Shannel to see whether it was on St James or Molesworth).

2.4.4 Weeds

St James is comparatively weed free, especially in the west and north of the property. The main weeds recorded are broom, Spanish heath, and wilding pines. Other exotic plants that have spread from their initial sources, but are still localised are rowan around Lake Guyon, and scattered near the Waiau/Ada River confluence and gooseberry, growing under matagouri on hillsides from Lake Guyon to the Henry River in the Waiau River valley and the lower Ada valley. Broom bushes are scattered down the Waiau River, on the riverbed, terraces and lower hillslopes from about the Ada homestead to the southern boundary of the property at the Steyning and Edwards Rivers - becoming denser the further south and spreading into the lower Edwards River. Broom is also thick in places in the lower Styx and in the lower Clarence valley. Spanish heath is concentrated in two large patches in the lower Styx valley and spreading over the Hanmer Range into Hanmer Conservation Park in isolated locations and into the Edwards Pass area. Wilding pines are not really a problem on St James but do occur in the lower Clarence, south of the Peters/Williams valley.

2.4.5 Evaluation

Like all properties these communities types listed are not distinct units but merge and alter according to environmental conditions. A vegetation type is not all encompassing over a whole catchment or mountain side. There are always mixes and combinations. So far St James has been described within 'community types', but there are a number of areas on St James that have particular combinations of communities or elements that make it desirable for protection because of their diversity, naturalness, or special features.

In the Balaclava Ecological District in the eastern part of St James the best of these areas have been identified in the Molesworth PNA survey as RAPs. The RAPs have been identified on ecological criteria such as naturalness, diversity, special features and long-term viability. Descriptions of the RAPs and their selection

criteria can be found in the PNA report. For this report I have taken out the relevant RAP descriptions and put them in an appendix.

This exercise of identifying areas on their conservation merit by PNA survey has not been done, however, in the headwaters and western side of the Waiau River (Lewis Ecological District), nor in the Miromiro Ecological District - south of the Edwards River. The Lewis Ecological district, does, however, include vast tracts of unmodified land in close to natural state with very high nature conservation, landscape and recreation values. It is only the valley floors and some lower altitude mountainslopes that have been modified to any great extent. This next section provides a brief overview of the values of St James.

2.4.5.1 Clarence Valley

Most of the lower altitude slopes in the lower Clarence valley south of Pass Stream have been modified by burning and grazing with a high exotic component and often depleted vegetation cover. Exceptions to this pattern are the "Edwards Pass basin" and many of the side catchments leading off the Clarence. The Edwards Pass basin is a poorly drained area of land between the Clarence River and Edwards Pass. The basin has been largely created by repeated movement along the Clarence Fault which has left a number of fault created features including fault-tilted terraces, offset streams and fans, and fault depressions. Because of the basin's low gradient, Horrible Stream and the other small water courses which flow across the basin, end up in an extensive system of meanders and oxbows with wet and dry areas of vegetation. The wet areas are dominated by extensive red tussock, areas of sedgeland, turflands and cushionfields. On the drier sites the cover is mainly scattered short tussocks and a significant proportion of exotic grasses and herbs. These wetland/dryland systems are surrounded by dry and relatively infertile low relief hill country covered in ancient moraines and an extensive mosaic of open shrublands including bog pine shrublands, short tussocklands, mossfield, herbfields and patches of loam. This whole area has been recognised as an RAP because of its exceptional diversity of landforms and associated communities, including the most extensive low relief area still predominantly covered in native vegetation. This area supports probably the largest areas of red tussock communities on St James, certainly on the eastern half of the property. It also has excellent examples of cushion bog communities and sedge wetland vegetation. They are diverse, highly natural cover, and very uncommon elsewhere in the district.

Williams Valley, the head of Timms Stream and the Styx River, the base of Peters Valley as well as all the side catchments north of Tent Stream are covered largely in indigenous species and are relatively unmodified often with mountain beech remnants, surrounding shrublands and tall tussocklands interspersed with loam and gravelfields on north facing slopes. The head of Timms Stream; Catley Stream, Pass Stream, and Duncans Stream are all included in RAPs in the Balaclava District. They were recommended because they contained a wide range of communities that are highly natural due to their low exotic component, and minimal disturbance by stock. These side catchments also contain the most extensive and continuous *Dracophyllum* shrublands and slim tussocklands on the property. The

beech forest remnants in the Catley and Duncans Stream are also in very good condition with a wide variety of understorey shrub and herb species and excellent regeneration. Williams Valley, Peters Valley and the Styx River are all in the Miromiro District which was not surveyed during the PNA survey but the Williams Valley and the upper Styx River contain relatively large areas of beech forest compared to many of the other Clarence River side-catchments. There is no beech in Peters Valley but the valley floor is covered in dense and continuous cover of red tussock interspersed with occasional sedgeland along water courses.

North of Pass Stream sideslopes, including those at low altitude are covered in indigenous species mainly bristle tussock, scattered shrubs and slim leaved tussock, the latter increasing in cover above 1100m. Poorly drained sites on the Clarence valley floor are commonly covered in areas of red tussock.

The head of the Clarence valley above Lake Tennyson, the moraines south of the Lake Tennyson and Princess Stream are covered in highly natural vegetation forming continuous, unmodified sequences from valley floors to high altitude cirques and mountain tops. The upper Clarence Valley floor and lower side slopes are covered in good quality, dense, short tussockland which supports a low number of introduced species compared to grasslands on other valley floors, and are probably the best example of fescue tussockland on the property. The riverbed vegetation is also highly natural, lacking many of the introduced species which characterise many of the riverbeds on the rest of the property, particularly vipers bugloss and woolly mullein.

The vegetation on the moraines is of very good quality, with good stature and a low component of exotic species, despite a history of burning and grazing. The wire rushlands around the raised bogs do not occur elsewhere in South Marlborough and are more allied to wetlands of the Lewis Pass area. The moraines also support the only known locality of *Cyathodes empertifolia* in South Marlborough. This is also one of the two areas on the property which supports bog pine shrublands, a vegetation type which would have been more common on the moraines before burning.

This is the only place known on the property where five species of *Chionochloa* occur together - mid-ribbed, slim, broadleaved and red tussocks and carpet grass. The beech remnants in the upper Clarence are also the largest tracts of beech forest in the Clarence Valley and contain occasional plants of the nationally threatened red mistletoe, *Peraxilla tetrapetala*.

Other special features of this area are the well-preserved terminal moraine loop-ridges, hollows and peat tarns. These are very distinctive glacial landforms which are regionally unique. The fault traces associated offset moraines and the earthquake triggered landslide are tectonic features of regional scientific and education importance.

The main areas of modification are small patches of the valley floor in Princess Stream and some of beech forest remnants that show conspicuous cattle sign - pugging and browsing of forest edges with areas of exotic grassland.

2.4.5.1 The St James Range including the catchments of the Edwards and Stanley Rivers.

The St James Range lies between the Clarence and Waiau Rivers and extends north from the Styx River to the Spenser Mountains at the head of the Clarence River catchment. South of a line from about Glenrae Saddle to Fowlers Pass and Pass Stream, the mountain slopes of the Range are very steep with extensive areas of bedrock bluffs, rock outcrops, sheet scree and, on north-facing slopes, large areas of bare ground. North of this line the terrain is much less broken, especially the main ridge north of Lake Guyon which is broad with easy contours on shoulders and upper slopes, although mountain tops still have

The vegetation is a mix of small mountain beech remnants in steep shady gullies, surrounded by either extensive kanuka shrublands south of Lake Guyon, or mixed species shrublands dominated by *Dracophyllum*. This latter community mainly occurs to the north of Lake Guyon. Most of the mountain beech remnants show good regeneration with little windfall and contain a reasonable diversity of understorey species, especially along riparian zones. The lower Stanley, south of Aniseed Valley and the lower Waiau Valley south of the Lake Guyon outlet contain the largest areas of manuka and kanuka on the property. They form extensive continuous stands below about 1000m, particularly on sunny faces (west and north facing slopes).

In the upper Stanley River catchment north of Aniseed Valley, and the lower altitude slopes of Mt Stanley, particularly the shady slopes, there are extensive mixed shrublands dominated by *Dracophyllum*, Hebes, *Olearia cymbifolia*, *Gaultheria crassa*, and matagouri. The scrub and shrubland communities are amongst the most extensive, diverse and dense on the property. Further upslope these shrublands grade into very dense and tall mid-ribbed snow tussocklands, with minor broadleaved snow tussock, mountain tauhinu, flax and short tussocks.

At high altitudes carpet grass turflands are extensive particularly on slopes and basins scoured by old glaciers. Along the ridge north of Mt Stanley are a number of small tarns with no outlet fringed by herbfields within the zone of water fluctuation. This community, although small in extent is nationally threatened, comprising very small herbs which are adapted to the fluctuating water regime. Some of the tarns have been eutrophied by use by Canada geese with abundant surrounding droppings and some grazing of adjacent tussocklands.

Around Lake Guyon beech forest fringes the lake, covering most of the lake margin fans and lower slopes and most of the line gullies on the flanks of Mt Stanley and Lake Hill. Here there is abundant regeneration and moderate species diversity including the regionally rare *Bracyglottis greyi* and *Pittosporum patulum*. On a fan north-east of the lake there is an unusual "dry" red and hard tussock community

with *Raoulia parkii* which according to Kelly's Scenic Reserves of Canterbury has no other equivalent in Canterbury.

On river terraces in the Stanley River catchment and in the middle reaches of the valley, immediately south of Lake Guyon exotic grasslands are dominant with modified wetlands and little shrubland vegetation.

In the main Edwards valley there are distinct differences between north and south facing slopes. high level screes. South facing slopes are often covered in short tussock shrublands of fescue and bristle tussock with *Dracophyllum*, scattered Hebes and a ground cover of native herbs. On north facing slopes, particularly at lower altitude, grasslands with a predominance of exotic grasses and herbs are the main cover, with areas of bare ground and scattered shrubs of matagouri. The headwaters and the main side catchments of the Edwards such as Cow Stream, Sadds and Wilmers are more natural with mountain beech remnants and surrounding shrublands of tussock-shrublands of snow tussock, *Dracophyllum*, and snow totara with extensive areas of short tussockland. Scree and rock outcrops are extensive throughout these catchments extending to the valley floors in places.

2.4.5.2 Waiau Valley

The Waiau River marks an ecological boundary with differences either side in the dominance of vegetation community types and condition. To the west most of the landscape is intact with natural vegetation sequences from valley floor to mountain top, particularly in the far west and north. Most of the valley floor of the Waiau River and its major tributaries, the Ada and Henry are modified grasslands with a predominance of exotic species with little natural value. The exception to this are the areas of tall matagouri that dominate alluvial fans and areas of river terrace, particularly in the Ada and Henry and the Waiau north of the Henry River. These fans are a very distinctive part of the property and from my knowledge of other major river valleys in the eastern South Island and other pastoral leases these are the best I have seen in terms of overall aerial extent, number of areas and intactness. Unfortunately, however, over the last three years they have progressively been sprayed with herbicide and over half of the matagouri areas appear to have large parts that are now dead. Valley floors above 900m are in much more natural condition with increasing diversity and dominance of indigenous species.

On lower altitude valley sides beech forest remains intact in the upper Waiau, Ada, Anne, Henry, Jones and Boyle Rivers forming a natural timberline about 1350m. In the middle and lower Waiau valley sides and in the lower Henry most of the beech has been destroyed, leaving remnants in gullies with extensive shrublands of manuka/kanuka particularly on the eastern side of the Waiau and south of Henry. On shady faces shrublands are dominated by Hebes and *Dracophyllum* and on north facing slopes such as in the Henry short tussock grasslands are the predominant vegetative cover.

Above timberline are narrow zones of subalpine shrubland and extensive tall tussockland merging into carpet grassland turflands in cirque basins and rounded

mountain slopes. Snowbanks and wetland flushes are scattered throughout. Above this is extensive rockland and on the Spenser Mountains, areas of permanent snow. All these high altitude areas are unmodified and hardly ever contain introduced species.

In summary, with the exception of valley floors, and some lower altitude north facing slopes in the Henry and lower Waiau the part of the property west of the Waiau is intact, highly natural, with few introduced species and very little sign of human disturbance.

2.5 Fauna

A specific field survey for fauna was not undertaken as part of tenure review, but any birds heard or seen were recorded during the vegetation survey work and information was also gathered from old faunal data-base records as well as previous trips into the area.

Birds

From data-base records and the field survey 44 bird species have been recorded on St James. Of the resident species 30 were native and 14 were introduced including four (category B) threatened species - New Zealand falcon, banded dotterel, black-fronted tern, rock wren.

Native species recorded in forest and scrub remnants include bellbird, grey warbler, silvereye, South Island rifleman, South Island fantail, South Island tomtit, tui, long tailed cuckoo, shining cuckoo, robin, morepork and brown creeper. In the western sections of forest such as the Ada and Christopher River valleys kakariki and kaka are regularly recorded.

The Waiau and Clarence river beds, valley floor tarns and some associated flats are habitat for numerous species including black fronted tern, South Island pied oystercatcher, banded dotterel, southern black-backed gull, pied stilt, black shag, grey duck, mallard duck, white-faced heron, grey teal, New Zealand scaup and paradise shelduck. Australasian harriers were occasionally seen around valley flats along with a mixed array of introduced birds.

Around mountain tops and high altitude slopes birds observed were New Zealand pipit, kea, and in the early 1980s rockwrens were known from the cirque basins of the Spenser Mountains, but these were not re-visited during this survey.

Fish

St James encompasses a wide range of freshwater habitat types including tarns, lakes, wetland associations, rivers and streams. There is little detailed information on their fish and freshwater invertebrate communities and a survey of these components of the freshwater ecosystem was not carried out. This overview is based on existing records from the Freshwater Fish Database for the area.

The three principal salmonids occurring in the area are brown and rainbow trout and chinook salmon. Rivers and streams within the lease provide significant spawning and rearing habitat for adults and sub-adults of all three species. These species in turn support significant recreational fisheries, notably a wilderness, trophy brown trout fishery and a regionally important salmon fishery.

A typical suite of indigenous freshwater fish typical of mid - higher altitude freshwater habitats is represented including the galaxiids: dwarf galaxias, koaro, Canterbury galaxias (formerly common river galaxias) and alpine galaxias; other non-galaxiid fauna includes: upland bully, torrentfish and longfinned eel. There is certainly scope for a more thorough investigation of these waters as undetected species and possibly undescribed galaxiids that form part of the common river galaxias complex may be present.

Principal concerns for the freshwater fisheries are the provision of angler access to the recreational salmonid fisheries and the maintenance of fish passage for the migratory salmonid and indigenous species to complete their lifecycles. The key issues for the protection of instream habitat are the careful management of stock and riparian zones.

Lizards

There is a diversity of lizard fauna on St James particularly in the Clarence River valley. Most of them are confined to rock outcrops or talus usually at the base of mountain slopes and margins of terraces. Only the common skink (*Leiolopisma nigriplantare polychroma*) was found in tussockland away from rock. The most commonly occurring species are common skink and the "common gecko" (*Hoplodactylus maculatus*).

The long-toed skink (*Oligosoma* "long-toes") and the spotted skink (*O. lineocellatum*) both occur on St James in the mid-Clarence valley. The long-toed skink is nationally rare (category B) and was first recognised in the upper Clarence valley. The Balaclava district is one of its strongholds, the only other location known outside of South Marlborough being near Lake Tekapo and the Craigieburn Range.

Invertebrates

There was no survey undertaken for invertebrates. Some beetles and weta were collected during the PNA survey. These were typical of the dry, open eastern South Island. Most species are widespread in Canterbury and Otago. Alpine grasshoppers are conspicuous in the tussocklands, alpine herbfields and scree slopes. *Brachaspis nivalis* and *Paprides nitidus* are common throughout, while *Brachaspis collinus collinus* is found in the St James Range, but may occur further west.

Several butterfly and moths were collected from Lake Guyon by Fereday in the 1880s - *Epichorista hemionana*, *Orocrambus callirrhous*, *Dasyuris strategica*, *Epiphyryne xanthaspis* and *Graphania agorastis*.

2.6 Historic values

2.6.1 History

Although there are no recorded archaeological sites on St James there are a number of access routes used by Maori travelling between the east and west sides of the South Island during the summer months. The main routes used were via the Awatere River and Tarndale on Molesworth and Lake Tennyson (Rangi Tahī), Waiau (Wai au uwaha), and Ada Valleys on St James, and then out to the West Coast via Cannibal Gorge (Kopi O Kaitangata) and Maruia.

St James Station, like many of the early larger Canterbury runs is an amalgamation of several smaller runs. The current property had its beginnings when the "Edwards Block" was taken up by G. Edwards in 1862. A cob homestead was built in the Edwards River valley, but it may not have been built by Edwards. There has been a suggestion that there is some evidence of this occupation in the form of cob mounds but the exact location is not known. In 1863 Edwards transferred the run to G. Willmer who also ran St Mary's and Rockhouse in the Waiau along with the Edwards block.

Other runs to be taken up in the area and then added to make up the current St James are as follows:

RUN	RUNHOLDER	DATE	AMALGAMATED
Rockhouse	G. Willmer	1863	1863
St Mary's	G. Willmer	1863	1863
Lake Guyon	W.T.L. Travers	1860	1879
Ada	W.T.L. Travers	c1864	1879
Henry	W.T.L. Travers	c1864	1879
Stanley Vale	J. Young	1865	1892

By 1877 the Clarence Valley Run (Lake Tennyson, Lower Valley and Mt. Muntz Runs) had been amalgamated to make up St Helens. From 1896 to 1902 this was managed along with St James by J. McArthur. In 1907 W. H. F. and A. L. Pratt took over St James while the New Zealand Loan and Mercantile Agency Co. took over St Helens.

The Ada and Henry runs, as far as can be ascertained, did not have homesteads built and were run by Travers, his managers and later runholders from Lake Guyon.

The Lake Guyon homestead was a cob building on the lake shore. There is considerable evidence of this early occupation at the site including remains of cob buildings. When Young took up a block of land in 1865 he located his homestead near the Stanley River about 3.5 km south of the Lake Guyon Homestead. He soon transferred the run to W.L. Fowler. Fowler, named it Stanley Vale. Access to Lake Guyon and Stanley Vale from Hanmer was by way of Jollies Pass, the Clarence Valley and Fowlers Pass. A two roomed mud and stud hut with vertical board and batten cladding and other homestead features still remain on the site.

Little is known about the Rockhouse and St Mary's runs, except that these two runs were merged with the original Edwards Block by Willmer and were located to the south of the Henry River and west of the Waiau.

The current St James run buildings are located on the Tophouse Road in the Clarence Valley with a base in the Waiau Valley near the confluence with the Ada River. The St James homestead itself was burnt down in 1947. However, the woolshed, stable and cookshop still survive from the 1880's. The current Ada homestead in the Waiau Valley was built some time between 1879 and 1896 by J McArthur, possibly with portions of it being relocated from Lake Guyon and Stanley Vale.

2.6.2 Significant Historic Places.

St James Station has a number of historic places ranging from homestead sites with their associated buildings to rabbit fences. The majority of these historic places occur on the small pockets of freehold. For full details of these sites refer to the original historic report and its attached Historic Site Record sheets.

- *St James Station run buildings*

Located in the Clarence Valley there are three historic buildings - the woolshed, cookhouse and the stable. All these buildings may have been built around 1880 which would tie in with McArthur's development of St James and it being managed jointly with St Helens. Because of the construction of the woolshed and stables and the integrity of the cookshop these buildings have considerable historic value.

- *Lake Guyon Homestead Site*

At the Lake Guyon homestead site there is clear evidence of the early occupation. Still visible today are the remains of the cob homestead, poplar trees, garden and orchard area with its rock walls, sheep-dip and yards.

This site is an important archaeological site as it has had very little modification over the years.

- *Ada Homestead And Out Buildings*

The complex at the Ada consisting of the homestead, men's quarters and implement shed is a good representation of early colonial run buildings with the main interest being in the mud and stud construction of the old homestead itself.

Nearby, surrounded by silver birch trees, is the grave of a musterer Peter Sinclair.

- *Stanley Vale*

The Stanley Vale Homestead built by Young around 1866 is in good condition having been restored in 1988. This mud and stud, timber clad two roomed hut and its setting along with a belt of poplar trees, like Lake Guyon, is significant in the establishment of pastoral farming in the area.

- *Edwards River Homestead Site*

Although this site has not been visited the outline of the 1860's cob homestead and some cob fence remains are supposed to be visible. Because the Lake Guyon site appears to be more intact it is regarded as more significant than the Edwards.

- *Rabbit Fence*

The section of the 1880's rabbit fence from near the top of Malings Pass down to the Waiau, known as the "Wing Fence" is in good condition. The fence which reportedly went for 78 miles was built in the Amuri in an endeavour to control a rabbit plague. Any sections of this fence that remain are important and rate highly alongside the Horsley Downs and MacKenzie to Hakataramea rabbit fences. There is also an original heavy iron gate at Lake Tennyson and another outside Fowler's Hut where a further section of fence also remains.

- *Fowler's Hut*

This is a two roomed hut built about 1890 by the Hurunui Rabbit Board to provide accommodation for Rabbit Board staff to maintain the fence and carry out rabbit control. On the Tophouse Road frontage is a section of the original 1880's rabbit fence complete with iron gate.

The hut and section of fence has high regional historic significance. The status of the land around the hut is UCL.

2.7 Public recreation

2.7.1 Physical characteristics

St James, along with Molesworth, is characterised by the large scale of the main valleys and by big travel distances. The lack of vehicle access means that horse riding, cycling or 4 w.d. are the main means of "transport". On the larger river systems, kayaking and rafting are also possible. Other than the popular St James Walkway the prospect of encountering other people on St James is very remote.

According to the Recreational Opportunity Spectrum (ROS) mapping system St James is predominantly classified as "Remote" and "Walk in". The combination of formed and unformed "legal roads" and other 4 w.d. tracks, while technically affecting the ROS scale of "Wilderness", in reality have little impact on the property. This means parts of St James could potentially be classified as "wilderness", particularly given its setting.

2.7.2 Public access

St James is criss-crossed with unformed legal roads, some following sensible and accessible lines, but many not. The 4 w.d. track over Malings Pass, and through Peters/Edwards Valley, as well as the old pack track over Fowlers Pass follow more or less the legal roads, but all have sections where the legal and track access do not co-incide. There is also legal access along the valley floors of the Ada River, the Waiau River from the Hope River in the south to just above Caroline Bivi, the length of the Henry (both branches) Anne Rivers, Boyle, as well as the Stanley from the Waiau River to Fowlers Pass and Lake Guyon and then through to the Waiau River again, into Horrible Stream, Edwards Pass/Edwards Valley and into Muddy and Jones River valleys and around Lakes Guyon and Tennyson as well as the length of the Clarence River. There are also legal roads to some of the tops of the Opera and St James Ranges such as Rokeby, Mt St Mary, Mt St George, Mt Wilmer and Pollock, Plinlimmon, Zampa and Maritana. However, very few of these legal roads are practical lines to follow - they are not marked out on the ground and are therefore very difficult to actually find. Access therefore to any parts of the property other than the St James Walkway is by permission of the lessee.

The St James Walkway itself has not actually been gazetted, but walkers use the track through a legal agreement with the lessee. Although people regularly drive the Clarence hydro road this is also not legal road.

2.7.3 Activites

Because of its location and-size St James offers a range of recreational experiences in a rural and mountainous setting. The popular tramping route, the St James Walkway, crosses the lease for 41 of its 66 km. Approximately 3000 people a year walk the track, and most stay in the three DoC huts (Christopher, Anne and Boyle Flats - the latter is just outside of the lease area) built in 1980 as part of the national walkway network.

The property has six other huts that the Department administers, all ex-Forest Service cullers huts. There are also four station huts, two of which have historic value. These huts are Stanley Vale and Fowlers.

Another recognised tramping route on the pastoral lease is the upper Waiau River, giving access to Nelson Lakes National Park via the Waiau Pass. Permission to walk this route must be obtained from the lessees.

Another popular destination is Lake Guyon, a fishing lake that has stocks of brown trout. The Waiau River, and portions of the Christopher, Ada, Boyle and Stanley Rivers are all fished by anglers seeking a wilderness experience, with several parties a year flying in to fish the river. Some of these river valleys, together with Lake Guyon, the Muddy Lakes and Edwards Valley are also important from a game bird hunting perspective. Foot access to Lake Guyon is via Fowlers Pass, and to the Waiau River is via Malings Pass, Fowlers Pass or the St James walkway. Access to the lower Waiau is via the Edwards Valley. Another possible tramping route is the lower Waiau valley between the Henry and Edwards Rivers following an old pack track and more recent bulldozed access for stock. All require permission from the lessee as parts of the access cross pastoral lease.

The Spencer Mountains is regularly used by climbers throughout the year. The main peaks that are climbed are Gloriana at 2218 metres, Faerie Queen (2236m) and Mt Una (2300m). In the St James Range further east, Mt Princess 2126m is climbed from Lake Tennyson.

Some mountain bikers use the tracks on the pastoral lease - particularly over Malings Pass and in the Edwards Valley, but are also known to go over Fowlers Pass to Lake Guyon and into the Waiau valley.

Several kayaking parties each year gain access to the Waiau River via Malings Pass and paddle out to the Ferry Bridge at Hanmer. The section of river from the mouth of the Henry River to the junction with the Hope river is moderately challenging because of the number of gorges, but is not popular because of the difficulties with access.

There is limited hunting on the property, with low to moderate numbers of red deer, chamois and pigs. The property offers many horse trekking options with a number of guided treks using the area during the summer months.

The Amuri Ski Club operate a ski-field on the pastoral lease. The skifield has a poma to the top of Mt St Patrick, and two rope tows, with a day lodge and accommodation lodge. Other commercial recreation activities on the property included guided walks along the walkway, a heliski operation and guided fishing.

PART 3 - CONSULTATION AND DISTRICT PLANS

3.1 NGO Consultation

A meeting was held on 5 May 1995 with representatives from the Four Wheel Drive Club, North Canterbury Conservation Board, Forest and Bird, FMC, North Canterbury Fish and Game Council and the Environment Centre to discuss the tenure review on St James amongst other properties.

St James was considered amongst some in the group to be one of the most important properties in terms of conservation in Canterbury. Purchase of the whole property

was considered to be the best option to achieve this. There was opposition to freeholding of the valley floors - this was seen to be creating grazing enclaves within future DoC land. Rather it was seen that grazing leases on the valley floors would be more appropriate.

The 4 w.d. Club were keen for vehicle access over Malings Pass into the Waiau.

The North Canterbury Fish and Game Council were concerned at the impact of cattle on spawning streams and at the high number of geese. They noted the property contained significant populations of sportfish and gamebirds as well as an important recreation fishery. Access for management purposes, and for anglers and shooters was also of concern. They have since produced a resource report outlining results from surveys of anglers, quinnat salmon, and game birds. The report also includes recommendations on access and protection of habitat. These recommendations include vehicle access over Malings Pass, and between Lake Guyon and Muddy Lakes (across freehold), foot access to the upper Waiau, upper Ada and Christopher Rivers, Lake Paget, Henry River, over Fowlers Pass to Lake Guyon, to the Stanley River, from Muddy Lakes downriver to the Stanley Gorge, to the Boyle River, Edwards and Peters Valleys, upper Clarence and to Paradise Lake in the lower Waiau between the Henry and Stanley Rivers. Fish and Games habitat recommendations include protection from stock and impacts of human practices for 18 main areas including a number of springs as well as the upper Waiau, the main stem of the Waiau River between Malings Pass and the Ada River, the Ada River, upper Ada catchment including Lake Paget and associated wetlands, Henry River, Boyle River, upper Clarence and Horrible Stream wetland.

Since starting to write this report Forest and Bird and FMC have inspected parts of the property and plan to make further recommendations on the property's values and possible protection mechanisms for these values. To date these are not available.

3.2 District Plans

St James lies within the Hurunui District. Their proposed District Plan was notified in September 1995. After consultation and submissions, decisions and minor amendments were released in a document produced in August 1997.

The plan identifies nearly all of St James (except an area around Philosophers Knob) as being of outstanding landscape value. It also identifies three areas on the property as significant natural sites - the Waiau River, Hanmer indigenous remnants and Little Lake (all SSWIs). It also identifies seven areas as "potentially significant natural sites" which have a similar status as the significant natural areas in terms of plan rules but these areas are subject to be review to determine if the sites should be incorporated into the plan. Council will do the review by conducting further research and consultation with affected parties within two years of the Plan being operative. These areas are the seven RAPs identified in the Molesworth PNA survey - BAL 2 Belvedere, part of BAL 8 Edward-Muntz, BAL 10 Fowlers-Duncans, BAL 11 Glenrae, BAL 12 Guyon-Stanley, BAL 17 Muddy, BAL 22

Tennyson. The plan also identifies one site on St James as a heritage feature - the Stanleyvale cob hut.

- For areas of outstanding landscape value forestry (excluding associated earthworks) buildings (other than private dwellings and their accessory buildings) are discretionary activities which means a resource consent is required.
- Earthworks, including the construction of roads or tracks but excluding tracks providing for foot access, are a *permitted activity* where there is cumulatively less than 1000m³ within any three year period. Clearance of indigenous vegetation, including by burning, is a permitted activity where the clearance is limited to maintenance or construction of foot access less than three metres wide, or maintenance of existing drains, ponds, vehicle tracks provided that clearance within a one-year period is limited to 5% or 1 ha of the area of any landholding, whichever is the lesser. Beyond these limits earthworks and vegetation clearance are discretionary activities. The Council's definition of indigenous vegetation, however, means that many modified areas are excluded from the coverage of these rules.
- In the area identified as a *significant* landscape area, the Philosophers Knob/Mt Federation part of the Opera Range forestry and buildings are controlled activities but the matters for control are limited to location of access roads and tracks, species and location of trees in relation to 'take-off' sites, planting on skylines and for buildings they are exterior finishes, including colour, and landscaping.
- For significant natural sites and potentially significant natural sites it is a discretionary activity to damage, remove or destroy any feature, tree or indigenous vegetation. Also any new planting, habitat restoration or enhancement work shall use locally occurring indigenous plant species, soil and rock.
- In all areas it is a discretionary activity to remove any indigenous vegetation located within 20 metres of any river, stream or wetland or within 50 metres of the margin of a lake listed in Appendix EI of the plan. It is also a discretionary activity for any building or forestry located within 20 metres of the Clarence or Waiau Rivers, any wetland or Lake Guyon or Tennyson. Earthworks within 20m of a stream, 50m of a wetland or 100m of any lake listed in Appendix E are also discretionary.
- Other discretionary activities are commercial recreation on the Waiau River, or within 20 metres of the margin of any river, lake or wetland; farming, keeping or release of deer species, thar, chamois or wild pig in the high country; harvesting of indigenous vegetation under a sustainable forest management plan or permit approved under the Forests Amendment Act.

4.0 RECOMMENDATIONS AND JUSTIFICATION

4.1 Introduction

The areas described in the proposals below have, in the Department's opinion, high conservation values and should be taken into account in tenure review discussions, along with public access requirements.

4.2 AREAS TO BE FULLY RESTORED TO THE CROWN

There are two large areas on St James recommended to be fully restored to the Crown. The two areas are adjacent to each other i.e. they are continuous at the top of the Waiau Valley, but are slightly disjoint in the lower Waiau. Because of this, and because they have some characteristics that are different from the other, they are described separately.

1. Upper Waiau, Ada, Henry/Anne, the Boyle and Jones Rivers and the upper Clarence River catchment including Lake Tennyson and Princess Stream

Recommendation

It is recommended this area of around 36,500 ha covers the western and northern parts of the property be administered by the Department of Conservation as a Conservation Area.

Justification

This area has very high nature conservation values. In particular it:

- contains a really wide diversity of vegetation types forming continuous unmodified sequences from the valley floor to high altitude cirque basins and mountain tops, all in excellent condition. This includes comparatively natural grassland flats with overlying areas of matagouri, large areas of mixed beech forest, mixed species shrubland, alpine tussocklands, rock and permanent snow.
- a range of wetland types at all altitudes in a natural condition
- wide range of habitats for bird-life from wetlands, shrublands, forest and mountain tops
- highly natural and intact landscape character within a dramatic and distinctive mountain landscape

Other special features include:

- well-developed glacial landforms in the upper Clarence, Waiau and Ada

valleys

- Good quality, dense, short tussockland in the upper Clarence Valley which supports a low number of introduced species compared to similar grasslands on valley floors in the lower Clarence and Waiau valleys.
- Highly natural riverbed vegetation on the upper Clarence, lacking many of the introduced species which characterise many of the riverbeds in the rest of the district, particularly vipers bugloss and woolly mullein.
- The alluvial terraces and fans at the head of Lake Tennyson, Ada, Waiau and Henry support populations of tall, dense matagouri which are possibly the best in Canterbury.
- The nationally threatened red mistletoe, *Peraxilla tetrapetala*, occurs as rare individuals in the beech forest in the mid-Waiiau valley and on the western side of Lake Tennyson.

Management and boundary issues

Fencing will be required to prevent stock in the:

- Anne and Boyle Rivers and upper Henry near the Anne/Henry confluence,
- upper Ada River somewhere near the Christopher River and
- upper Waiau at the current fence line down from Malings Pass.

2. St James Range and valleys

Recommendation

- It is recommended that an area of around 38,000 ha in the St James Range be administered by the Department of Conservation as a Conservation Area.

Description

This area covers the upper and lower Stanley River valley (i.e. not the middle), mountain slopes north and south of Lake Guyon, and all mountain slopes and valleys north of the Edwards River except the far downstream end near the Waiau River. It also includes the basin area east of Edwards Pass to the Clarence River, Peters Pass and the higher altitude slopes of the Hanmer Range including Cow Stream, Williams Valley and the upper Styx - see map for boundaries.

Justification

This area includes a extremely wide range of natural environments - from mountain beech forests, to dry valleys, mountain tops and wetlands. Although much of this side of the Waiau has historically been burnt it remains in a natural state with

vegetation communities dominated by indigenous species, a low exotic component, and minimal disturbance by stock.

Other special features of this area are:

- the most extensive and continuous areas of turpentine scrub/shrublands, and slim snow tussocklands in the district
- The nationally threatened vegetation community occupying the seasonally wet depressions and tarn margins north of Mt Stanley. Although small in extent, this community comprises very small herbs which are adapted to a fluctuating water regime. It is easily destroyed by physical modification of its landform, exotic weed competition, and grazing animals.
- the regionally uncommon dry red tussocklands on the fans and moraines around Lake Guyon, and on the ridge above Sandy Stream. Otherwise these tussocklands are normally found in Marlborough and Canterbury on alluvium.
- an exceptional diversity of landforms and associated communities around the Edwards Pass flats, including the most extensive low relief area on St James still predominantly covered in native vegetation.
- A good variety of tectonic features around Edwards Pass, some of which are obvious and well-developed examples, including fault trace scarps, a low relief fault pass, sag ponds, and offset streams, hills, fans, terraces and moraines.
- the largest horizontal displacement measured across the Clarence Fault. At 360m the fault scarp across the moraine at grid reference N32?? 907673, just south of Edwards Pass, is classified as a tectonic feature of regional scientific and educational importance (Stirling 1988). The site is monitored for precise strain measurements by the Earth Deformation Section, DSIR Geology and Geophysics.
- the largest areas of red tussock communities on St James.
- excellent examples of cushion bog communities and sedge wetland vegetation. They are diverse, highly natural cover, and very uncommon elsewhere on St James.
- a number of unusual or notable plants including *Pittosporum patulum* in a forest remnant in Horrible Stream under Red Hill, at the base of Malings Pass, Lake Guyon and Williams Stream. This is a regionally rare plant usually only seen as juveniles. Adults are very rare. *Carmichaelia corrugata*, a mat broom, is also regionally rare known from a few scattered colonies - including along the terraces of the Clarence River within this recommended area. Near Lake Guyon is the regionally rare plant *Brachyglottis greyi*.
- The presence of bog pine - bog pine shrublands are rare in Marlborough and eastern South Island, and are typically represented only by senescent shrubs of a

community which would have been common over gentle, open country such as valley flats and moraines. In the Edwards Pass area there is a diversity of size classes apparent - evidence of regeneration.

- The rock outcrops on Samoa Ridge and along the Clarence River provide excellent lizard habitat, supporting one of the highest diversity of lizard species in the three districts surveyed. Animals present are two species of common gecko, common skink, green-spotted skink and long-toed skink. The latter is nationally rare, known only from a handful in inland Marlborough, mid-Canterbury and Otago.

Management and boundary issues

Fencing will be required to prevent stock in the:

- upper Clarence somewhere near Pass Stream
- upper Stanley somewhere near Aniseed Valley
- Edwards Pass basin area

COVENANTS

It is proposed that one large area be covenanted to protect landscape values including the maintenance of wetlands and matagouri shrublands. This is in the Waiau Valley and includes the area of current freehold.

Recommendation

- It is recommended that the area of land in the Waiau Valley that is freehold, and that will be freeholded as part of tenure review be protected by a conservation covenant.

Management and boundary issues

The objectives of the covenant would be to retain the semi-natural character of the flats, riverbed/riparian areas, wetlands and areas of matagouri. Tree planting is probably the greatest threat, as well as major earthworks, and burning or spraying/clearance of shrublands, particularly the matagouri on alluvial fans and terraces.

The covenant conditions would mean requiring approval to erect any building or other structure, any cultivation or earthworks on land near the wetlands, stream edges and matagouri as well as any tree planting, and burning and spraying of shrublands.

Further investigation is required to take account of wildlife and fisheries values in the Waiau River and adjacent bed.

ACCESS ARRANGEMENTS

1. That foot, mountainbike and horse access be provided by easement on any land that is freehold along:

- the 4 w.d. track from the Clarence Valley Road over Malings Pass to the Waiau Valley and Lake Guyon, and down the Waiau River below the Ada and Henry Rivers along the old pack track to the Edwards River, but not in the Ada or Henry Valleys themselves.

Part of this access is over land recommended to be administered by DoC and would not require an easement if implemented, but the remainder is over land that is currently freehold or is on land that may be freehold through tenure review.

- the 4 w.d. track in the Edwards Valley between the Clarence River and Waiau River. This is to link in with the St James Walkway and the 4 w.d. track in the Waiau River from the Henry valley north to Malings Pass and to use the McArthur/Audrey Stevenson Swingbridge.
- on the old pack track over Fowlers Pass, to the Stanley River and Lake Guyon. If the recommendations for Crown retention are implemented most of this access will be on land administered by DoC and would not therefore need to be covered by an easement. However, part of this line covers an area that is currently freehold - around Lake Guyon and Stanley Vale, and an area that is not recommended for Crown retention - in the middle reaches of the Stanley River.

2. That foot access only be provided:

- between the Christopher Hut in the Ada Valley and the 4 w.d. track in the Waiau Valley, north of the Ada homestead. This is over current freehold land and is to be sited well north of the Ada homestead around the base of the hill.
- to the upper Waiau valley north from the 4 w.d. track that goes over Malings Pass

3. That St James Walkway be defined for gazettal under the Walkways Act over those areas that will be freehold (note part of the walkway already goes over current freehold).

4. An easement will be required for the owners of St James over areas of DoC land. This will include around Edwards Pass, from the Clarence River to the Waiau over Malings Pass and over Fowlers Pass and the lower parts of the Stanley.

OTHER MATTERS

Historic

That the three historic St James run buildings (in the Clarence valley), the Lake Guyon homestead site, Ada homestead and out buildings, the rabbit fence and Fowlers Hut be included in the schedule of historic places in the Hurunui District Plan.

That all the St James historic run buildings (in the Clarence valley), Ada homestead and outbuildings, Stanley Vale and Fowlers Hut merit registration pursuant to the Historic Places Act 1993 and should be brought to the attention of the Canterbury Branch Committee of the NZ Historic Places Trust.

Discussion of NGO comment

The recommendations in this report do not agree with the NGO's recommendation to purchase the whole property. In this report some freehold areas are likely on valley floors in the Waiau and Edwards River valleys and in the lower Clarence. This is because there are already large areas of freehold in the Waiau and around Stanley Vale and the areas that are not recommended for Crown retention are predominantly farmland. If, however, the lessees were willing to sell these areas of freehold and if the Crown had the finances to purchase the whole property it would be highly desirable to pursue this option.

Acquisition of freehold

Lake Guyon Scenic Reserve consists of the lake bed only, but is surrounded by areas of biological, scenic and recreation interest - on land which is currently freehold title. In order to protect these values it is recommended that the Crown purchase some of this freehold land - on the north-east side of the lake.