

Crown Pastoral Land Tenure Review

Lease name : Cascade

Lease number : Ph 003

Conservation resources report

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

The report attached is released under the Official Information Act 1982.

Copied November 2002

**DOC CONSERVATION RESOURCES REPORT ON THE
REVIEW OF CASCADE PASTORAL LEASE**

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

2.1 Landscape

Cascade Pastoral Lease is situated in South Westland between Jackson Bay in the north and Fiordland in the south. It is located within the upper reaches of the Cascade River flood plain and includes adjoining forested toe slopes and outwash terraces. It is one of two pastoral leases within the valley floor in an area otherwise surrounded by Public Conservation Land.

The Cascade is a remote valley and is part of largely unmodified tract of land that extends from the sea to the main divide and from Jackson Bay to the south west tip of Fiordland.

The Cascade River landscape is typical of river valleys in South Westland with dense lowland rain forest on the ranges and, outwash terraces, and open grassy river flats. The Cascade and Martyr Rivers and their tributaries are major features of the valley floor.

Geologically the Cascade area is interesting as it lies on the edge of the Red Hills Ultramafic zone. This distinctive red range lying to the south is a distinctive feature from the valley. On the opposite side of the valley, the Cascade Plateau, a giant lateral moraine, is another significant and distinctive landform feature. The plateau extends from Cascade Point and slopes on a long and even incline to the northeast.

Methodology

Landscape units and landscape types for the Cascade Pastoral Lease are firstly defined as the basis for analysis and description of the landscape. The landscape character is then described along with a description of the key visual and scenic attributes. This is followed by an evaluation summary using a range of criteria to assess each unit and assist with determining each unit's high inherent values. The criteria include:

Intactness: - refers to the condition of the natural vegetation, patterns and processes and the degree of modification present.

Legibility: - refers to its expressiveness - how obviously the landscape demonstrates the formative processes leading to it.

Aesthetic Factors: - include criteria such as *distinctiveness* - the quality that makes a particular landscape visually striking. Frequently this occurs when contrasting natural elements combine to form a distinctive and memorable visual pattern. A further criteria assessed under aesthetic factors is *coherence*. This is based on characteristics including intactness, unity, continuity, and compatibility. Intrusions, alterations, disruptions tend to detract from coherence.

Historic Factors - refers to historically valued attributes in the context of a high country landscape

Visibility - refers to the visibility from public places such as highways, waterways or local vantage points.

Significance - is the significance of the characteristics and features, or combination of characteristics and features within individual units. If they are locally, regionally or nationally significant.

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Vulnerability - is a measure of each landscape unit's susceptibility to further ecological deterioration, which would impact on landscape values.

Cascade Pastoral Lease is considered to belong to one landscape unit that includes all of the Cascade flood plain and enclosing ranges. However within this unit there are two landscape types found.

- a) Forested toe slopes, outwash terraces and moraine
- b) River Flats.

Landscape Character Description - Cascade Valley

Forest covered toeslopes, outwash terraces and moraine landscape

The forested toe slopes, and outwash terraces around the margin of the lease comprise a mix of dense beech, kamahi, rimu, kahikatea lowland rainforest and associated understorey.

Included within this type is Charles Bump, a forested moraine which protrudes into the open river flats. It is a notable landmark on the valley floor.

Generally there is little intrusion by cattle into forest areas although forest remnants on the flats are heavily impacted upon.

River flats landscape

River flats make up the majority of the lease.

The river flats on the true left of the Cascade River and between the true right and the Martyr River are relatively similar in composition and character. These are open, predominately grass covered flats with gravel and sand dune areas close to the river. Remnants of tall forest (including kahikatea) and shrubland are scattered across the flats. Also characteristic is a myriad of dry and wet watercourses and backwater areas. The rivers course is highly dynamic.

Close to the river, drifts of toetoe have colonised recent soils and sand dunes and their flowering flumes were prominent during the site inspection. Other scattered remnants across the flats include flax, manuka, coprosma, tutu, cabbage tree as well as the tall forest remnants. Rank exotic grasses and legumes however, dominate the groundcover over wide areas. Rushes are also widespread amongst the grass sward especially in wetter zones. Other common characteristics include prickly shield fern on the edge of bush, and *Carex secta* lining waterways and ponds. Within a small area on the true right of the Martyr (bull paddock) in the northwest, the pattern is reversed with regenerating shrubland dominant over grass. Pugging by stock is a feature.

The shrubland and forest remnant, wetlands and riverbanks, unlike the forest margins, are being impacted on by cattle grazing. Viewed at close range there is a rawness and immaturity that is common in landscapes that are in transition from a natural state to a more culturally modified one.

Viewed from a distance however, such as the viewpoint from the Jackson River Road, the landscape appears much more coherent and less fragmented, with a high level of natural character. This is partly due to the power and dominance of the surrounding forested slopes and terraces surrounding and the mostly intact natural patterns and processes. The imprint of human activities from this perspective are insignificant in the context of the wider landscape. Cultural features are limited to the cluster of buildings associated with the Martyr homestead, outlying huts, the Barn Bay access road and fenced paddocks close the homestead.

Cattle pugging and the effects of grazing on vegetation and wetlands is the most significant aspect of human modification and use.

Visual & Scenic Values

Visual and scenic values on Cascade Pastoral lease are related to the following factors/characteristics or combination of-

- visual values associated with the waterways/wetlands and riparian vegetation eg. *Carex secta*.
- the distinctive and memorable views from the river flats to the Red Hills, Cascade Plateau and surrounding forested ranges.
- the visual effects of the forested margin which envelops the lease and the contrast of the open valley floor. Also the natural pattern of forest intersecting and intermingling with river flat.

Charles Bump is a significant physical and visual feature in the context of the valley
The impact of grazing on the remnant forest shrublands and wetlands impacts on visual values depending on the perception of the viewer.

Evaluation Summary

Table One

Criteria	Value	Comment
Intactness	Medium	High within forested hillslopes and outwash terraces. Low to medium on river flats
Legibility	High	Glacial and fluvial processes highly legible
Aesthetic Factors	Medium	At a macro scale appears as a unified and coherent landscape with intact natural patterns. At the micro scale is more fragmented and less coherent. Cascade Valley as a whole while distinctive and memorable, is not dissimilar to other areas of South Westland.
Historic Factors		Not significant. Cultural values associated with cattle grazing in the Cascade
Visibility	Low	Visible from Jackson River Road end
Significance	High	Part of a large tract of largely unmodified natural landscape and NZ South West World Heritage Area
Vulnerability	Medium	Under current landuse and management - damage already done. Change in landuse or more intensive farming regime may increase level of degradation

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Significance of landscape values

Cascade Pastoral Lease is an isolated pocket of modified land within a largely natural landscape that extends from Jacksons Bay to Fiordland. Part of the inherent character of this vast tract of land is its remote and wilderness values set in a pristine natural environment. In many respects this enclave of modified land is anomalous with the character of the wider landscape.

There are two levels of landscape values on Cascade pastoral lease. The first level is values contained within the lease itself and associated with the natural patterns of forest, shrubland, wetland and river flats. The second is related to landscape values associated with a large area which possesses wilderness attributes and the South West New Zealand Te Wāhi Pounamu World Heritage Area

In this, as in most landscapes, naturalness equates to high landscape values. While some of the naturalness and intactness of these patterns have been modified within the river flats, the integrity of the indigenous landscape is essentially intact.

On the other hand it is also important to state that landscape values within the Upper Cascade pastoral lease are not unique to the Cascade and are similar to other areas of South Westland.

The most significant aspect of landscape values associated with Cascade Valley however, is the second level. That is the broader one of a large remote area with wilderness qualities and pristine natural landscapes of which Cascade Pastoral Lease is a part. The possible consequences of fragmentation of the Cascade is to diminish the remote/wilderness and naturalness of the whole.

While a degree of fragmentation has already occurred, in this environment and at the current level of modification, the process is reversible.

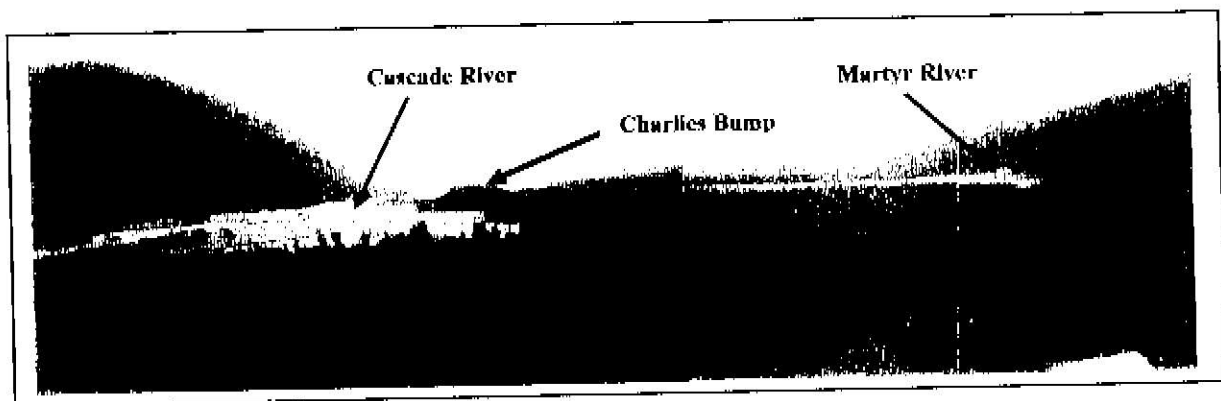


Photo One. Upper Cascade Flats from Jackson Road Lookout

2.2 Landforms & Geology

The lease area is predominantly comprised of post glacial alluvial outwash from the Cascade River of mixed composition, reflecting the contrasting geological makeup of the river's headwaters. The Red Hills on the western side of the catchment are composed of ultramafic material (iron and magnesium rich), volcanic rocks and serpentine -- collectively these materials are termed ophiolites. Ophiolites form where the collision of two continental plates crush a section of sea floor between them resulting in the exposure of a rock layer which normally lies

beneath some 3km of unconsolidated sediments and sedimentary rocks. The Olivine Mountains on the eastern side of the Cascade catchment are comprised of Haast Schists.

Charles Bump (77m a.s.l.) comprises moraine outwash. Forested country on the south side of the Cascade comprises relatively freely draining alluvial outwash surfaces whilst other alluvial and moraine outwash surfaces are podolized and are poor draining (for example forested flats west of Charles Bump and toeslopes west of the Martyr homestead).

2.3 Climate

Climate is typical of enclosed valleys in South Westland. Annual rainfall is approximately 4000mm with a spring maximum. Winters have a tendency to be drier with frequent frosts.

2.4 Vegetation

Description

The lease includes two major vegetation types – tall forest on toe slopes, glacial outwash terraces and river flats, and open vegetation generally dominated by adventive grasses, rushes, sedges, flax and shield fern on river flats. A number of isolated remnants of tall forest are scattered over the flats. Areas of shrubland and wetland are scattered throughout. The tall forest communities were well described by Woolmore (1989), and this description is summarised here. The vegetation survey undertaken between April 22nd and 24th 2002 concentrated on the river flats, including the remnant forest stands and shrublands as these areas have been less thoroughly described during previous surveys.

Areas of continuous forest

Most of the forest areas are on hillslopes around the margin of the lease. Woolmore (1989) identified a number of different forest types within this lease. Kamahi (*Weinmannia racemosa*) with occasional rimu (*Dacrydium cupressinum*) and miro (*Prumnopitys ferruginea*) dominate the colluvial slopes on the true left of the Cascade at the western end of the lease. Silver beech (*Nothofagus menziesii*) and kamahi form the canopy, with occasional emergent rimu further upstream on the alluvial terrace adjacent to Colin Creek. Similar forest occurs on the alluvial outwash terrace at the eastern end of the lease. The beech mistletoe *Penicilla colensoi* is common where silver beech is present.

Charles Bump supports an unusual assemblage of beech species (silver, mountain (*Nothofagus solandri* var. *differtoides*) and red (*N. fusca*) in a small area. An adjacent fertile wetland is fringed with kahikatea (*Dacrydium dacrydioides*). A diverse mixture of mountain beech-silver beech-rimu-kamahi occurs on an area of moraine outwash at the southern corner of the lease. Wetter parts of this area are dominated by low-statured vegetation including manuka (*Leptospermum scoparium*)-*Lepidosperma australe* and *Baueria rubiginosa*. *Carex* species, particularly *C. secta*, dominate areas with large pools of permanent standing water. There are hummocks of *Sphagnum cristatum* throughout this area. Other species present include flax (*Phormium tenax*), *Cladonia laxiflora*, *Bledium minus*, *Myrsine diuricaea*, mountain beech and silver pine (*Manoao colensoi*).

There was little evidence of cattle impact within the forest areas. Woolmore (1989) also found that the impact of cattle on these areas of forest was minimal, but noted that any increase in stocking rates could lead to increased impacts, particularly in the wetlands. Cattle were accessing the small forest remnants on the river flats, and heavily impacting on the understorey by trampling and browsing.

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Photo Two. Mixed Beech/Podocarp Forest – Southern Side of the Cascade River.

Open river flat vegetation

Vegetation cover varies depending on the age of the river flats. Very recent flats have little vegetation cover and are a mixture of sand, silt deposits and river gravels. The early colonisers include *Raoulia tenuicaulis*. Other species commonly present include *Muehlenbeckia axillaris*, *Coprosma acerosa*, and the grasses *Lachnagrostis filiformis* and silver tussock (*Poa cita*). Toetoe (*Cortaderia richardii*) is sometimes present, particularly at the eastern end of the river flats on the true left of the Cascade (Photo 3).

Older flats are dominated by adventive grasses, particularly browntop (*Agrostis capillaris*), Chewings fescue (*Festuca rubra*), tall fescue (*Schedonorus phoenix*), sweet vernal (*Anthoxanthum odoratum*) and Yorkshire fog (*Holcus lanatus*) with some clover. Typically less than 30% of vegetation cover is native. Native cover is comprised of scattered *Poa cita* tussocks, shrubs including manuka and the broom *Carmichaelia australis*, and a ground layer of herbs including *Leptinella squalida* and *Pratia angulata*. The tussock forming sedge *Carex flagellifera* is common amongst the grass sward in all but the most free draining areas. At some locations on older terraces a sparse vegetation cover exists amongst areas of cobble and gravel; for example in some areas on the south side of the Cascade vegetation are dominated by lichens, mosses and *Coprosma acerosa* with scattered native and adventive grasses.

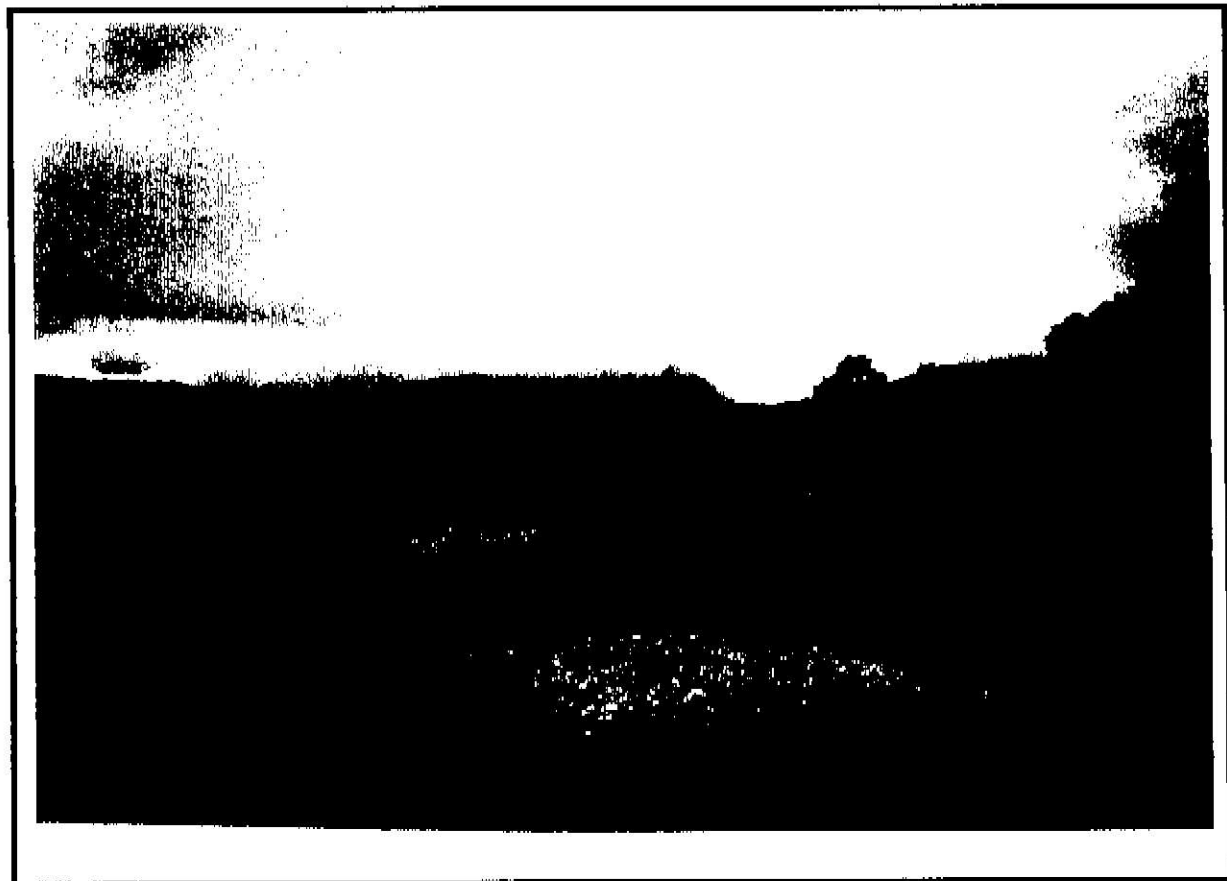
The natural cover of these river flats prior to clearance for farming was probably a mosaic of tall forest patches, shrubland, wetland and areas of native grassland on recent river flats (e.g. see Buxton et al 2001). Then, as now, inland non forested, low lying areas would have represented an extremely important biological habitat in a region which is clothed in an almost complete forest cover.

Shrub species are scattered throughout the open river flats, particularly along flowing and ephemeral stream channels. For example open manuka stands are present along the eastern end of the access road and along a tributary of the Martyr River near Charlies Bump. Other species

commonly present include *Coprosma propinqua*, lowland ribbonwood (*Plagianthus regius*), and the climbers *Muehlenbeckia australis* and *Rubus schmidtioides*. The mistletoe *Iteadanthus micranthus* is commonly found on manuka, and is also present on nine other host species in this survey. Rarer shrubland species include *Olearia lineata*, *Olearia lasiflora* and *Coprosma wallii*. A dense patch of prickly shield fern (*Polystichum vestitum*) dissected by cattle trails adjoins the area of forest on Charles Bump.

Small patches of silver beech forest are also scattered throughout the open river flats. Occasionally these stands include red beech e.g. on the lease on the true left of the Cascade. The beech mistletoe *Peraxilla colensoi* is often common within these patches. Individual mistletoe are typically large, which probably reflects the relatively open nature of these stands and the consequent higher light levels in comparison to continuous forest stands. Possum browse was noted on some mistletoe individuals. The typical understorey and ground cover in these stands includes *Coprosma rotundifolia*, *Myrsine divaricata*, *Coprosma foetidissima*, lancewood (*Pseudopanax crassifolius*), wheki (*Dicksonia squarrosa*), and bush rice grass (*Microlaena axonacea*). The margins of these stands often merge into shrub cover, with lowland ribbonwood often present in the ecotone between forest and shrubland. A kahikatea dominated wetland is located adjacent to a silver beech forest remnant at the lower end of the flats on the true right of the Cascade. The wetland is fringed with *Carex virgata*, *Juncus canudensis* and *Agrostis stolonifera* (see Photo 4).

These stands are typically heavily trampled by stock, and adventive species such as Yorkshire fog, creeping buttercup (*Ranunculus repens*) and dock (*Rumex obtusifolius*) are often present. Two plants of the threatened *Coprosma wallii* were found in the understorey of a silver beech stand on the true left of the Cascade. In addition two specimens of the threatened beech mistletoe (*Alepis flavida*) were found, one growing on a dying red beech and a second specimen on a mountain beech host along the forest margin within 500m of the red beech record.



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Photo Three. Open Cascade River Bed and Flats. Note Toetoe in Background.

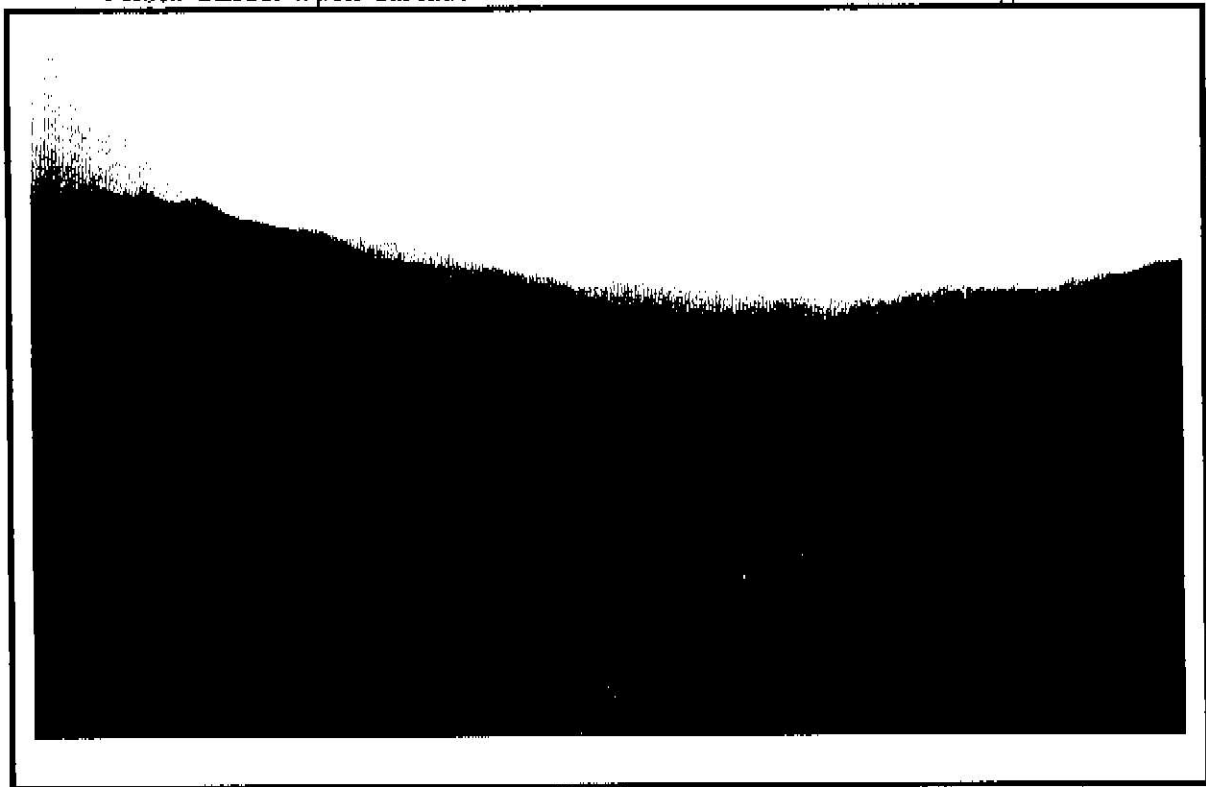


Photo Four. Forest Remnant on Cascade Flats Comprising Silver Beech, Kahikatea and Lowland Ribbonwood. Foreground comprises mixed grasses, sedges, herbs and rushes including *Carex flagellifera*.

Ephemeral Wetlands

Ephemeral wetlands are scattered throughout the river flats on the true right of the Cascade (Photo 5). They are often small and characteristic of marshy wetlands associated with fluvial landforms. These areas contrast with the larger palustrine (mainly swamps and bogs) and more permanent wetlands of the lower Cascade. Pedestals of the sedge *Carex secta* are common in these sites. *Carex gaudichaudiana* is often present, with *Potamogeton cheesemanii* growing in pools. The river flats on the true right of the Cascade are also dissected by a multitude of small tributaries of the Martyr River most often fed by groundwater. These clear flowing streams support species such as *Myriophyllum triphyllum*, *Callitriche* sp. and the adventives *Ranunculus flammula* and *Myosotis laxa* (Photo 6).

An area on the true right of the Martyr River (Area 10 in Woolmore's (1989) report), which had been crushed, cleared, oversown, and fenced, is now rough pasture with scattered clumps of prickly shield fern and shrubs including *Pennantia corymbosa*, *Myrsine divaricata*, and manuka.



Photo Five. Ephemeral Wet Areas on the Martyr / Cascade Flood Plain.

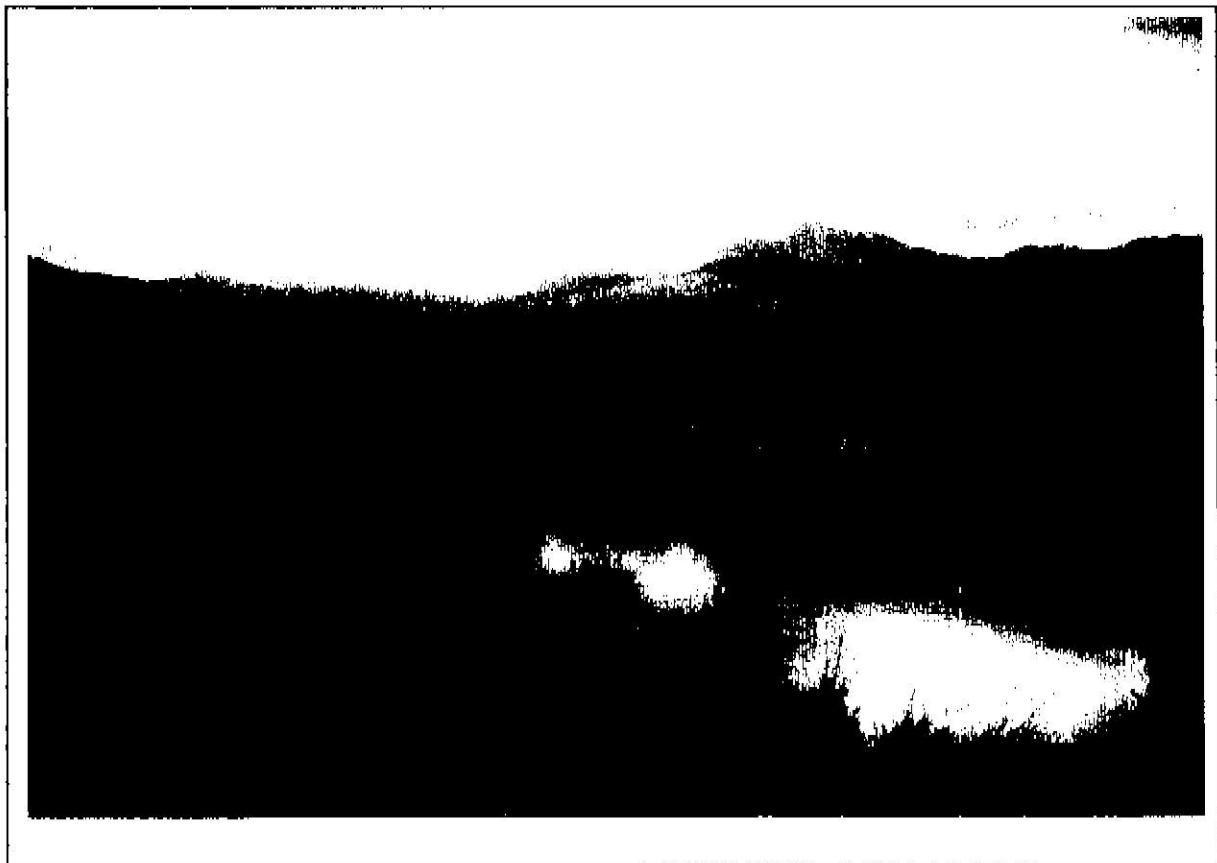


Photo Six. Clear Flowing Stream Between the Cascade and Martyr Rivers

Weeds

Adventive grasses and sedges dominate the river flats. These are mainly pasture grasses including browntop, chewings fescue and Yorkshire fog and the sedge *Carex flagellifera*. Broadleaf weed species such as creeping buttercup, selfheal and dock are also common throughout the grazed area.

Two small crack willow (*Salix fragilis*) are growing in a damp hollow adjacent to the Hut at the eastern end of the lease. There is significant potential for willow to spread in the Cascade Valley and these two plants should be removed as soon as possible. There are patches of blackberry (*Rubus fruticosus*) throughout the grazed area. These patches could spread further in the absence of grazing or chemical weed control.

Of particular note is the apparent absence of gorse on the lease area. Gorse is present at the Cascade River mouth where it is being controlled by the Department of Conservation and on recently cleared areas within the Lower Cascade pastoral lease. Maintaining the flats in a gorse-free state is a high priority from both a farming and conservation perspective.

Significance of the vegetation

The Upper Cascade pastoral lease (in conjunction with the Lower Cascade pastoral lease) is an enclave of open semi-modified floodplain vegetation within a largely forested landscape that extends from Jackson Bay to the north, south into Fiordland. The areas of forest around the margins of the pastoral lease are contiguous with New Zealand's largest remaining lowland forest wilderness. These areas of forest are unmodified by human activity (Woolmore 1989), and therefore retain high conservation values.

Within forest areas, of particular note is the abundance of the nationally declining beech mistletoe *Peraxilla colensoi* (chronically threatened - gradual decline; Hitchmough, in prep. Possums have only reached this area within about the last 15 years, and there is now evidence of possum browse on some mistletoe individuals.

Two other mistletoe species were recorded during the survey. The beech mistletoe *Alepis flavida* is also ranked as chronically threatened - gradual decline. This species was not thought to be common in South Westland because its predominant host mountain beech is not common. There have been two recent finds in South Westland in addition to the Cascade record - from the nearby Arawhata and Hope Valleys. The discovery that *Alepis flavida* also grows on red beech hosts in South Westland means it is likely to be more common in South Westland than was previously thought. Its future abundance will depend on how well possum populations can be prevented from reaching peak densities.

The green mistletoe (*Ileostylus micranthus*) is common on a range of hosts on the river flats. This species is no longer ranked as nationally threatened, although it continues to decline in parts of its range. It is likely to decline in abundance in future on the Cascade River flats as hosts die and there is no recruitment of suitable hosts.

The open, flood disturbed vegetation is of significant inherent value despite the dominance of grass and *Carex* dominated swards. All of the likely original native vegetation communities are present although some are now confined to small areas. Numerous ephemeral and permanent wetlands retaining native elements are scattered amongst pasture. Many wet areas, terrace margins and flood scoured sites retain lowland shrubs, mixed forest patches, sedgeland and herb assemblages of significant inherent value. Vegetation patterning on the flats conforms to

natural boundaries reflecting a range of disturbance regimes in terms of frequency and magnitude.

Two small trees of particular interest were found in the shrublands and forest remnants on the grazed river flats. *Coprosma wallii* is ranked as chronically threatened - gradual decline (Hitchmough, in prep.). This is the first confirmed record for the Cascade Valley - previous records e.g. Johnson & Lee (1977) are more likely to have been *Coprosma ciliata*. This species is proving to be more widespread in Westland than was previously thought. Populations are now known from the Haast, Landsborough, and Windbag Valleys to the north. The main threats to *Coprosma wallii* are habitat clearance and associated loss of natural disturbance processes, and lack of recruitment caused by browsing animals and competition with sward forming adventive grasses.

The presence of lowland ribbonwood on the flats is of conservation interest. This small tree species was probably once widespread on alluvial river flats in South Westland which have largely been developed for farming purposes. Lowland ribbonwood groves are poorly represented within public conservation lands.

Olearia lineata is ranked as at risk - sparse (Hitchmough, in prep.). *Olearia lineata* is not common on the West Coast. The nearest previous record is from Big Bay (Wilson 1991). The threats to this species are similar to those for *Coprosma wallii*. Maintenance of these rarer species in the Cascade is likely to require a range of conservation techniques. Simply removing grazing pressure typically leads to the establishment of a dense adventive grass and herb layer (Buxton et al 2001).

Other than the presence of species such as *Olearia lineata*, *Coprosma wallii*, lowland ribbonwood and the abundant *Ileostylis micranthus* and *Peraxilla colensoi* populations, the vegetation cover of the river flats on this pastoral lease is representative of other large river valleys in South Westland. The flats are dominated by adventive species. Natural river processes continue to function - river flats are eroded, while new flats and surface depressions are created as the river changes course. A recent report by Johnson and Rogers (2002) has highlighted the likely importance of ephemeral wetlands found in these depressions and also the potential impacts of trampling and grazing on their communities.

2.5 Fauna

2.5.1 Aquatic Fauna

Context

Sections of the lower Cascade and Martyr River Valley are located within the pastoral lease. Much of this broad floodplain, terrace and toeslope lies below 14m a.s.l. Some migratory native fish movement occurs through these river sections due to the close proximity of the Tasman Sea and to the complex natural linkages to adjacent back channels, flood sumps, wooded wetlands, *Carex* swamps and minor tributary channels. Natural functioning of these linkages has been only moderately compromised by the loss of woody vegetation, drainage, soil change and cattle trampling.

Smaller streams, springs, back channels, wetlands and sumps on the property flow into the Cascade and Martyr Rivers. The streams draining the swampy regions between the Cascade and Martyr Rivers are small and slow flowing with a mixture of native and introduced riparian

vegetation. The streams on the south of the Cascade River and north the Martyr River, are typically steeper and faster flowing and are surrounded by native vegetation.

Tenure Review Inspection

The property was surveyed over the 13th & 14th May 2002 for freshwater fish. Twelve sites were fished. Existing Data Sets hold not records for freshwater fish.

Six sites were fished using a Kainga backpack electric fishing machine; one stream on the true right of the Martyr River, the main Cascade River and the remaining sites between the Cascade and Martyr Rivers. A further six sites were fished by setting Gee-minnow fish traps overnight.

At each site fished with the electric fishing machine approximately 100 square metres of surface water was fished with one pass of the machine. Gee-minnow traps were baited with marmite and left overnight at a few of these sites as well. A NIWA Freshwater Fish Database form was completed at each site fished. All fish collected were readily identified on site and returned to the stream.

Six fish species were recorded from the sites sampled, one introduced and five native. The introduced brown trout (*Salmo trutta*) was the most widespread species encountered and populations were found at all but one site. Longfin eels (*Anguilla dieffenbachii*) were also widespread being found at most of the sites. Redfin bullies (*Gobionomorphus huttoni*) were observed at three sites, two on the true right of the Martyr River and one between the Cascade and Martyr Rivers (sites EF1, EF2 and EF3 Appendix Two). Bluegill bullies (*Gobionomorphus hubbsi*) were only found in the main stream of the Cascade River (site EF 5 – Appendix Two). Koaro (*Galaxias brevipinnis*) were found in one of the streams flowing between the Cascade and the Martyr Rivers (site EF3 – Appendix Two). Lamprey (*Geotria australis*) were found at one of the sites (site EF3 – Appendix Two) in ammocoete and macrophthalmia forms in substantial numbers which is relatively unusual.

Significance of Aquatic Fauna

The survey conducted showed the property contained at least five freshwater fish species. Of all of these native species two species, longfin eel and lamprey, are currently considered threatened (Hitchmough in prep.) with a "general decline" and "sparse" threat classification status respectively. Both species are also of cultural importance to tangata whenua.

Originally these streams would have provided habitat for larger populations of galaxiids such as banded kokopu and koaro. However, the presence of brown trout in many of the streams suggest it is unlikely significant populations of Galaxiids inhabit these waters. Galaxiids appear unable to coexist with introduced salmonids (Allibone 1997, McIntosh 2000).

The general health of streams between the Cascade and Martyr rivers was not good with average water quality, dense aquatic plant-beds and only some invertebrate groups present. Stream riparian zones showed trampling from livestock. The general health of streams on the true right of the Martyr River and true left of the Cascade River was generally good with better water quality, absence of dense aquatic plant-beds and undisturbed riparian zones. Streams of this quality are common locally and unlikely to decline in the future.

A report by Eldon (1987) highlighted the importance of the Cascade River as a whitebait fishery and highlighted the value of its waters and riparian zones.

2.5.2 Herpetofauna

No lizard survey was carried out as part of the tenure review due to time and weather constraints. The following summary is adapted from the West Coast Lizard Action Plan (T. Whittaker in prep). The lizard fauna of South Westland is remarkable for apparently having no species in common with the rest of the West Coast. Three of the species recorded within the Soyweheka Area are currently regarded as endemic to it, and the fourth extends into northern Fiordland. Two of the endemic taxa are in fact only known from 20 ha Taumaka Island in the Open Bay Island group. Whilst the situation to some extent reflects the current knowledge, it is also clear that the lizard fauna of South Westland is quite distinctive.

The forest gecko in South Westland/Weheka Area is a genetically distinct member of the *Halocarpus granulatus* complex – the 'Cascade forest gecko' – presently known only from the Cascade Plateau and Gorge River. Just where the northern limit of the range of this species lies is unclear. The only other gecko confirmed from this area is the Open Bay Island gecko, although there are unconfirmed reports of "green geckos" of unknown identity (i.e. it is unclear if they are West Coast green geckos or jewelled geckos).

The two skinks known from the Area are the Open Bay Island skink and the 'Big Bay Skink', the latter being locally common in cobble strands in northern Fiordland and at Barn Bay, and possibly the skin species that is relatively abundant in rocky areas on the Cascade Plateau (Miller *et al.* 1999). A brown striped skink of unknown identity and affinity has been found in sphagnum swamp at Okuru.

Few other lizard species are likely to occur in the South Westland/Weheka Area. Just east of the Main Divide in Otago and Fiordland there are Otago geckos (*Hoplodactylus cf. maculatus*), jewelled geckos, green skinks (*Oligosoma chloronotum*) and cryptic skinks (*O. inornatum*) (Amphibian and Reptile Distribution Survey), any one of which may occur further west. Perhaps more likely is the presence of the montane taxa within the *H. granulatus* species-complex that are present in mountain areas in Otago, Southland and Fiordland. The Fiordland skink (*Oligosoma acinacum*) inhabits small islets and rock stacks along the Fiordland coast but there have been no detailed surveys to determine its northern limit of range.

Significance of Herpetofauna.

The lease provides some potential gecko and skink habitat although forested and shrub covered areas form only a minor component of similar habitats on adjoining land which has fully protected public Conservation Land status. In terms of lizard conservation, open areas within the lease may provide habitat for common skinks, in which case they would be at or near their southern limit. However the presence of any lizard species on the property remains conjecture.

2.5.3 Avifauna

Birds

The bird fauna within the Cascade River Pastoral Lease has not been surveyed recently. For the purposes of this report bird survey data from the South Westland Management Evaluation Programme (SWMEP) is used as it is synonymous with that further north in O'Donnell & Dilks' (1986) study area. O'Donnell and Dilks (1986) sampled the avifauna of the Cascade area, using a study area that included the north-east corner of the Upper Cascade Pastoral Lease. The study area extended from the Cascade River in the south to the Arawhata River in the north and was bordered by the coast to the west and roughly the Jackson River to the east.

Bird distribution was mapped using transects through each 1,000-yard grid square. Transect length and location depended on topography, forest type and the next square to be surveyed. Observers walked slowly along each transect, pausing at intervals to record all birds seen or heard. In addition, one stationary five minute bird count was carried out approximately in the middle of each 1,000-yard grid square. All birds seen or heard during five minute counts were recorded.

O'Donnell and Dilks (1986) recorded a total of 44 species in the Cascade area: 21 native forest species, 8 introduced species and 15 coastal, wetland and open country species. Of these, 14 native and 4 introduced species were found in the forest at the south of O'Donnell & Dilks' (1986) study area including where it overlapped the Upper Cascade pastoral lease. These were: kereru, kaka, kea, parakeet, shining cuckoo, long-tailed cuckoo, rifleman, brown creeper, grey warbler, fantail, tomtit, silvereye, tui, bellbird, song thrush, blackbird, chaffinch and redpoll. Other species recorded from the Cascade area and likely to be present on the open river flats of the Cascade River within the Upper Cascade pastoral lease include harrier, paradise shelduck, shags (black, little black, pied), grey duck, pukeko, SI pied oystercatcher, spur-winged plover, black backed gull, Caspian tern, skylark, welcome swallow and pipit.

The following bird species were recorded during the actual tenure review inspection: paradise duck, bellbird, kaka, grey warbler, tomtit, silvereye, brown creeper, New Zealand falcon and kea.

Bats

No bat surveys were undertaken in the forested portion of the pastoral lease as the timing of the survey work as part of the pastoral lease review was outside of the best time for bat surveys. While it can be quite difficult to confirm the presence of bats due to their mobile behaviour the presence of large trees and relatively unmodified suggest long tail bats should be present in the forested portion of the pastoral lease. Long tail bats have been recorded in other South Westland valleys. There is also a possibility that short tail may also be present although less likely as they are only known from the Eglinton and Oparara Valleys in the South Island while long tail bats are considerably more widespread.

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Significance of Avifauna

Birds

Of the birds observed by O'Donnell and Dilks (1986) five species are listed in the Department of Conservation's Threatened Species Classification System (Hitchmough in prep.) (Table Two). One species, the New Zealand Falcon which was recorded on the tenure review inspection is also listed. A further four threatened species are thought to occur at the site (Table Three).

Bird Species	Classification
Kea	nationally endangered
South Island kaka	nationally endangered
Kereru	gradual decline
Yellow-crowned parakeet	gradual decline
long-tailed cuckoo	gradual decline
New Zealand falcon (Southern)	nationally endangered

Table Two. Five bird species found within the forest adjacent to the Upper Cascade pastoral lease which are listed in the Department of Conservation's Threatened Species Classification System.

Bird Species	Classification
caspian tern	nationally vulnerable
little black shag	Sparse
black shag	Sparse
pieb shag	Sparse

Table Three. Four bird species thought to live in the aquatic environments at the Upper Cascade pastoral lease which are listed in the Department of Conservation's Threatened Species Classification System.

None of the species recorded by O'Donnell and Dilks (1986), observed on the tenure review inspection or species thought to occur at the Upper Cascade pastoral lease are endemic to South Westland. Most occur throughout forested areas and aquatic areas in the South Island (Bull *et al*, 1985). Of those species recorded by O'Donnell and Dilks, kaka and parakeet are obligate forest dwellers. Kereru, long tail cuckoo, morepork, rifleman, tui, brown creeper and tomtit are primary forest dwellers. Harrier, bellbird, kea, shining cuckoo, grey warbler, fantail and silvereye are all facultive forest dwellers (can survive outside of the forest). The retention of forest values is important for the majority of the avifauna found in the pastoral lease.

Maintaining the forest structure is important and the presence of large forest trees is important to several species of birds. Research has shown that hole nesting species are significantly more abundant in un-logged forest than logged forest. The large trees are also preferred as feeding trees. Provided the forest habitat within the Upper Cascade pastoral lease is not degraded further, then the avifauna of the area would not be *seriously* threatened by the current farming activities undertaken on the site.

Bats

Long tailed bats are an endemic species (King 1990). It is considered to be a Nationally Endangered (Hitchmough in prep) species.

A particular cause of concern is the loss of large old beech trees which bats use as roost sites. It appears from existing research that the loss of such trees which bats use for a specialised purpose is having a disproportionate effect on this species (O'Donnell 2001).

2.5.4 Invertebrate Fauna

The Lease was inspected for invertebrate fauna during the tenure review inspection in mild conditions and also rain. Invertebrates were hand collected or collected at ultraviolet light at night. During late April, few insects are found as adults and were not recorded during the survey. However, 73 species of invertebrates were identified from an extensive range of habitat and host plant associations. Patterning of communities through flood events and subsequent retention of water is a significant feature of the lease. The insects noted are representative of complex low altitude habitats of stream and fertile river floodplain. Ecotones are a significant feature as there are numerous edges where different classes of habitat merge together. Many insects present in the Cascade River flood plain are widespread in the South Island but of local occurrence. Some moths present are of limited distribution or associated with rare plants or isolated habitats. A range of species occupying flood disturbed ecosystems at the Cascade River are likely to be at their southern limit on the West Coast.

Streams, rivers and small open water areas

Aquatic insects, common and widespread in natural stony streams are represented. More obscure faunal habitats are associated with seepage and spring areas and ephemeral wet hollows. These are extensively represented in the open grazed flats but also occur inside forest associated with the Martyr River and backchannels or moraine debris on the true left of the Cascade River. These wet areas are reasonably productive for a range of insects with aquatic life stages. For example, flies (eg. families Chironomidae, Sciaridae, Tipulidae) beetles (Hydraenidae, Dytiscidae) and caddis (Leptoceridae, Hydroptilidae) and also aquatic snails. The emergent vegetation is host to abundant leaf hoppers (families Cicadellidae, Delphacidae) and shield bug *Rhopalumorphia linearis*. Also on the emergent vegetation in these flush sites are wetland spiders *Dolomedes* sp. aff. *aquaticus* and *Tetragnatha* species. Blue damselfly *Austrolestes colsonis* and dragonflies *Procordulia* species range over open wetlands.

Damp hollows and swamp vegetation

A fan system associated with Colin Creek has a pattern of damp grass and herb filled channels among rank grasses and scattered shrubs. Moth *Asaphodes stephanitis* is locally common here with larvae feeding on herbs in damp hollows. This is the south-western limit and new distribution record for an uncommon day flying moth of damp non-forest areas.

The lease has good habitat for the rare moth *Asaphodes stinaria* (threat of extinction status Nationally endangered, Hitchmough in prep). While not recorded here, this moth is hosted on native buttercup *Ranunculus foliosus* or *R. reflexus* in fertile wetlands and has been recorded very nearby in two other South Westland localities (Patrick 2000a).

Several moth species were recorded from open grassy wetlands. Representative species include *Eudonia octophora* and *Schmankia costaeatrigilis* (larvae on damp grasses), *Tmetolophota semirutata* (larvae on *Carex* spp.) and *Scoparia ustimacula* (larvae on *Hydrocotyle*). Important insects not recorded include *Wisania* species porina and diverse *Carex* sedge feeding moths that will more than match the diversity of sedges present. Seven crane fly species (with many more present) are also recorded here. These insect associations are represented in lowlands elsewhere that have fairly

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natural wetlands with reasonable fertility. The species richness of sedges and herb associations in the grassland has significance for invertebrate species richness.

Swamp shrubland and shrubs of disturbed areas (flooded or farmed terraces) have representative insects associated with them. Recorded in the survey are moths *Austrocidaria gobiata* and *Metenara tartarea* (larvae on *Coprosma* spp.), *Eiphyne terriculata* (larvae on *Cortylinae*), *Ischalis fortuneata* (larvae on ferns), *Pasiphila melochlora* (larvae on *Chamrichalia*), *Poecilasthera pulchra* (larvae on *Cyathodes* and *Leucopogon*) and *Deana hybrealis* (larvae on *Olearia* and other hosts). These are representative and fairly widespread moths. However, moth *Pasiphila oxina* recorded on the lease is part of a rich fauna of moths hosted on small-leaved *Olearia* (Patrick 2000b). Almost certainly, some moth species with larvae restricted to feeding on three or four species of *Olearia* will be present on the lease. There are 2 moths hosted on *Olearia linetta* trees and these two plus another 5 species are known from *O. laxiflora* trees (Patrick 2000b). Such moth populations are as fragmented in distribution and as vulnerable as their host plant.

Recent floodplains and stony terraces

While recent floodplains are not part of the Lease, they are throughout the Lease area and unbounded in terms of management. Recent floodplains form a diverse mosaic from cobble beaches in scour and deposits to sand dune communities to aggrading sites covered in recent silt deposits. Bare stones and bare soils dominate these areas and native and exotic adventive plants are the colonisers including toetoe, diminutive native grasses, abundant *Coprosma acaesa* and mats of *Muehlenbeckia axillaris* and *Raoulia tereticaulis*. Some stony terraces adjacent have similar plant elements but also include mosses, lichens and litter. In the region these are key natural ecosystems of non-forest for basking insects such as cicada (*Kikihia* species), grasshopper *Phalacridium marginale* and two butterflies. Boulder butterfly *Boldenaria* species and Copper butterfly *Antipodochyana* species are among several insects with larvae on *M. axillaris* here. The moth *Scoparia tetracycla* is a specialist on *C. acaesa* and is likely to be present. It is known elsewhere on the West Coast and would be close to its south-western limit at this site. Moth *Scoparia rotuella* is present with larvae on willowherbs and three moth species with larvae on rock mosses were noted from the Martyr and Cascade Rivers.

The sand dune system located on the true right of the Cascade River near the junction with Colin Creek is a remarkable inland feature probably inhabited by most of the insects mentioned above and also mobile insects of sandy soils such as tiger beetles *Neocicindella* sp., solitary wasps *Priocnemis* sp. and colonies of native bees.

Logs stranded on terraces and levees

This is the habitat of stag beetle *Dendrobates arbyi* with large larvae feeding on decayed wood. Such logs harbour a range of spiders, chafers, predatory carabid beetles, amphipod hoppers and native and exotic slaters that use the adjacent herb and grass communities.

Forests

The forests contain a diverse range of micro environments including riparian areas, shrub-forest margins, infertile sites, fertile sites, well drained areas and wet sites. Twenty five common and widespread forest insects were recorded. The composition is indicative of an area retaining much of its natural character. The nature of the survey did not allow a full suite of insects representing the complexity of habitats present to be recorded. Representative insects of note include a tree weta, cave weta and two ground weta known in the lower Cascade Valley. The ground weta *Hemirandrus 'madisylvestris'* (Peter Johns) is endemic to South Westland-north Fiordland. The stick insect *Acanthocylia prasina fergusonii* favours totara, rimu and rata. The impressive stag beetle *Geodorcus helmsi* inhabits a range of ecosystems. Four fern feeding moth

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species *Ischalis gallaria*, *I. variabilis*, *I. fortunata* and *Sarisa murifera* are indicative of the importance of ferns. Moths with larvae on Mahoe and *Pseudopanax* and other forest elements were also recorded.

Mistletoes *Penaxilla colensoi* and *Illeostylus micranthus* are locally abundant and are elsewhere known to host four specialist mistletoe feeding moth species (Patrick and Dugdale 1997). Three or more species are likely to be present here. While not classed as threatened, these moths are affected by declining mistletoe populations and loss of habitat.

No insects were recorded from ribbonwood scattered on forest margins and along old channels in the valley. However, at least seven moths with larvae specific to trees of *Plagianthus* or *Hobertia* are expected here. This includes moth *Heterocrossa* species (*maculata* group) with the threat of extinction status 'Sparse' (Hitchmough in prep).

Significance of the invertebrate fauna

Very complex and nationally significant habitats are encompassed by the Lease in the lowland part of the Cascade Valley (10-14 metres above sea level). There is significant natural character in flood disturbed ecosystems and fertile lowland wetlands. There are wet or silty flooded forest dominated systems of high physical and biotic integrity. However, even more significant is the range of non-forest systems that retain natural character. These are less well represented in protected areas and are likely nationally significant habitats for invertebrates.

The moth *Asaphodes stephanitis* is newly recorded. It is an uncommon moth at its south-western limit on the West Coast. The ground weta *Heriannthus 'madisylvestris'* (Peter Johns) known from forest here is endemic to the region. The moth *Pasiphila cotinea* has larvae on *Q. laxiflora* or *Q. lineata*. This moth and many others have populations as rare and fragmented as their small leaved *Olearia* hosts. The endangered moth *Asaphodes stinaria* (threat of extinction status Nationally endangered, Hitchmough in prep.) was not found here. However, it is likely to occur with larvae feeding on native buttercup *Ranunculus filiosus* or *R. reflexus* in fertile wetlands.

The presence of grasshoppers, boulder butterflies and copper butterflies living on naturally open areas of old stony terraces, sand dunes and recent riverine alluvium, well inland from the sea, is significant for the region.

There are unrecorded but likely significant moth populations hosted on mistletoes and on ribbonwood.

2.5.5 Problem Animals

Possoms, deer, stoats, rats and mice are present. The presence of weasels and ferrets is probable. Possum numbers are relatively low as this pest is a recent arrival. As is the case at most New Zealand mainland locations mustelids, possums and rats are a serious threat to several bird species. Rat, mice and mustelid numbers fluctuate in conjunction with beech seeding patterns.

2.6 Historic

Maori Sites

There are no known prehistoric sites within the boundaries of the leasehold land recorded on the New Zealand Archaeological Association site file.

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Historic Sites

There are no historic sites recorded on the New Zealand Archaeological Association site file within the boundary of the leasehold land.

History of the Area

Duncan Macfarlane, the Government resident agent at Jackson's Bay Special settlement made a reconnaissance trip to the Cascade in late July 1876. In his annual report to J. A. Bonar, (the Executive Officer of Westland Province), McFarlane described the area in complimentary terms. He estimated that there was '25,000 to 30,000 acres of really good land ... available for settlement in this block' and 'a good deal of cattle feed' lay in the open bush of the foot hills.¹ Macfarlane also presented a report on the geology of the area with rock samples, in the hope that valuable minerals would be identified.² As the government settlement at Jackson's Bay became established many prospectors used the Bay as their base as the search for gold first extended south to the Cascade area and beyond. Calls were also made to open up the country to the south by providing a horse track through the Cascade.³

In early 1884 chief surveyor Gerhard Mueller completed a reconnaissance survey between the Cascade and the Hollyford Valley in Fiordland. The purpose of this trip was to 'ascertain whether it was possible to get a practicable line for the extension of the main road to Martin's Bay Settlement'. The proposed line started in Jackson's Bay, crossed the Stafford Range, the Stafford River, then on to the Cascade Plateau before dropping down to the Martyr River, and crossing both this and the Cascade River at the head of the Cascade Valley. Once again agricultural potential of the land in the Cascade was commented on. These sentiments were echoed in early 1884 by A. Barron the Surveyor General after he visited Jackson's Bay. The settlers at 'the Bay' made comments to him regarding the need to construct a track between the Cascade and Barn Bay to facilitate access to 'auriferous country'. In his opinion this was a worthy venture, as was the stocking of the Cascade Run especially if gold miners took up residence in the area.⁴

In response to these reports the track from Jackson's Bay to the Cascade was started following Mueller's line, and by May 1885 it had been extended as far as Carmichael's Creek on the Cascade Plateau.⁵

In 1885 Duncan Macfarlane (the very same government agent who had praised the agrarian promise of the valley nine years earlier) took up the run in the Cascade Valley. In conjunction with his son Colin the land was stocked with sheep and cattle and a homestead built at the confluence of the Martyr and Cascade Rivers.⁶

Charlie Douglas was friends with the Macfarlane's and he spent December of 1885 helping them take up their run and looking after the homestead in Macfarlane's absence.⁷

¹ AJHR 1877, H-28 pp6-8.

² AJHR 1879 H-9A pp102-103.

³ AJHR 1878 D-6A p3-4.

⁴ AJHR 1884 C-1, Appendices 4 and 5, pp.73-76.; see also "Cascade to Pyke Valley Road" map held at DoC Hokitika for route of the road.

⁵ AJHR 1885 C-2, p.43

⁶ See Minchan 2002; Peat 1979:66; see also Appendix 1 for a contemporary description.

⁷ Langton 2000:54-55.

Macfarlane continued to agitate for the opening up of country to the south of Jackson's Bay. By 1888 the road south initially surveyed by Mueller was in the course of construction. The line over the Cascade Plateau was abandoned, and the track was continued on from a horse track constructed up the Jackson River, over the Martyr Saddle to the Cascade River. Three years later Charlie Douglas spent 4 months cutting the track from the Cascade to Barn Bay, and was often visited by Colin Macfarlane. There was trouble with completion of the track, but by 1898 this track had be formed to such a standard that it was described as '[a] 4 ft. metallad horse-track 60 chains long'.⁸ The current track, bulldozed in the 1960s follows this historic track for some of its length.

From the turn of the century the brothers Paddy and Dinny Nolan took up the run. In the Depression the Cascade run provided work for many men from the district, chiefly employed clearing bush. The run also became inextricably linked to the legendary Nolan cattle drives where cattle were herded from the Cascade for 150 miles north to market in Whataroa.⁹

For an early account of the Cascade Valley see Appendix Four.

Historic Significance

There are no known extant historic features in this piece of land. The most apparent significant historical associations of the Cascade Run lie with its use in the past as access to the Hope River and Barn Bay for mineral exploitation. Other significant aspects are the association with early settlement of South Westland through the Macfarlanes, and the attempt to construct the 'Main South Road' road from Jackson's Bay to the Hollyford.

2.7 Public Recreation

2.7.1 Physical Characteristics

The property is located in a spectacular and remote location within the South West New Zealand Te Wāhi Pounamu World Heritage Area which provides a dramatic setting for a range of recreational activities.

2.7.2 Legal Access

The pastoral lease has no legal access as road lines have not been legalised. Marginal strips are not present and do not appear to have been considered on lease renewal in 1987. Riverbeds including the Cascade and the Martyr would appear to be within the lease area.

2.7.3 Activities

Access

Public access over the Cascade Saddle is possible from the Haast-Jackson Bay Road to the McDonald's farm homestead, at the Martyr River. While this formed road is a well used access way it was never gazetted and is therefore not a legal public road. A surveyed (but again not gazetted) track continues from the homestead through the Upper Cascade pastoral lease to the

⁸ AJHR 1888 C-5:29; C-6:10; Douglas 1892 MS papers; AJHR 1892 C-3A:33; AJHR 1893 C-3:xxxiv; Department of Lands and Surveys report 1897 to 1898 C-1

⁹ Peat 1979:69; Nolan 1983:8;

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Cascade River and beyond to Barn Bay via the Lower Cascade pastoral lease and public Conservation Land. Sections of surveyed road within public Conservation Land remain public Conservation Land and sections traversing pastoral lease remain within the lease. This track provides the traditional land access to the lower Cascade Valley, Barn Bay, Gorge River and other coastal areas. Four-wheel-drive vehicle access is possible on this route, provided river levels and track conditions permit passage. The section of the track located on the two cascade pastoral leases is maintained by the lease-holders. Permission is required from Mr McDonald prior to use.

Land access to the Upper Cascade Valley can be achieved by following a four-wheel-motorbike track that leads off from the Cascade road at the Department of Conservation's Red Hills Interpretation Panel. Access is generally by foot only, however users do not need to cross pastoral lease land to get to their destination.

Proposals have been put forward by the Westland District Council and business consortiums to establish a highway from Cascade through to the Hollyford for the purpose of carrying tourists from Southland through to the West Coast. This proposal has not been progressed to date although interest is still there.

The Cascade River is regularly used by jet boaters to access the river mouth where there is a well established white-baiting settlement. Permission is required to cross the pastoral lease in order to gain access to the river.

Recreational Activities

Recreational activities undertaken in the Cascade Valley include boating, fishing, hunting, jet boating, mountain biking, white baiting, hunting, tramping, four-wheel-driving, picnicking, and occasionally horse trekking.

The Cascade River, and its tributaries, is popular for trout fishing (by reel or fly). Jet boating is also popular. These activities are mostly undertaken by private recreationists, although *Haast River Safaris Ltd* hold a concession to take commercial jet boat trips in the Cascade. Jet boat access to the Cascade is possible via the Martyr River although this route can be technically difficult, especially when water levels are low, so the majority of "boatics" access the river from the Barn Bay track.

Hunting is keenly pursued in the Cascade Valley. Populations of red deer are resident on the south side of the Cascade River, from the toe of the hill, and in small pockets on the north side of the river mouth.

The track to Barn Bay attracts four-wheel-drive enthusiasts from outside the district. While the track is now eroded in places, it allows for some challenging 4WD opportunities for groups, who manage to leave the track in varying states of disrepair.

Tramping is another activity practised in the Valley. The three-day 'Cascade to Big Bay' backcountry route travels along the 4WD track to Barn Bay and then down the coast through Gorge River and on to Big Bay. Other routes from here include a 4-5 day tramp to the Lower Hollyford, via the Pyke Valley, or a tramp to Martins Bay (1 day) and then on to the lower Hollyford road-end (3-4 days). DOC huts are available at Gorge River and Big Bay. Access to these walks is via the lower Cascade Valley and hence crosses the pastoral lease properties. Trampers heading into the Olivine Wilderness Area can travel through the Upper Cascade Valley and therefore do not need to pass through the Upper Cascade pastoral lease.

Picnics and day trips into the Cascade are commonly undertaken activities during the summer months. The Cascade Road has many attractive pull-offs by Jackson and Martyr Creeks. A Department of Conservation interpretation panel on the Red Hills is located at a roadside viewpoint overlooking the Valley, and picnicking opportunities are situated within the pastoral lease in the vicinity of the Cascade River.

Significance of Recreation:

The Upper Cascade pastoral lease is strategically located in terms of recreational access and activities. The area is of great importance to trampers, hunters, four wheel drivers, fishermen, mountain bikers, jet boaters and whitebaiters. The draft Conservation Management Strategy describes the Cascade as *one of the last great areas of lowland wilderness in New Zealand* (section 10.7.3). Backcountry hikers, hunters, and other recreationalists intentionally seek out destinations such as this to experience its solitude and natural diversity. Recreational demand is likely to increase in years to come, as is growth in commercial hunting and fishing charters in the area.

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PART 3: OTHER RELEVANT MATTERS & PLANS

3.1 Consultation

Conservation resources on Upper Cascade pastoral lease were discussed at a meeting with "umbrella" recreation and conservation groups (NGO's) in Alexandra on October 8 2001. As the NGO representatives were all Otago based knowledge of the property was limited.

Key points raised at the meeting were in relation to this property were:

- Portion of the Barn Bay Road lying on the property must be legalized (access to Barn Bay).
- No consensus over desirability of future grazing.
- Position within South Westland World Heritage Area noted.

Further comment was invited from West Coast based NGO's although no response has been forthcoming.

Federated Mountain Clubs and the Royal Forest and Bird Protection Society have submitted further preliminary reports containing their assessment of inherent values and recommendations relating to future land tenure. These reports are attached as Appendix 5 (FMC) and 6 (Forest and Bird).

Both these organisations recommend that it is probably not practical to separate lands of high inherent value from those capable of economic use. They therefore recommend that a full property purchase should be pursued by the Crown.

3.2 Regional Policy Statements & Plans

The West Coast Regional Policy Statement provides a policy framework for all of the West Coast's significant regional resource management issues. It does not contain rules. District Plans shall not be inconsistent with the Regional Policy Statement.

In respect of natural values the Regional Policy Statement includes the following policies:

- Preserve the natural character of the West Coast's wetlands, lakes and rivers and their margins and protect them, and outstanding natural features and landscapes, from inappropriate subdivision, use and development.
- Recognise and provide for the protection of significant indigenous vegetation and significant habitats of indigenous fauna.
- Promote, and where necessary require land use practices which avoid, remedy or mitigate offsite adverse effects on areas of significant vegetation and significant habitats of indigenous fauna and outstanding natural features and landscapes.

- To promote and encourage the restoration, where appropriate, of degraded wetlands, and where practicable, creation of artificial wetlands.

3.3 District Plans

Westland District Plan (2002)

The property is located within the Rural zone of the Westland District Plan. The Rural Policy Unit covers all non-urban land within Westland District. Given the over-riding emphasis on conservation orientated management within the District, the Plan's approach is to support sustainability managed development opportunities that can avoid, remedy or mitigate adverse effects on the natural environment. Emphasis is placed on retaining the sustainability of natural areas. Activities may then utilise the resource provided adverse effects can be remedied or mitigated and options for future use of the resource remain open. This approach places onus on developers and landowners to derive environmentally sound practices and methods of rehabilitation so that the full potential and benefits of resources to communities can be realised.

Areas of significant indigenous vegetation and significant habitats of indigenous fauna and outstanding natural features in the District will be protected. Council will, in particular, target those indigenous vegetation types occurring in alluvial and coastal areas. The continuity of the mountains to sea landscape in Westland, particularly in the south of the District, and significant landscape elements shall be protected by ensuring development takes into account the landscape setting. The contribution of indigenous vegetation to the landscape character of the district shall be recognised and its clearance controlled. South Westland has a greater vulnerability than North Westland to even small scale change.

Resource consent is required for subdivision and subsequent development, buildings, forestry above an altitude of 1000 m, clearance of indigenous vegetation and modification of natural wetlands.

3.4 Conservation Management Strategies & Plans

West Coast Conservation Management Strategy (1999 Draft)

The West Coast Conservancy of the Department of Conservation has prepared a draft Conservation Management Strategy (CMS) which is currently being reviewed. The draft CMS must be approved by the New Zealand Conservation Authority before it becomes a statutory document.

The draft of the CMS which is currently under review identifies eleven 'Places' in the West Coast Conservancy. The Upper Cascade pastoral lease lies within the 'South West New Zealand Te Wāhi Pounamu World Heritage Area' Place Unit.

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3.5 New Zealand Biodiversity Strategy

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

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

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

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

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PART 4: MAPS ETC.

4.1 Additional information

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4.2 Illustrative Maps

Map 4.2 (a) Topo/Cadastral

Map 4.2 (b) Significant Inherent Values: ecological/Landscape/Recreation

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Appendices

APPENDIX ONE. VASCULAR PLANT SPECIES LIST : Lower Cascade Pastoral Lease.

Observer: Phil Knightbridge, Rob Wardle, Eric Edwards
 Date: 22 - 24 April 2002
 Time spent on survey: 16 hours
 Access: Drive to Martyr homestead. On foot over area from there.
 Ecological District: Cascade
 Grid References: Centred on E38 505 695
 Altitude: 12 - 40 m (higher altitude areas within lease but not surveyed during this visit)
 Area: 1200 ha
 Vegetation: Tall forest on hillslopes and moraine - canopy typically dominated by silver beech, but some areas of kamahi canopy.
 Communities/Habitats: Rimu occasional emergent. *Penaxilla colensoi* common.
 Wet shrublands - manuka-flax/ *Carex secta-Basarea rubiginosa*.
 Rough pasture - dominated by adventive grasses Yorkshire fog, sweet vernal, browntop, chewings fescue, tall fescue.
 Patches of forest and shrubland (including manuka and lowland ribbonwood; *Ileostylus micranthus* abundant).

SPECIES LIST

Adventive species denoted by an asterisk (*).

Voucher specimens denoted by **

Trees and shrubs (indigenous species, naturalised species)	Forest	Wetland	River flats & fans	Comments
<i>Alepis flavida</i>	Y		Y	Two seen - fourth record for South Westland. First record for South Westland on red beech host.
<i>Aristotelia fruticosa</i>			Y	Hybrid <i>A. serrata</i> x <i>A. fruticosa</i> also present
<i>Aristotelia serrata</i>	Y		Y	
<i>Carmichaelia australis</i>			Y	
<i>Carpodetus serratus</i>	Y			
<i>Coprosma acerosa</i>			Y	
<i>Coprosma foetidissima</i>	Y		Y	
<i>Coprosma lucida</i>	Y			
<i>Coprosma propinqua</i>		Y	Y	Often hedged by cattle browsing
<i>Coprosma rhamnoides</i>	Y			
<i>Coprosma rigida</i>		Y	Y	
<i>Coprosma rotundifolia</i>			Y	On fan
<i>Coprosma rigosa</i>			Y	
<i>Coprosma</i> sp. Y			Y	

<i>Coprosma wallii</i> **			Y	A few individuals either in forest patch understorey or as isolated individuals in pasture
<i>Coniopsis?</i>			Y	
<i>Cordyline australis</i>			Y	
<i>Coriaria arborea</i>			Y	
<i>Coriaria plumosa?</i>			Y	
<i>Dacrydium dacrydioides</i>	Y	Y		
<i>Dacrydium cupressinum</i>	Y			
<i>Elaeocarpus bookeerianus</i>	Y	Y	Y	
<i>Fuchsia excorticata</i>	Y		Y	On fan
<i>Griselinia littoralis</i>	Y			
<i>Hebe peltata</i>		Y		
<i>Hebe salicifolia</i>			Y	
<i>Hebe subulpina</i>			Y	
<i>Ileostylus micranthus</i> **			Y	On <i>Leptospermum scoparium</i> , <i>Carmichaelia australis</i> , <i>Schefflera digitata</i> , <i>Plagianthus regius</i> , <i>Coprosma rotundifolia</i> , <i>Neomyrtus pectunculata</i> , <i>Coprosma wallii</i> , <i>Coprosma rigida</i> , <i>Olearia linata</i> , <i>Rubus schmucklioides</i>
<i>Leptospermum scoparium</i>			Y	Common throughout lease area. Most common host for the mistletoe <i>Ileostylus micranthus</i> .
<i>Mancosia colensoi</i>		Y		
<i>Melicope ramiflora</i>	Y		Y	
<i>Metrosideros umbellata</i>	Y			
<i>Myrsine australis</i>	Y			
<i>Myrsine divaricata</i>	Y	Y	Y	
<i>Neomyrtus pectunculata</i>	Y		Y	
<i>Nothofagus fusca</i>	Y		Y	
<i>Nothofagus menziesii</i>			Y	On fan
<i>Nothofagus solandri</i> var. <i>diffortiooides</i>	Y	Y		Occasional along forest margin and on poorer drained sites
<i>Olearia ilicifolia</i>			Y	On fan
<i>Olearia laxiflora</i> **		Y	Y	A few individuals found, mainly in damper sites
<i>Olearia linata</i> **			Y	A few individuals in shrubland
<i>Persea corymbosa</i>			Y	On fan
<i>Penicillia colensoi</i>	Y			Common on silver beech hosts. A few individuals browsed by possums
<i>Phyllocladus alpinus</i>	Y			
<i>Pittosporum rigidum</i>	Y			
<i>Plagianthus regius</i>			Y	Common canopy in shrubbier forest remnants on flats
<i>Podocarpus hallii</i>	Y		Y	On fan and in forest. Sample

collected heavily infested with the fungus *Corynelia tropica* - apparently causes no harm to totara.

<i>Podocarpus totara</i>		Y	
<i>Prumnopitys ferruginea</i>	Y		
<i>Pseudopanax colensoi</i>	Y		
<i>Pseudopanax crassifolius</i>	Y		
<i>Pseudowintera colonata</i>	Y		
<i>Raukawa anomalous</i>	Y		
<i>Raukawa edgerleyi</i>	Y		
<i>Schefflera digitata</i>	Y		
<i>Weinmannia racemosa</i>	Y		
Lianes and related trailing plants (indigenous species, naturalised species)			
<i>Metrosideros diffusa</i>	Y		
<i>Metrosideros fulgens</i>	Y		
<i>Muehlenbeckia australis</i>	Y	Y	
<i>Muehlenbeckia axillaris</i>		Y	Common ground cover on recent well drained flats
<i>Parsonsia heterophylla</i>	Y		
<i>Ripogonum scandens</i>	Y	Y	
<i>Rubus australis</i>	Y		
<i>Rubus fruticosus*</i>		Y	Scattered patches
<i>Rubus schmidlioides</i>		Y	Common climber in shrubland throughout lease
Ferns and fern allies (indigenous species, naturalised species)			
<i>Asplenium bulbiferum</i>	Y		
<i>Asplenium flaccidum</i>	Y		
<i>Asplenium polyodon</i>	Y		
<i>Blechnum chambersii</i>	Y		
<i>Blechnum colensoi</i>	Y		
<i>Blechnum discolor</i>	Y		
<i>Blechnum fluviatile</i>	Y		
<i>Blechnum novae-zelandiae</i>		Y	
<i>Blechnum penna-mitris</i>	Y	Y	
<i>Ctenopteris heterophylla</i>	Y		
<i>Cyathea smithii</i>	Y		
<i>Grammitis billardierei</i>	Y		
<i>Histiopteris incise</i>	Y		
<i>Hymenophyllum demissum</i>	Y		
<i>Hymenophyllum flabellatum</i>	Y		
<i>Hymenophyllum multifidum</i>	Y		
<i>Hymenophyllum nanum</i>	Y		
<i>Hymenophyllum revolutum</i>	Y		
<i>Hymenophyllum scabrum</i>	Y		
<i>Hymenophyllum villosum</i>	Y		
<i>Hypolepis nigrobarbata</i>	Y		

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<i>Microsorium pustulatum</i>	Y		
<i>Paesia scaberula</i>			Y
<i>Pneumatopteris pennigera</i>	Y		
<i>Polystichum vestitum</i>			Y
<i>Pyrosia eleagnifolia</i>	Y		
<i>Ranchoia adiantiformis</i>	Y		
Dicotyledonous herbs (indigenous species, naturalised species)			
<i>Acaena arserinifolia</i>			Y
<i>Achillea millefolium*</i>			Y
<i>Anaphaloides bellidioides</i>			Y
<i>Callitriche?</i>		Y	
<i>Cardamine debilis</i>	Y		
<i>Cerastium fontanum</i>			Y
<i>Cirsium vulgare</i>			Y
<i>Crepis capillaris</i>			Y
<i>Epilobium briansonii</i>			Y
<i>Epilobium melanocaulon</i>			Y
<i>Euchiton australis</i>			Y
<i>Gonocarpus aggregatus</i>			Y
<i>Gumera monica</i>			Y
<i>Hydrocotyle novae-zeelandiae</i>	Y		Y
<i>Hypochaeris radicata*</i>			Y
<i>Hypochaeris radicata</i>			Y
<i>Leptinella squalida</i>			Y
<i>Limnoloba?</i>			
<i>Lotus pedunculatus*</i>			Y
<i>Luckwillia</i>		Y	
<i>Mimulus maculatus*</i>		Y	
<i>Myosotis laxa</i>		Y	
<i>Myriophyllum triphyllum</i>		Y	
<i>Nertera depressa</i>	Y		
<i>Nertera villosa</i>	Y		
<i>Parabebe byallii</i>			Y
<i>Pink flowered weed</i>			Y
<i>Plantago major*</i>			Y
<i>Plantago lanceolata*</i>			Y
<i>Polygonum sp</i>	Y		
<i>Pracel</i>			Y
<i>Pratia angulata</i>	Y		Y
<i>Prionella vulgaris*</i>			Y
<i>Ranunculus flammula*</i>		Y	
<i>Ranunculus repens*</i>			Y
<i>Ranunculus reflexus</i>	Y		
<i>Raoulia tenuicaulis</i>			Y
			Common ground cover on most recent river flats

Occasional in pasture

Along creek margins, sometimes submerged
In flowing creeks within grazed area

On ground in forest remnants on flats

Common ground cover on most recent river flats

<i>Trifolium pratense*</i>			Y	
<i>Rorippa nasturtium-aquaticum</i>		Y		
<i>Rumex acetosella</i>			Y	
<i>Rumex</i>			Y	
<i>Rumex obtusifolius</i>	Y		Y	
<i>Senecio minimus</i>			Y	
<i>Stellaria graminea*</i>			Y	
<i>Stellaria media*</i>	Y		Y	
<i>Trifolium repens*</i>			Y	
<i>Viola hwallii</i>			Y	
Monocot herbs, rushes, sedges and grasses				
(indigenous species, naturalised species)				
<i>Agrostis capillaris*</i>			Y	A dominant pasture grass
<i>Agrostis sclerifera*</i>			Y	
<i>Anthoxanthum odoratum*</i>			Y	
<i>Astelia grandis</i>		Y		
<i>Astelia scleroti</i>	Y			
<i>Baumea nidiginksa</i>		Y		
<i>Carex flagellifera?</i> or <i>Carex testacea?</i>			Y	Common in places amongst pasture
<i>Carex gaudichaudiana</i>		Y		Sward forming in damp hollows
<i>Carex geminata</i>		Y		
<i>Carex ovalis?</i>			Y	
<i>Carex secta</i>		Y		Common in ephemeral wetlands and permanent pools throughout river flats
<i>Carex virgata</i>		Y		
<i>Cortaderia richardii</i>			Y	Abundant in patches on river flats
<i>Dichelachne crinita</i>			Y	
<i>E. arina austroarmalis</i>	Y			
<i>E. leocharis acuta</i>		Y		
<i>E. leocharis gracilis?</i>		Y		
<i>Fesmit?</i>			Y	
<i>Festuca rubra*</i>			Y	Dominant pasture grass in patches forming dense swards
<i>Holcus lanatus*</i>			Y	Common in pasture
<i>Isolepis</i>			Y	
<i>Isolepis fluviatilis?</i>	Y			
<i>Juncus?</i>		Y	Y	
<i>Juncus articulatus</i>		Y	Y	Common rush of ephemeral wetlands
<i>Juncus edgariae</i>			Y	
<i>Juncus effusus</i>			Y	
<i>Juncus effusus*</i>			Y	
<i>Juncus saxiphorus</i>			Y	
<i>Juncus tenuis</i>			Y	
<i>Lachnagrostis</i>			Y	

<i>Lachnagrostis filiformis?</i>			Y	
<i>Lemna minor</i>		Y		
<i>Lepidosperma australe</i>		Y		
<i>Lolium perene*</i>			Y	
<i>Luzuriaga parviflora</i>	Y			
<i>Phleum pratense*</i>			Y	
<i>Phormium tenax</i>		Y		Patchy in wetlands
<i>Poa annua*</i>	Y			On ground in forest remnants on flats
<i>Poa cita</i>			Y	Scattered tussocks in pasture and more open sites
<i>Potamogeton boesenianii</i>		Y		Occasional in pools within grazed area
<i>Potamo?</i>		Y		
<i>Rytidosperma gracile</i>			Y	
<i>Rytidosperma setifolium?</i>			Y	One patch on river flats
<i>Schedonorus phoenix</i>		Y	Y	Common adventive grass, particularly in damper sites. Scattered along ephemeral channels
<i>Schoenus pauciflorus</i>		Y		
<i>Uncinia distans?</i>			Y	
<i>Uncinia gracilentia</i>	Y			
<i>Uncinia rubra?</i>	Y			
<i>Uncinia uncinata</i>	Y			
<i>Vulpia bromoides*</i>			Y	
<i>Wenka cunninghamii</i>	Y			

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APPENDIX TWO: Sites fished

<i>Location</i>	<i>Fishing Method</i>	<i>NZMS 260 Grid Ref.</i>	<i>Date</i>	<i>Fish species</i>
EF1	EFM	E38 2152623 5669051	13/5/02	Sal. tru, Gob. hut
EF2	EFM	E38 2152564 5669132	13/5/02	Sal. tru, Gob. hur, Ang. die
GM1	GM	E38 2152337 5669307	14/5/02	None
GM2	GM	E38 2152401 5669327	14/5/02	None
GM3	GM	E38 2151456 5669299	14/5/02	None
GM4	GM	E38 2151324 5669268	14/5/02	None
GM5	GM	E38 2151247 5669688	14/5/02	None
GM6	GM	E38 2151118 5668941	14/5/02	None
EF3	EFM	E38 2151206 5668851	14/5/02	Gal. bre, Ang. die, Geo. aus, Gob. hut, Sal. tru
EF4	EFM	E38 2148670 5670381	14/5/02	Sal. tru, Ang. die
EF5	EFM	E38 2148697 5669719	14/5/02	Gob. hub
EF6	EFM	E38 2151457 5669310	14/5/02	Sal. tru, Ang. die

EFM - Electric fishing machine, GM - Gee-minnow.

Sal. tru - brown trout *Salmo trutta*. Gob. hut - redfinned bully *Gobiomorphus hutereaui*. Ang. die - long-finned eel *Anguilla dieffenbachii*. Gal. bre - koaro *Galaxias brevipinnis*. Geo. aus - lamprey *Geotria australis*. Gob. hub - blue-gilled bully *Gobiomorphus hubbsi*.

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APPENDIX THREE. INVERTEBRATE RECORDS FROM TENURE REVIEW INSPECTION.

Appendix 3.

Annotated list of invertebrates noted on the lease and in the lower Cascade River region

Collector codes

EE E. Edwards

PMJ P. Johns

J & L P. Johnstone and W. Lee

Order/Family	Taxon	Locality	Elevation	Collectors	comment
Spiders -Araneae	<i>Dolomedes</i> sp. aff. <i>aquaticus</i>	Cascade R.	11 m	EE	wetland and streams spider
Cockroaches -Blattellidae	<i>Tetragmethia</i> sp.	Cascade R.	11 m	EE	wetland sedge and rush spiders
Beetles -Coleoptera	<i>Celetobdella noëalis</i>	Cascade R.	?	PMJ	Blattellidae Logs
	<i>Celetobdella noëalis</i>	Jacksons Bay	?	PMJ	Blattellidae Logs
	<i>Celetobdella subconformica</i>	Jacksons Bay	?	PMJ	Blattellidae Logs
Carabidae	<i>Neoferonia</i> nsp.	Jacksons Bay	?	PMJ	Carabidae, logs
Carabidae	<i>Plectymus macropterus</i>	Cascade R.	?	R.R. Forster	Carabidae 1955, Logs
Lucanidae	<i>Dendroblax eartyi</i>	Cascade R.	11 m	EE	stag beetle of large woody debris on margins
Lucanidae	<i>Geodorcus heimsi</i>	Cascade R.	~5 m?	J & L	Stag beetle Johnstone & Lee 1977, Det M. Meads
Scarabaeidae	<i>Colombia</i> spp.	Cascade R.	11 m	EE	chafers
Millipedes -Diplopoda	<i>Proctosonnia</i> species	Cascade R.	10 m	EE	Pill millipede. EE, R. Wardle
Flies -Diptera	<i>Amphineurus brevicornis</i>	Jacksons Bay	?	PMJ	
	<i>Amphineurus ochropicus</i>	Cascade R.	?	PMJ	
	<i>Amphineurus senex</i>	Jacksons Bay	?	PMJ	
	<i>Amphineurus senex</i>	Jacksons Bay	?	PMJ	

Tipulidae	<i>Amphineurus limbatu</i>	Cascade R.	?	PMU	Tipulidae fern and broadleaf sweeping
Tipulidae	<i>Atracta sikta</i>	Jackson Bay smoothwater	?	PMU	
Tipulidae	<i>Atracta flicornis</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Austrolimnophila argus</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Austrolimnophila argus</i>	Cascade R.	?	PMU	
Tipulidae	<i>Austrolimnophila chrysothorax</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Austrolimnophila lambr</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Austrolimnophila nigrocincta</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Chorotipula viridis</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Discobola venustula</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Dolichopeza parvicauda</i>	Cascade R.	?	PMU	
Tipulidae	<i>Elephantomyia zelandica</i>	Cascade R.	?	PMU	
Tipulidae	<i>Limonie multispina</i>	Jacksons Bay	?	PMU	
Tipulidae	<i>Molophilus campbellianus</i>	Cascade R.	?	PMU	
Tipulidae	<i>Molophilus irregularis</i>	Cascade R.	?	PMU	
Tipulidae	<i>Rhyacophila sinistra</i>	Jacksons Bay	?	PMU	
Bugs etc. Hemiptera					
Pentatomidae	<i>Rhopalosiphum linearis</i>	Cascade R.	11 m	EE	shield bug common in wetlands
Moths & Butterflies - Lepidoptera					
Crambidae	<i>Barea exartha</i>	Cascade R.	11 m	EE	Widespread and common - endemic.
Crambidae	<i>Eubonia characta</i>	Cascade R.	11 m	EE	autumn emerging, forest, Widespread and common.
Crambidae	<i>Eubonia doctria</i>	Cascade R.	11 m	EE	Local
Crambidae	<i>Eubonia fenestrata</i>	Cascade R.	11 m	EE	Widespread and common, open areas
Crambidae	<i>Eubonia ocellifera</i>	Cascade R.	11 m	EE	Widespread and common, wetlands
Crambidae	<i>Eubonia philega</i>	Maitai R.	30 m	EE	Larvae on mosses on rocks
Crambidae	<i>Orocrambus flexuosellus</i>	Cascade R.	11 m	EE	
Crambidae	<i>Orocrambus ramosellus</i>	Cascade R.	11 m	EE	Widespread and common, grasses
Crambidae	<i>Orocrambus vifellus</i>	Cascade R.	~5 m?	J & L	Johnstone & Lee 1977, Det M. Meads
Geometridae	<i>Asaphodes aegrola</i>	Cascade R.	11 m	EE	Larvae on herbs
Geometridae	<i>Asaphodes beata</i>	Cascade R.	11 m	EE	Larvae on herbs
Geometridae	<i>Asaphodes carnalis</i>	Cascade R.	11 m	EE	

Geometridae	<i>Asaphodes stephanitis</i>	Cascade R.	11 m	EE	local on wetland herbs
Geometridae	<i>Austroclastaria globularia</i>	Cascade R.	11 m	EE	W, C, Coprosma
Geometridae	<i>Chlorocystis festuicatus</i>	Cascade R.	11 m	EE	common widespread polyphagous
Geometridae	<i>Dactana fibricosa</i>	Cascade R.	11 m	EE	W, C, polyphagous on trees
Geometridae	<i>Dactana grisescens</i>	Not found but on mistletoes			Paratilia, Illicotylus and Tupaea
Geometridae	<i>Declana junctifemur</i>	Cascade R.	11 m	EE	W, C, shrubs
Geometridae	<i>Epiphyas verniculata</i>	Cascade R.	11 m	EE	Cabbage tree
Geometridae	<i>Epysa rosaria</i>	Cascade R.	11 m	EE	Polyphagous on herbs
Geometridae	<i>Gaionia deflectaria</i>	Manly R.	30 m	EE	Polyphagous on shrubs
Geometridae	<i>Helastia cineraria</i>	Cascade R.	11 m	EE	W, C, Mosses on rock
Geometridae	<i>Helastia corcularia</i>	Cascade R.	11 m	EE	W, C, P. mosses/herbs
Geometridae	<i>Hydnomena arida</i>	Cascade R.	11 m	EE	
Geometridae	<i>Hydnomena rivata</i>	Cascade R.	11 m	EE	Larvae on herbs
Geometridae	<i>Ischaelis forficata</i>	Cascade R.	11 m	EE	W, C, ferns
Geometridae	<i>Ischaelis forficata</i>	Manly R.	30 m	EE	W, C, ferns
Geometridae	<i>Ischaelis gallearia</i>	Cascade R.	11 m	EE	Local on ferns
Geometridae	<i>Ischaelis variabilis</i>	Cascade R.	11 m	EE	
Geometridae	<i>Ischaelis variabilis</i>	Manly R.	30 m	EE	
Geometridae	<i>Paspiphila cotinosa</i>	Cascade R.	11 m	EE	local on small leaved Oleasnia
Geometridae	<i>Paspiphila melochlora</i>	Cascade R.	11 m	EE	On Chraimichraella local
Geometridae	<i>Paspiphila muscosata</i>	Cascade R.	11 m	EE	common, widespread on Muehlenbeckia
Geometridae	<i>Proclasthena pulcherrata</i>	Cascade R.	11 m	EE	L on heath: Cyathodes, Leucopogon etc.
Geometridae	<i>Pseudocoremia productata</i>	Cascade R.	11 m	EE	Larvae polyphagous on trees
Geometridae	<i>Pilepsa scotosialis</i>	Cascade R.	11 m	EE	W, C, litter
Geometridae	<i>Sarisa murifurcata</i>	Cascade R.	11 m	EE	
Lycenidae	<i>Antipodolycaena nsp.</i>	Cascade R.	11 m	EE	Muehlenbeckia exaltaris
Lycenidae	<i>Boldenaria nsp.</i>	Cascade R.	11 m	EE	Muehlenbeckia exaltaris
Noctuidae	<i>Agrotis ipsilon</i>	Cascade R.	11 m	EE	W, C, P.
Noctuidae	<i>Alata moderata</i>	Cascade R.	11 m	EE	W, C, Daisies
Noctuidae	<i>Ferocystis grammiosa</i>	Cascade R.	11 m	EE	W, C, Mahoe
Noctuidae	<i>Graphania mutans</i>	Cascade R.	11 m	EE	
Noctuidae	<i>Meterana tarlanae</i>	Cascade R.	11 m	EE	W, L, Coprosma
Noctuidae	<i>Persectania aenea</i>	Cascade R.	11 m	EE	W, C, grasses
Noctuidae	<i>Schraneria costaeatrigata</i>	Cascade R.	11 m	EE	Wetlands

Noctuidae	<i>Trimetoplophota elyopa</i>	Cascade R.	11 m	EE	Local on Monocots
Noctuidae	<i>Trimetoplophota eistranga</i>	Cascade R.	-5 m?	J & L	C, W, grasses. Johnstone & Lee 1977, Det M. Meads
Noctuidae	<i>Trimetoplophota seminivata</i>	Cascade R.	11 m	EE	W, C, sedges
Geophoridae	<i>Proteodes profunda</i>	Manly R.	30 m	EE	Larvae on <i>Nothofagus</i>
Psychidae	<i>Lochma ornivora</i>	Cascade R.	-5 m?	J & L	Cass larvae on Oleana, Aristotelia and <i>Adiantum</i> etc. Johnstone & Lee 1977, Det M. Meads
Pterophoridae	<i>Pterophorus monospilalis</i>	Cascade R.	11 m	EE	Plume moth on Pats and <i>Pseudopanax</i>
Pterophoridae	<i>Stenoptilia zaphrodactyla</i>	Cascade R.	11 m	EE	Plume moth, exotic on exotic gentian - <i>Ceratania</i>
Pyralidae	<i>Antiscopa Epicornia</i>	Cascade R.	11 m	EE	C, W larvae common on Clematis and some other hosts
Pyralidae	<i>Deana hybrealis</i>	Cascade R.	11 m	EE	W, C. Mosses
Pyralidae	<i>Scoparia minisculalis</i>	Cascade R.	11 m	EE	C, W Autumn emerging
Pyralidae	<i>Scoparia pethina</i>	Cascade R.	11 m	EE	W, C. on <i>Epilobium</i>
Pyralidae	<i>Scoparia rotundella</i>	Cascade R.	11 m	EE	Larvae on <i>Hydrocotyle</i>
Pyralidae	<i>Scoparia ustamaculata</i>	Cascade R.	11 m	EE	
Pyralidae	<i>Udea flavidialis</i>	Cascade R.	11 m	EE	
Tortricidae	<i>Ctenopseustis obliquana</i>	Cascade R.	-5 m?	J & L	Polyphagous on shrubs, <i>Aristotelia</i> etc. Johnstone & Lee 1977, Det M. Meads
Tortricidae	<i>Megophyas leucaniana</i>	Cascade R.	11 m	EE	W, C, grasses and <i>Pimelea</i>
Tortricidae	<i>Planorbrix arossana</i> grp.	Cascade R.	11 m	EE	
Tortricidae	<i>Planorbrix flavescens</i>	Cascade R.	11 m	EE	
Yponomeutidae	<i>Protosynsasma stercoraria</i>	Cascade R.	11 m	EE	W, C, grasses
Lacewings - Neuroptera					
	<i>Aficromus lasmanioides</i>	Cascade R.	11 m	EE	Common lacewing
Damselflies & Dragonflies - Odonata					
	<i>Austrolestes colsonis</i>	Cascade R.	11 m	EE	Damselfly
	<i>Proconotula</i> species	Cascade R.	11 m	EE	dragonfly
Webs & grasshoppers - Orthoptera					
Acridae	<i>Phaulacridium marginale</i>	Cascade R.	11 m	EE	lowland grasshopper
Anostostomatidae	<i>Hemidantus maculifrons</i>	Jacksons Bay	?	Trevor Crosby	Anostostomatidae malaise trap
Anostostomatidae	<i>Hemidantus maculifrons</i>	Jacksons Bay	?	PMJ	Anostostomatidae forest

Anostostomatidae	Hemianthus maculifrons	Cascade R.	?	A. S. Gerber	Anostostomatidae pitfalls
Anostostomatidae	Hemianthus resp. 'medusylvestris' (P.M. Johns)	Jacksons Bay, Jacksons Head	?	PMU	Anostostomatidae
Anostostomatidae	Hemianthus resp. 'medusylvestris' (P.M. Johns)	Jacksons Bay - Tuning Fork Ok.	?	Lyle, J.	Anostostomatidae
Anostostomatidae	Hemiteles thoracica	Cascade R.	~5 m?	J & L	Tree weta Johnstone & Lee 1977, Det M. Mead
Raphidophoridae	Taëtropsis senilis	Jacksons Bay	?	PMU	Raphidophoridae logs at night
Raphidophoridae	Taëtropsis senilis	Cascade R.	?	PMU	Raphidophoridae
Stick insects - Phasmatodea	Acanthoxyia prasina ?gelisovi	Cascade R.	11 m	EE	stick insect favours ibatara, rimu, rata
Blattellinae - Planaria					
Geophilidae	Nezaislandia sp.	Cascade R.	?	PMU	Flabworm, logs near river
Caddis - Trichoptera					
Conoesucidae	Pycnocentroides aeneus	Cascade R.	11 m	EE	caddis
Conoesucidae	Pycnocentroides aureolus	Martyr R.	30 m	EE	caddis E 38 21526 56682
Hydrobiosidae	Costachnoema californicum	Martyr R.	30 m	EE	caddis E 38 21526 56682
Hydrobiosidae	Hydrobiosis clavigera	Martyr R.	30 m	EE	caddis E 38 21526 56682
Hydrobiosidae	Hydrobiosis copis	Martyr R.	30 m	EE	caddis E 38 21526 56682
Hydrobiosidae	Psilochorema leptotarsax	Martyr R.	30 m	EE	caddis E 38 21526 56682
Leptoceridae	Hudsonema armabile	Martyr R.	30 m	EE	caddis E 38 21526 56682
Polyplectroptidae	Polyplectropus puerilis	Martyr R.	30 m	EE	caddis E 38 21526 56682

APPENDIX FOUR

ARAMBLE THROUGH THE JACKSON BAY RIDING

(By a Tourist).

West Coast Times

1894

21 November: Starting at the Cascade River, the first sign of civilisation is the sheep and cattle station of Mr Colin McFarlane, in the valley of the Cascade & Martyr rivers, which consist of a number of good alluvial flats covered with ribbon wood and scrub, with open grass flats in several places along the river bed, also a great extent of bush land suitable for cattle rearing. The home station is situated on the Martyr River, at the foot of the Olivine range, and consists of a comfortable and substantially built house suitable for a family residence. A smaller house is at present occupied by Mr C Macfarlane and his brother, with well kept wool sheds. Sheep and cattle yards are all well and substantially built, with a good orchard of various kinds of fruit trees looking grand with blossom. Several large wire-fenced paddocks in oats, turnips and grass as well as the inevitable potato patch, all looking splendid.

On my arrival at the station, Mr Macfarlane was away mustering cattle for the Hokitika market, but he returned in the evening with a mob of about 20 head of splendid beef cattle, all as quiet as if they had never left the home paddocks. The owner has not been fortunate with his sheep this lambing season, although all I saw on the river flats were looking well.

This is my first visit to the valley of the Cascade and I was agreeably surprised to find such a large extent of good useful land for cultivation as well as sheep and cattle raising. Mr C Macfarlane is badly handicapped and has been for sometime; what he requires here is a partner as energetic and industrious as himself, and there is a grand future before them in this splendid country. The one great drawback to it at present is its isolation. There have been several sporadic attempts to get a road into this part of Westland, making a patch of a few miles here and a few miles there, then leaving about double the length unfinished or untouched so that it is almost impossible to get on to the constructed portions from either end.