
KANIERE FORKS AND MCKAY'S CREEK HEPS RE-CONSENTING
TRUSTPOWER LIMITED



Photo A5-29: The proposed location of the new McKays Power Station on the flat grass and gravel area in the foreground.

Appendix 6: Description of the vegetation communities in the vicinity of the Wards Road Power Station

The following seven vegetation communities occur within the vicinity of the proposed new KNF Power Station and tailrace.

1. *Carex* sedgeland;
2. *Coprosma propinqua* shrubland;
3. *Coprosma propinqua* / *Carex* shrubland;
4. *Leptospermum scoparium* shrubland;
5. *Phormium tenax* flaxland;
6. *Phormium tenax* flaxland / *Sphagnum*; and
7. *Manoao colensoi* forest.

The location and extent of these vegetation communities in relation to the construction envelope of the proposed KNF HEPS enhancement are shown in Map 9 and photographs for each vegetation community are included below.

The following descriptions of these vegetation communities are derived from measurements and observations within temporary unbounded Recce plots (following Hurst and Allen 2007) and general observations during site investigations.

Carex sedgeland

This is a relatively modified, low stature vegetation community (average canopy height 0.5 m) that occurs on moderately drained substrates and grades into shrubland on the margins (Photo A6-1). It is dominated by *Carex* species⁸ and exotic grasses (primarily *Holcus lanatus**) with scattered rushes (*Juncus edgariae* and *J. effuses**) and shrubs (*Ulex eurapaeus**, *Coprosma propinqua*, *C. tayloriae*), *Rubus fruticosus* agg.*, *Pteridium esculentum*, and occasional *Cortaderia richardii*. The groundcover (<0.3 m tier) is largely comprised of exotic grasses and herbs including *Agrostis capillaris**, *Ranunculus repens**, *Lotus pedunculatus** and *Stellaria alsine**.

⁸ Note that some *Carex* and grass species could not be identified with certainty as the *Carex* sp. had died-off over winter and seed heads were either old and damaged or absent on the grass species.

***Coprosma propinqua* shrubland**

This vegetation community (Photo A6-2) occurs on the northern side of the wetland on a moderate to well drained, slightly raised, flat terrace bisected by a small stream. It is notably drier than the *Coprosma propinqua* / *Carex* shrubland described below. The average top height is 2.5 m and the canopy cover of the upper tier (2 – 5 m) is open (30% cover). Although *Coprosma propinqua* is dominant, a range of other species are also present i.e., *Ulex eurapaeus**, *Coprosma tayloriae*, *Hebe salicifolia* and *Phormium tenax*. In small patches *Coprosma propinqua* forms a continuous canopy through which occasional dryland forest species are regenerating. In the 0.3 – 2 m tier many of the species listed above are represented. In addition, *Cortaderia richardii*, *Juncus edgariae*, *Rubus fruticosus agg.** and the ferns *Polystichum vestitum* and *Blechnum minus* are present, but occasional. *Crococsmia x crocosmiiflora** grows along riparian edges. The groundcover is dominated by exotic grasses (*Holcus lanatus** and *Agrostis capillaris**) and occasional herbs (<1% cover) including *Ranunculus repens**, *Lotus pedunculatus** and *Digitalis purpurea**. This vegetation community has a high proportion of exotic species relative to other vegetation types in the wider area, and has historically been cleared of its original indigenous cover.

***Coprosma propinqua* / *Carex* shrubland**

This vegetation community (Photo A6-3) is distinct from the dryland *Coprosma propinqua* shrubland described above, largely as a result of differences in drainage. This vegetation type occurs on a flat, poorly drained surface. *Coprosma propinqua* and *Coprosma tayloriae* are prominent in the relatively open canopy (25% cover) which has an top height of 2 m. Other species, including saplings or shrubs of *Phyllocladus alpinus*, *Manoao colensoi*, *Myrsine divaricata* and *Libocedrus bidwillii* individually comprise <1% of the cover. With the exception of *Carex* sp. (50 - 75% cover) and *Carex secta* (1 - 5% cover), other species in the 0.3 – 2 m tier are uncommon and comprise <1% of the cover in this tier. They include *Ulex eurapaeus**, *Phormium tenax*, *Neomrytus pedunculatus*, *Leptospermum scoparium*, *Juncus edgariae* and *Polystichum vestitum*. Due to the poor drainage the ground tier (<0.3 m) is dominated by *Carex* species (including *Carex secta* 1 – 5% cover) and *Sphagnum cristatum* (26 - 50% cover) rather than exotic grasses and herbs which are much more abundant in the dryland *Coprosma* shrubland. Some exotic species, namely *Holcus lanatus**, *Agrostis capillaris**, *Ranunculus repens**, *Lotus pedunculatus** *Stellaria alsine** and *Cirsium* sp. are present but they are uncommon (<1% cover). Other native species in the lower tiers; *Acaenia* sp. and the ferns *Blechnum penna-marina* and *B. minus* also have a cover of <1%.

***Leptospermum scoparium* shrubland**

This vegetation community (Photo A6-4) is very similar to the *Coprosma propinqua* / *Carex* shrubland described above except that *Leptospermum scoparium* is more prominent in the canopy than *Coprosma propinqua* and the canopy height is higher (3.5 m vs. 2 m). Again other species in the 2 – 5 m tier; *Phyllocladus alpinus*, *Manoao colensoi* and *Coprosma tayloriae* have a limited cover (<1%). The composition and structure of the 0.3 – 2 m and <0.3 m tiers are very similar to the *Coprosma propinqua* / *Carex* shrubland. *Carex* species and *Sphagnum cristatum* are again prominent and make up a similar percentage of the cover.

***Phormium tenax* flaxland**

Phormium tenax flaxland (Photo A6-5) occurs on flat poorly drained surfaces. Scattered shrubs (<1% cover) of *Coprosma propinqua*, *Coprosma tayloriae* and *Myrsine divaricata* grow above the *Phormium tenax* canopy, which has an average top height of 1.8 m and a canopy cover of 40%. A small number of other tree species including *Griselinia littoralis*, *Phyllocladus alpinus*, *Manoao colensoi* and *Pseudopanax crassifolius* occur within this flaxland in the 0.3 - 2 m tier, but they are also uncommon (<1% cover). With the exception of *Carex* sp., which has a cover of 26 - 50%, other species in this tier, i.e. *Carex secta*, *C. virgata*, *Blechnum minus*, *Juncus edgariae*, *J. effusus**, *Rubus australis* and *Ulex eurapaeus** also have a cover of <1%. *Sphagnum* is notably absent from the <0.3 m tier, which is largely *Carex* sp. with the remainder comprised of exotic herbs and grasses such as *Agrostis capillaris**, *Ranunculus repens**, *Lotus pedunculatus** and *Stellaria alsine** (all <1% cover).

Phormium tenax* flaxland / *Sphagnum

This flaxland community (Photo A6-6) is more open than the one described above and is characterised by *Phormium tenax*, *Coprosma tenuicaulis*, *Carex maorica* and *Sphagnum cristatum*. It is also notably less modified. The only introduced plant species recorded was *Ulex eurapaeus**. This vegetation community occurs on a flat terrace that is lower than the *Phormium* flaxland described above. It is wetter and the soils are probably more leached and nutrient poor. The average top height is lower (1.5 m) and the *Phormium* canopy is more open (25%). Occasional *Manoao colensoi* trees are scattered throughout, some of which are in the 5 – 12 m tier. Scattered shrubs of *Phyllocladus alpinus*, *Leptospermum scoparium* and *Coprosma propinqua* exceed 2 m, but the overall canopy cover in this tier is sparse (1 – 5%) relative to the 0.3 – 2 m tier (76 – 100%). The 0.3 – 2 m tier is comprised of *Phormium tenax* (the dominant canopy species), scattered trees/shrubs of the species mentioned above,

as well as *Coprosma tenuicaulis* (1 – 5% cover), *Coprosma tayloriae*, *Myrsine divaricata*, *Ulex eurapaeus**, *Podocarpus cunninghamii* and *Pseudopanax crassifolius* (all <1% cover). Lower down in this tier sedges are dominant and include *Carex maorica* (51 – 75% cover) *C. secta* and *C. virgata* (both <1%) as well as the rush *Juncus edgariae*. *Sphagnum cristatus* is the dominant ground cover (26 – 50%) with the ferns *Polystichum vestitum* and *Blechnum minus* being the only other species recorded in this tier (other than the species that occur in higher tiers).

***Manoao colensoi* forest**

In the immediate vicinity of the wetland at Wards Road, *Manoao colensoi* forest (Photo A6-7) is restricted to an area of the narrow terrace face where the drainage is moderate. The average top height is 10 m and the canopy cover is 30%. The only species in the 12 – 25 m tier is *Manoao colensoi*, but the overall cover for this tier is <1%. Canopy and sub-canopy species in the 2 – 5 and 5 – 12 m tiers include young *Dacrydium cupressinum*, *Libocedrus bidwillii*, *Griselinia littoralis*, *Weimannia racemosa* (1 – 5% cover), *Phyllocladus alpinus*, *Pseudopanax crassifolius*, *Leptospermum scoparium*, *Myrsine divaricata*, *Neomyrtus pedunculata*, *Pittosporum tenuifolium* and *Coprosma areolata* (<1% cover). *Neomyrtus pedunculata* is prominent in the 0.3 – 2 m tier and other shrub species include *Pseudowintera colorata* and *Coprosma foetidissima* and many of those species listed in higher tiers. The ground cover is predominantly vegetation (85%) including seedlings of many of the species recorded in the higher tiers as well as sedges (*Carex virgata*, *Microlaena avenacea* and *Uncinia* sp.) and ferns (*Polystichum vestitum* and *Blechnum novaezealandiae* and *B. procerum*), with the remainder being leaf litter and moss.



Photo A6-1: *Carex* sedgeland, Wards Road.



Photo A6-2: Dryland *Coprosma propinqua* - *Ulex europaeus* shrubland, Wards Road.



Photo A6-3: *Coprosma propinqua* / *Carex* shrubland, Wards Road.



Photo A6-4: *Leptospermum scoparium* shrubland, Wards Road.



Photo A6-5: *Phormium tenax* flaxland, Wards Road.



Photo A6-6: *Phormium tenax* flaxland / *Sphagnum*, Wards Road.



Photo A6-7: Looking across to *Manoao colensoi* forest from within *Phormium tenax* flaxland, Wards Road.

Appendix 7: Description of the vegetation communities along the proposed new MKY HEPS water race

The terrestrial vegetation communities within the construction envelope of the proposed new section of water race to bypass McKays tunnel are comprised of the following three vegetation communities:

1. *Ulex europaeus* scrub;
2. Secondary *Weimannia racemosa* / *Quintinia serrata* forest; and
3. *Cyathea smithii* - *Dicksonia squarrosa* tree-fernland.

The following descriptions of these vegetation communities are derived from a rapid walkover survey only. Quantitative surveys of these vegetation types have not been undertaken.

***Ulex europaeus* scrub**

This vegetation community (Photo A7-1) is widespread on the private farmland through which the proposed new section of water race would traverse. The canopy is dominated by *Ulex europaeus* with an average canopy height of 3 - 4 m and cover of 80-90%. There are occasional patches and individual trees of species such as *Weimannia racemosa*, *Dacrydium cupressinum*, *Dacrycarpus dacrydioides*, *Carpodetus serratus*, *Griselinia littoralis*, *Cyathea smithii*, *Pittosporum eugenoides*, *Melicytus ramiflorus*, *Coprosma propinqua*, *C. lucida* and *Aristolelia serrata* regenerating through the gorse. Introduced weed species such as *Leycesteria formosa* and *Rubus fruticosus* occur in places and there are occasional open areas of exotic grassland dominated by common exotic pasture species. This vegetation is grazed, highly modified and of low ecological value.

Secondary *Weimannia racemosa* / *Quintinia serrata* forest

This vegetation community (Photo A7-2) is generally fairly typical of secondary *Weimannia racemosa* / *Quintinia serrata* forest. The canopy varies in height from 8 – 20 m and is dominated by *Weimannia racemosa* and *Quintinia serrata* with some *Melicytus ramiflorus* and *Elaeocarpus dentatus* common where the canopy is taller. There are very occasional large emergent *Dacrydium cupressinum* (up to 1.6 m dbh). The sub-canopy, understorey and ground cover tiers are open. The sub-

canopy and understorey is characterised by abundant *Dicksonia squarrosa* and *Cyathea smithii*, *Ascarina lucida*, *Coprosma lucida* and *Pseudowintera colorata* with *Ripogonum scandens* in wetter areas, The vegetation cover in the understorey is limited (20%) and comprised largely of ferns including *Asplenium flaccidum*, *Leptopteris superba* and *Blechnum discolor* as well as young *Dicksonia squarrosa* and *Cyathea smithii* and *Metrosideros diffusa*, *Microlaena avenacea* and *Uncinia* sp. The remaining 80% is leaf litter (Photo A7-2). The species composition and understorey structure indicate that browsing pressure is probably moderate.

***Cyathea smithii* - *Dicksonia squarrosa* tree-fernland**

This is an early successional vegetation community (Photo A7-3) in the bottom of the valley. The canopy is dominated by 4 – 6 m high *Cyathea smithii* and *Dicksonia squarrosa*. It is relatively open (50% canopy cover) and shade intolerant species such as *Ulex europaeus* persist, particularly lower down the slope. Other canopy/sub-canopy species include young *Weimannia racemosa*, *Ascarina lucida* and *Dacrycarpus dacrydioides* and *Prumnopitys ferruginea* seedlings as well as shrubs including *Coprosma propinqua*, *Neomyrtus pedunculata*, and *Myrsine divaricata*. The understorey is comprised of common indigenous species including *Metrosideros diffusa*, grasses and sedges such as *Microlaena avenacea* and *Uncinia* sp., the fern *Blechnum fluviatile* and the creeping herb *Centenella uniflora*. This vegetation community is modified and currently of low – moderate ecological value, however it is an early successional community that is actively regenerating towards an indigenous forest community.



Photo A7-1: *Ulex europaeus* scrub on private farmland.



Photo A7-2: Secondary *Weimannia racemosa* / *Quintinia serrata* forest, Kaniere Forest CA.



Photo A7-3: *Cyathea smithii* - *Dicksonia squarrosa* tree-fernland, Kaniere Forest CA.

Appendix 8: Significance criteria

For the purposes of this assessment of significance, the WDC criteria, set out in Part 4 of the Westland District Council Plan (2002), and the WCRC criteria, set out in Policy 9.2 of the West Coast Regional Policy Statement (2000) have been used as the primary criteria for determining the significance of the vegetation and habitats potentially affected by the enhanced Scheme.

West Coast Regional Council Significance Criteria

Under Policy 9.2 of the Regional Policy Statement, the West Coast Regional Council will:

“Recognise and provide for the protection of significant indigenous vegetation and significant habitats of indigenous fauna. Matters to be considered as a guide for decision making include those that follow, any one of which may determine whether areas of indigenous vegetation and/or habitats of indigenous fauna are “significant”.

- a) The desirability for their protection by statute or covenant;
- b) Protection status, including reserves created under the West Coast Accord;
- c) The degree to which the area is representative of an association of species or an ecosystem that is typical of the region;
- d) The likelihood of the area retaining its viability, quality and integrity of processes over a long time period;
- e) The presence or absence of an indigenous species or community of indigenous species that is rare or threatened regionally or nationally;
- f) The degree to which the area is distinctive in terms of indigenous species that are unusual, endemic, or that reach a distribution limit in the region;
- g) The extent to which the area has been modified from a natural state or affected by weeds or pest species;
- h) Its connection with other areas of significant indigenous vegetation or significant habitats of indigenous fauna;
- i) Its contribution to the avoidance or mitigation of natural hazards;

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- j) Its use or value on a local, regional or national scale for public access, recreation, amenity and heritage purposes;
- k) The relationship of Poutini Ngai Tahu and their culture and traditions with their ancestral lands, water, sites, waahi tapu, mahinga kai and other taonga;
- l) The contribution of the area or habitat to maintenance and enhancement of ecological and reproductive processes water quality, water flow and soil conservation;
- m) The relationship of the area or habitat to any water body included in a water conservation order;
- n) Whether they occur near wetlands and estuaries;
- o) The importance to migratory species, including whitebait; and
- p) The relevance of ecological districts in relation to matters (c), (e) and (f).

Westland District Council Significance Criteria

Council will protect areas of significant indigenous vegetation and significant habitats of indigenous fauna and outstanding natural features in the District. Council will, in particular, target those indigenous vegetation types occurring in alluvial and coastal areas. All areas of significant indigenous vegetation and habitats shall meet one or more of the following criteria:

(i) Intactness

The area is unmodified by human activity, comprises a predominantly intact indigenous system and is not affected in a major way by weed or pest species; AND

Size

The area of indigenous vegetation has a predominant cover of 5 hectares or more.

(ii) Representativeness

The area is one of the best examples of an association of species which is typical of its ecological district;

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(iii) Distinctiveness

The area has indigenous species or an association of indigenous species which is unusual or rare in the ecological district, or endemic or reaches a distribution limit in the ecological district. The area may be distinctive because of the influences of factors such as altitude, water table, soil type or geothermal activity.

(iv) Protected Status

The area has been set aside by New Zealand Statute or Covenant for protection and preservation or is a recognised wilderness area.

(v) Connectivity

The area is connected to one or more other significant areas in a way, (including through ecological processes) which makes a major contribution to the overall value or natural functioning of those areas.

(vi) Threat

The area supports an indigenous species or community of species which is threatened within the ecological district or threatened nationally.

(vii) Migratory Species:

An inter-tidal area or area of forest, wetland, lake, estuary or other natural habitat that is important for migratory species or for breeding, feeding or other vulnerable stages of indigenous species.

(viii) Scientific or other Cultural Value:

The area is a type, locality or other scientific reference area, is listed as a geopreservation site, or has a distinctive amenity value (e.g. it contributes to a distinctive and outstanding landscape of the district, has other significant cultural value or is of international importance).