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VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui

SCHOOL OF BIOLOGICAL SCIENCES
Te Kura Matauranga Koiora

RIMUTAKA INCLINE WALKWAY

LADLE BEND WETLAND SITE ASSESSMENT

Report to Wellington Regional Council

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INTRODUCTION

This report covers the outcome of a preliminary investigation into the natural values of an isolated bog[1] site on the Rimutaka Incline Walkway. The site is located above the railway route east of the Ladle Bend bridge and runs parallel to the railway route for about 400m, and covers an area of about 1.5 Ha. The site is on the proposed route for a logging road for access to adjacent plantation pine which would largely destroy it. Our considerations were as follows.

- Does the site have any natural character or feature that merits protection?

- If so what considerations might be necessary to ensure that such character or feature is maintained?

An inspection of the site was made on 12 January 2000. A further visit was made on 28 January by M.McIntyre with Dr Frank Climo (volunteer) and Karin Mahlfield (Victoria University) who examined the site for land snails.

GENERAL DESCRIPTION

The site is an area of impeded drainage which supports an even canopy of medium height spindly manuka (*Leptospermum scoparium*) on peaty soil. This grades into a wet area with patches of sphagnum and clumps of sedge and less manuka,. There is more or less persistent wetland at the western end although there is no open water. The area is probably subject to occasional flooding.

Construction of the railway, opened in 1878, has probably reduced the extent of the boggy area by cutting off the lower edge, and deflecting runoff from above the railway route into a drain for discharge elsewhere. This is best seen from an aerial photograph. The area below the walkway is now planted in pine. A deep tomo at the drain outlet nearest the

[1]A bog is defined by Buxton (1991) as a wetland fed by rainfall, and developing from impeded drainage which is followed by the buildup of characteristic bog vegetation. Slow rates of decomposition contribute to low fertility, acid soils and peat development.

western end suggests that there may be (or was in the past) occasional large runoff.

Pigs have been in part of the drier area perhaps 1-2 years previously, leaving the characteristic uneven soil surface. There was also fresh deer sign (footprints) and a few scattered possum pellets. It seems to be a site known to hunters but is not easy to move about in and has relatively little visual attraction.

VEGETATION

To characterise the vegetation we ran a 200m transect through the long axis of the site from the drier outer region to the wetter central region, recording all species present to about 50cm each side of the line in 10m sections. We then undertook a general reconnaissance for any additional species.

The wetland comprises two distinct communities (Fig.1). These are –

- a less boggy region completely covered in a manuka canopy with an understorey of varying thickness

- a "wet" region with grass and sedge species and a less dense covering of manuka.

We recorded 49 species of native plants, 42 of which occurred along the transect line (Table 1). While manuka up to about 10cm dbh is clearly the dominant species, the fern, *Blechnum novae-zelandiae,* was present on the ground throughout and swamp coprosma (*Coprosma tenuicaulis*) formed a low understorey in all sections (Fig.2), making some areas difficult to penetrate. Other common species include *Carex dissita, Pseudopanax aboreus*, and *Blechnum procerum*, all of which were present as ground cover in about half of the sampled sites. All other species (Table 1) were infrequent – most also occurring as ground cover in less than four sites along the transect.

The growth of manuka appears to be limited by the soil fertility or other environmental conditions. As the WRC warden suggests (Dean Hearfield, pers comm.) it has apparently remained about the same height for at least the last 20 years. The ground cover is

TABLE 1. Ladle Bend bog site plant list * = not encountered on transect

Species	common name
Dicot and monocot trees:	
Leptospermum scoparium	manuka
*Cordyline australis**	cabbage tree
Dicot shrubs:	
Coprosoma tenuicaulis	swamp coprosma
*Cyathodes juniperina**	hard mingimingi
*Helichrysum lanceolatum**	niniao
*Leucopogon fasciculatus**	soft mingimingi
Olearia virgata var. *virgata**	
Dicot tree and shrub seedlings:	
Aristotelia serrata	wineberry
Brachyglottis repanda	rangiora
Carpodetus serratus	putaputaweta
Clematis paniculata	puawhananga
Coprosma grandifolia	raurekau
Geniostoma rupestre var. *ligustrifolium*	hangehange
Griselinia littoralis	kapuka
Hebe stricta	
Melicope simplex	poataniwha
Melicytus ramiflorus	mahoe
Myrsine australis	mapou
Pittosporum tenuifolium	kohuhu
Podocarpus totara	totara
Pseudopanax aboreus	five-finger
Pseudopanax anomalus	
Pseudopanax crassifolius	lancewood
Dicot herbs:	
*Drosera binata**	sundew
Hydrocotyle moschata	
Senecio minimus	
Centella uniflora	
Dicot exotic weeds:	
Senecio jacobaea	ragwort
Ulex europaeus	gorse
Rubus fruticosus	blackberry

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Grasses, sedges and rushes:

Baumea tenax	
Carex dissita	
*Carex flaviformis**	
Carex geminata	
Cortaderia fulvida	toetoe
Gahnia xanthocarpa	
*Juncus planifolius**	
Lepidosperma australe	
Microlaena avenacea	bush rice grass
Uncinia uncinata	hook grass
*Uncinia angustifolia**	hook grass

Monocot herbs other than grasses, sedges and rushes:

Astelia fragrans

Ferns :

Blechnum fluviatile	kiwakiwa
Blechnum penna-marina	
Blechnum procerum	
Blechnum novae-zelandiae	kiokio
Cyathea dealbata	ponga, silver fern
Cyathea smithii	katote
Dicksonia squarrosa (juvenile)	wheki
Histiopteris incisa	mata, water fern
Hypolepis rufobarbata	
Paesia scaberula	matata, hard fern
Pteridium esculentum	bracken
*Lindsaea linearis**	

Mosses:

Ptychomnion aciculare	
*Sphagnum cristatum**	sphagnum

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significant for a variety of native ferns, most notably *Blechnum* spp., and for seedlings and saplings of larger trees (such as *Pseudopanax aboreus*, *Ps.crassifolius*, *Podocarpus totara* - see Table 1). However, the tree species were not present in any form larger than saplings. The apparent age of the forest suggests they will not grow larger than this in the future. Because of this the manuka lacks a true understorey where swamp coprosma is absent, even where ground cover (mainly sedges) is relatively tall.

The dominant species in the wetter area were *B.novae-zelandiae*, manuka and swamp coprosma, although the manuka and coprosma were more sparse than in the drier region (Fig.1). The *B.novae-zelandiae* that occurred in this area was larger and more abundant than in the drier area. The understorey and seedlings virtually disappear in this region, and there was some gorse present.

In addition to these two major communities were some smaller intermediate communities, including several patches of sphagnum extending up to about two square meters in area, in the zone between wetter and drier areas. Sphagnum is not classified as endangered regionally or nationally by the Department of Conservation, but is becoming very rare in Wellington's lowland areas. The scattered nature of the sphagnum made it difficult to ascertain the overall extent. There were also scattered open areas with native grasses and no manuka covering.

There were very few exotic species present in the wetland; apart from small patches of gorse in the wetter region. However the perimeter of the wetland is covered in blackberry; and while this does not appear to have penetrated the area an invasion would be likely if the wetland was disturbed.

While none of these species alone are recognised as vulnerable or endangered, the vegetation assemblage and plant soil association is distinctive, characteristic of peaty sites and becoming increasingly rare.

This description and semi-quantitative evaluation (Table 1, Fig.1, 2) is intended as a baseline to allow for future monitoring of change in the character or status of the site.

LAND SNAILS

There were also 12 species of indigenous land snails found in damp leaf litter in the drier part of the site (Table 2). While some of these species also persist in other habitats with various states of modification,their survival in such circumstances nevertheless seems to be associated with the persistence of the native fern species (Gibbs G., Victoria University pers comm.). The ferns in turn seem to persist as long as there is adequate shade, adjacent indigenous vegetation and source of propagules and relative freedom from

TABLE 2. List of snail species collected from forest litter (det. F.Climo).

species	comment
Family: Rhytidae	
Wainuia urnula	especially abundant, shell diameter up to 25mm
Family: Charopidae	
Phenacharopa pseudanguicula	
Carellia buccinella	
Huonodon pseudoleidon	albino specimen (an occasional occurrence)
Therasiella n sp	similar to *T.neozelandica*
Family: Punctidae (sub.family Punctini)	
Punctum ordinarium	
Pu. lateumbilicata	
Parolaoma microdegenerata n sp.	
Pa. gracilis	
Pa.microbrunnea n sp.	
Pa. ?globosa n.sp.	sparse-ribbed form; may be new species
Pa. serratocostata	

disturbance. Except where there is obvious obliteration of habitat the factors associated with loss of snail diversity are not known[2].

The medium-sized carnivorous land snail *Wainuia urnula* is abundant and easy to find. It is known for its unusual feeding habit of grabbing prey (mainly amphipods) with a flick of the tongue and ingesting it whole (Efford 1991). This species is easily recognised by the thin light shiny dark brown shell. Empty shells, perhaps predated by blackbirds or possums, are scattered in patches throughout the drier part of the area, while live specimens are readily found underneath patches of deeper litter in small depressions left by pig rooting or under ferns. This species is distributed in the Rimutaka and Tararua ranges and adjacent forest remnants (Efford 1991, 1998).

[2] A relevant research project, perhaps for a university student, would be to identify the environmental factors (degrees of modification & disturbance, isolation from indigenous forest, logging of adjacent exotic forest) associated with loss of snail species from different local habitats and their relative influence. The implications of exotic forestry practices would be of particular interest.

The other species are all smaller ranging in shell diameter from 1-1.5 mm. The specimens were obtained by extraction from the leaf litter collected from the site. The records from this site are also scientifically valuable because they add to known distributions in an area not previously sampled. It is of particular biogeographic interest that two of these species (*Pa.microdegenerata* and *Pa.gracilis*) occur together (Climo F. pers. comm.) here. The extent to which these species persist in various habitats is not known.

On the basis of snail fauna it is desirable to protect the Ladle Bend site as habitat where an assemblage of indigenous snail species persists in a state relatively free from disturbance and in conjunction with a distinctive plant community – given the state of disappearing biodiversity in the Wellington Region (Wellington Regional Council 2000).

CONTEXT OF RECOMMENDATIONS

Habitats of a primarily indigenous character are becoming increasingly fragmented throughout the lowlands and foothills of New Zealand. The route to local extinction of biotic assemblages, and eventually of species, typically involves fragmentation of habitat then gradual degradation of individual sites by any, or a combination of the following:

- prevailing physical conditions are altered by outside influences (water table, wind, moisture, light)
- loss of species by predation, overbrowsing, weed cover or other interactions with invasive species
- encroachments around the perimeter or other disturbance reducing the area of indigenous vegetation to the point that the site loses its essential character.

Gabites (1993; note Chap. 6,9) provides a very readable description of remnant plant communities in the Wellington area, and the Wellington Regional Council acknowledges that "As much as 90% of the regions wetland have been drained, filled or otherwise lost." (p87 in Wellington Regional Council 2000).

The peaty nature of the soil on the Ladle Bend site probably inhibits growth of most weeds, in particular gorse and blackberry, although these grow around the edge

providing a ready seed source. Wild animals, although present are probably not a major concern in protecting the character of the site. However, the prevailing hydrological regime is crucial to maintaining its character. The site is probably subject to periodic flooding, though this may not be a concern unless there is substantial silting or scouring. If there is significant drying out the character of the site will change; the seedlings on the forest floor of the drier part will eventually grow through the swamp coprosma to establish a vegetation succession which will eventually overtake the manuka, and other bog vegetation. Gorse and blackberry will also spread inside the site, although in the longer term natives are likely to take over if the site is otherwise undisturbed.

Wetland sites are subject to a natural evolution in the medium-longer term (see Fuller 1993). However, the fragmentation of areas with indigenous vegetation reduces the opportunities for them to form elsewhere as natural drainage patterns shift. Construction of drains, which may be outside the site, adds to the fragmentation effect by lowering the water table. Thus it is important to take heed of relevant conditions outside the site, and in some instances to actively intervene to maintain a wetland site.

RECOMMENDATIONS

1. **We strongly recommend that the site should be preserved.**

   The justification for this is:

   - the site supports distinctive and representative local biota
   - the physiography is distinctive
   - roading will physically obliterate part of the site and alter the rest by draining it
   - the Wellington region has lost 90% of its wetlands (Wellington Regional Council 2000).

   One stated objective for Biodiversity is that "Special ecosystems in the region are actively protected." (p83 Wellington Regional Council 2000). Clearly the issue of disappearing biodiversity in the Wellington Region is sufficient to merit public concern (Evening Post 1/2/2000).

2. **Steps should be taken to ensure that logging of the adjacent pine forest is undertaken in a manner that will not greatly alter the hydrological regime**

We are unable to advise how this should be done but emphasize that major change in the hydrological regime is likely to results in a loss of special character. The concerns are to avoid heavy silting or scouring & substantial and permanent drying out.

There is a bank of seedlings of various indigenous understorey shrub and early successional native tree species, and also of weed seeds. These are present over most of the drier part of the site but not represented in the canopy. This is presumably because the peaty character of the soil is limiting to them. If the site were to become substantially drier these species would eventually grow through to change the character of the vegetation. If otherwise undisturbed this would remain predominantly native but the distinctive swamp vegetation would be lost. Snail densities would also fall and some species perhaps disappear from the site.

3. **The site should be drawn to the attention of visitors on the walkway. This should be in keeping with and in the same low key but informative tone as the historical information already provided elsewhere along the walkway.**

A notice at side of the walkway might have a profile diagram of swamp vegetation (& image of a snail) and wording to the effect that the site is neither easy to move about in nor particularly scenic, but is protected because it contains an assemblage of representative and distinctive native plants and land snails, and such sites are becoming increasingly rare and fragmented. . This would be highly appropriate on a public walkway which was created to preserve other aspects of New Zealand's past heritage. We think the most likely people to enter the area are probably occasional hunters, who might also benefit from the awareness.

4. **The site should be listed in an appropriate inventory or database of wetland sites and its condition monitored closely with regard to the removal of adjacent pine logs, and subsequently from time to time.**

ACKNOWLDEGMENT

Dr Frank Climo (Wellington) and K. Mahlfield (Victoria University) collected and identified the snail species.

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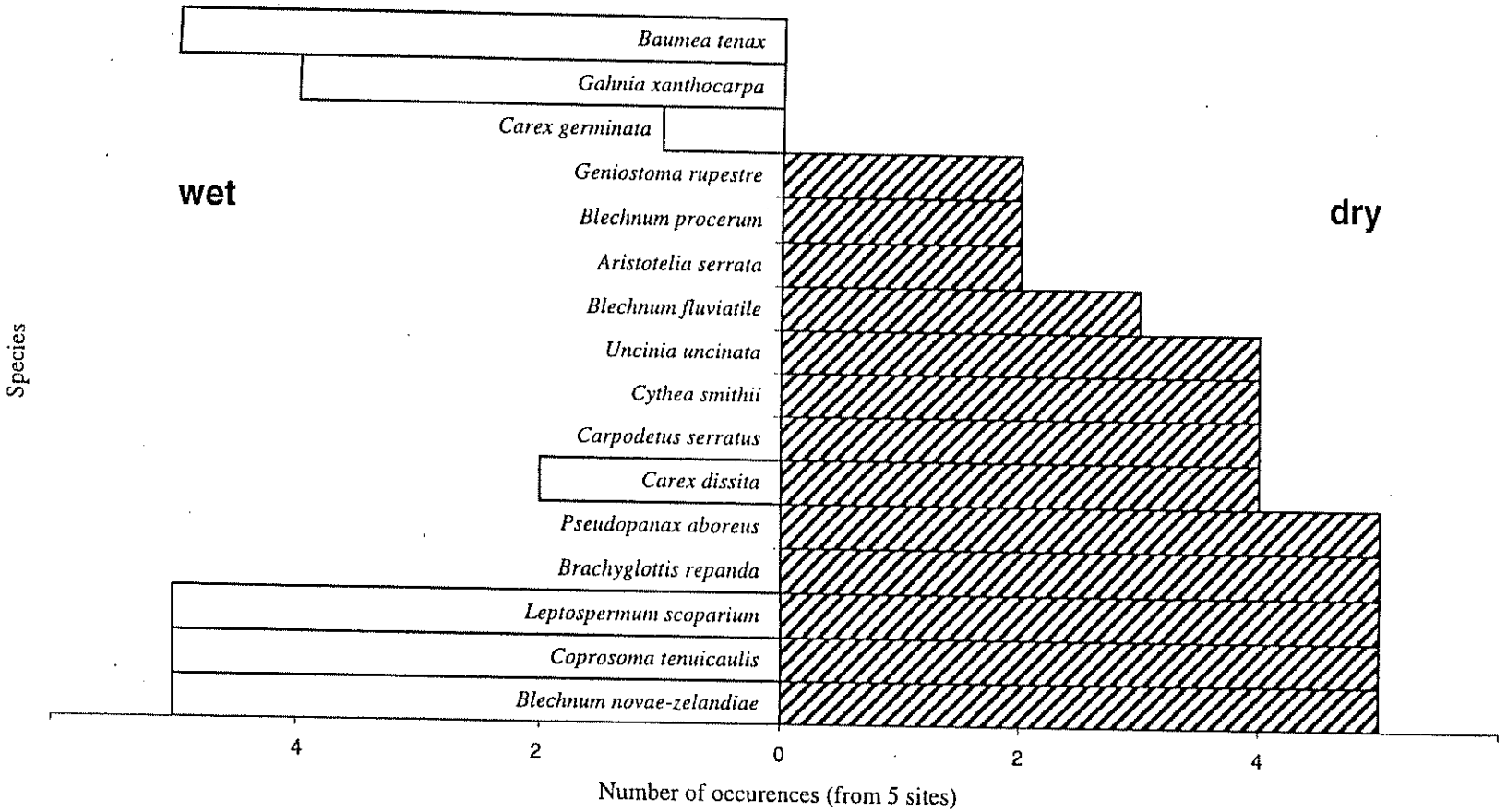

FIGURE 1. Composition of wetter and drier bog communities indicated by the occurrence of species in 10m sections over the first and last 50m of the transect

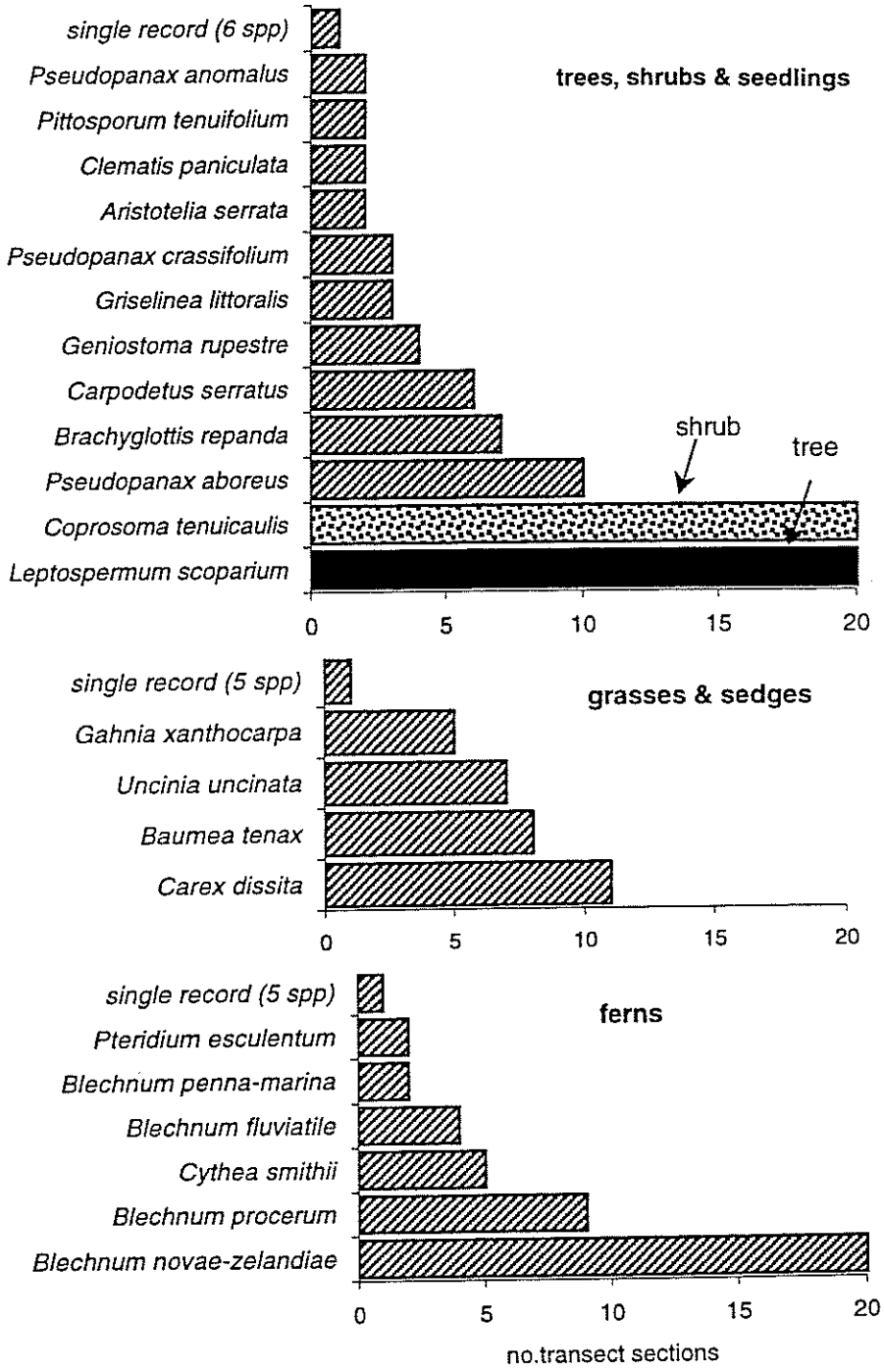

FIGURE 2. Species occurrence in 10m sections on 200m transect from the east end to the centre of the site.