

## BLUFF VEGETATION AT ELLANGOWAN SCENIC RESERVE, BANKS PENINSULA

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As part of my masters research on the ecology and conservation management of *Chionochloa rigida* on Banks Peninsula (Lilley 1990), I was interested in trying to establish the type of site that grassland vegetation, and especially *C. rigida* grassland, would have occurred in before human settlement. Banks Peninsula appears to have been largely covered in dense podocarp dominated forest prior to the arrival of humans, with considerable forest still present when the first Europeans arrived in the middle of last century (e.g., Armstrong 1879, Johnston 1969). However, a few sites almost certainly lacked forest either because they were too steep or too wet. Steep rocky bluffs around the volcanic rim of Akaroa and Lyttelton harbours would have provided such sites, and are likely to have been important habitats for non-forest species. Grassland plants like *Chionochloa rigida* may well have had their pre-human stronghold on these bluffs, although they may also have occurred in the occasional disturbed areas within forest (e.g., slips).

Although we have no direct evidence of what the pre-human vegetation of these bluffs was like, we can infer this from the present vegetation, especially at sites where the surrounding forest is relatively intact. It would seem that these rocky bluff areas did not support grassland but were characterised by isolated patches or individuals of *Chionochloa rigida* and associated grassland species clinging precariously to the steep rocky bluff faces, and were surrounded by dense podocarp forest on more gentle slopes. An apparently little modified example of this rock bluff vegetation is found in Ellangowan Scenic Reserve and provides a useful model of what the pre-human or 'primaeval' habitat of *C. rigida* may have been like.

In the central section of Ellangowan Scenic Reserve, a steep bluff is present on which *Chionochloa rigida* grows with other grassland species. Forest is present both above and below the bluff. The bluff was sampled by abseiling down the rocky face and recording the species present (see species list).

On the top of the bluff, the vegetation is composed of naturalised grasses (e.g., *Anthoxanthum odoratum*, *Holcus lanatus* and *Agrostis capillaris*) and indigenous shrubs (e.g., *Melicactus alpinus*, *Hebe lavaudiana* and *H.strictissima*), grading back into low forest on the rear slope. The steep upper section of the bluff is largely dominated by lichens with a few indigenous species such as *Ctenopteris heterophylla*, *Rytidosperma* species and *Poa cita* clinging precariously in rock cracks. At 4 m from the top, the bluff was indented slightly with a sloping ledge below. This ledge contained enough soil to support small shrubs (e.g., *Coprosma rhamnoides*,

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*Gaultheria antipoda* and *Pseudopanax colensoi*), grasses (*Chionochloa rigida* and *Chionochloa conspicua*), *Phormium cookianum* and small indigenous herbs (e.g., *Anisotome aromatica*, *Brachyglottis lagopus* and *Lycopodium varium*). On the steep lower section of the bluff, which was much damper than the upper section, *Chionochloa rigida* occurred in vertical crevices, with its leaves drooping down into the podocarp forest below. Several other herb and grass species (e.g., *Chionochloa conspicua*, *Brachyglottis lagopus*) also occurred here, as did a number of bryophyte species. The forest below the bluff contained mature *Podocarpus hallii* trees, with *Griselinia littoralis*, *Myrsine australis*, *Pseudopanax colensoi* and *Coprosma rhamnoides* dominant as shrubs, and a ground layer of *Polystichum vestitum* and *Phymatosorus diversifolius*.

Other bluffs on the peninsula with *Chionochloa rigida* include Cooper's Knob and those in and adjacent to Armstrong Scenic Reserve. These bluffs have slightly different species compositions depending on local floristic patterns and the degree of anthropogenic disturbance.

The western peak of Cooper's Knob (573 m) on the western side of Banks Peninsula supports *Chionochloa rigida*, but few other indigenous species remain (see species list). Instead a large number of naturalised species are present on the bluff including *Ulex europaeus*, *Dactylis glomerata* and *Rumex acetosella*. Those indigenous species that do occur include *Brachyglottis lagopus*, *Kunzea ericoides* and *Festuca novae-zelandiae*. Cooper's Knob, although protected as part of a scenic reserve, appears a severely degraded area with considerable damage to the vegetation due to introduced animals. The relative floristic poverty of this site compared to the Ellangowan bluff is also due to its lower altitude and drier climate (mean annual total rainfall is about 1000 mm cf. 1600 mm at Ellangowan), and perhaps to its isolated western location.

The wet bluffs found in Armstrong Scenic Reserve are floristically more similar to those at Ellangowan, although more subalpine species are present. *Celmisia mackaui* is an important constituent species of the bluff vegetation at this site along with *Chionochloa rigida*. Other species with subalpine affinities present on the Armstrong bluffs but not at Ellangowan include *Forstera tenella* and *Gingidia ensyii*.

From the sites seen, it would appear that the Ellangowan bluff is probably typical of the general vegetation pattern on little modified bluff sites and serves as a useful model for the type of site grassland species must have been largely confined to when Banks Peninsula was dominantly forested. It is interesting to reflect that if Banks Peninsula was as dominated by forest as it appears to have been, then these few open sites must have been very important sources of plants once deforestation took place. This would have been particularly so for the *Chionochloa rigida* grasslands of eastern Banks Peninsula, as no other seed source was available for this species.

## References

- Armstrong, J.B. 1880. A short sketch of the flora of the Province of Canterbury, with catalogue of species. *Transactions of the New Zealand Institute* 12, 325-353.
- Johnston, W.B. 1969. Modification of the natural environment by man. In G.A. Knox (ed.), *The Natural History of Canterbury*. Reed, Wellington. pp 77-94.
- Lilley, F.J. 1990. The ecology and conservation management of *Chionochloa rigida* on Banks Peninsula, New Zealand. Unpublished M.For.Sc. thesis, University of Canterbury.

**Checklist of main vascular plant species present for Ellangowan Scenic Reserve (E) and Cooper's Knob (C) bluff sites.**

<i>Anisotome aromatica</i>	E	<i>Holcus lanatus</i>	EC
<i>Anthoxanthum odoratum</i>	EC	<i>Hymenophyllum multifidum</i>	E
<i>Asplenium hookerianum</i>	E	<i>Hypochoeris radicata</i>	C
<i>Asplenium terrestre</i>	EC	<i>Kunzea ericoides</i>	C
<i>Astelia nervosa</i>	E	<i>Lycopodium varium</i>	E
<i>Brachyglottis lagopus</i>	EC	<i>Melicytus alpinus</i>	EC
<i>Cerastium fontanum</i>	C	<i>Phormium cookianum</i>	E
<i>Chionochloa conspicua</i>	E	<i>Phymatosorus diversifolius</i>	E
<i>Chionochloa rigida</i>	EC	<i>Poa cita</i>	EC
<i>Coprosma parviflora</i>	E	<i>Podocarpus hallii</i>	E
<i>Coprosma rhamnoides</i>	EC	<i>Polystichum vestitum</i>	E
<i>Corokia cotoneaster</i>	C	<i>Pseudopanax colensoi</i>	E
<i>Ctenopteris heterophylla</i>	E	<i>Pyrrosia elaeagnifolia</i>	E
<i>Dactylis glomerata</i>	C	<i>Rytidosperma</i> sp	EC
<i>Festuca novae-zelandiae</i>	C	<i>Rumex acetosella</i>	C
<i>Gaultheria antipoda</i>	E	<i>Scleranthus uniflorus</i>	C
<i>Griselinia littoralis</i>	E	<i>Senecio vulgaris</i>	C
<i>Hebe lavaudiana</i>	E	<i>Ulex europaeus</i>	C
<i>Hebe strictissima</i>	E		