



NATIVE FOREST REMNANTS OF

WELLINGTON CITY

- A Survey of Five Sites

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MAP 1 Wellington Botanic Gardens

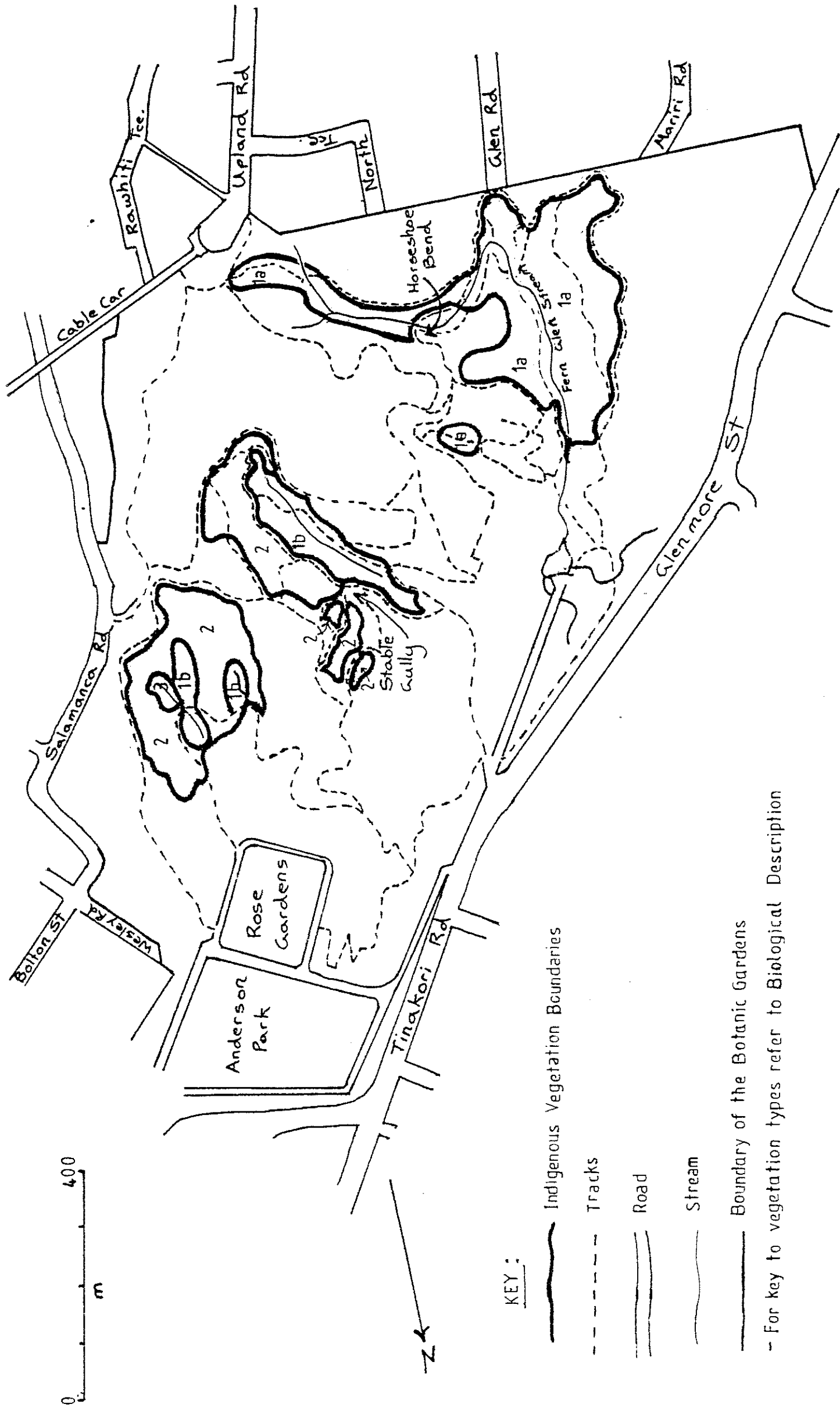
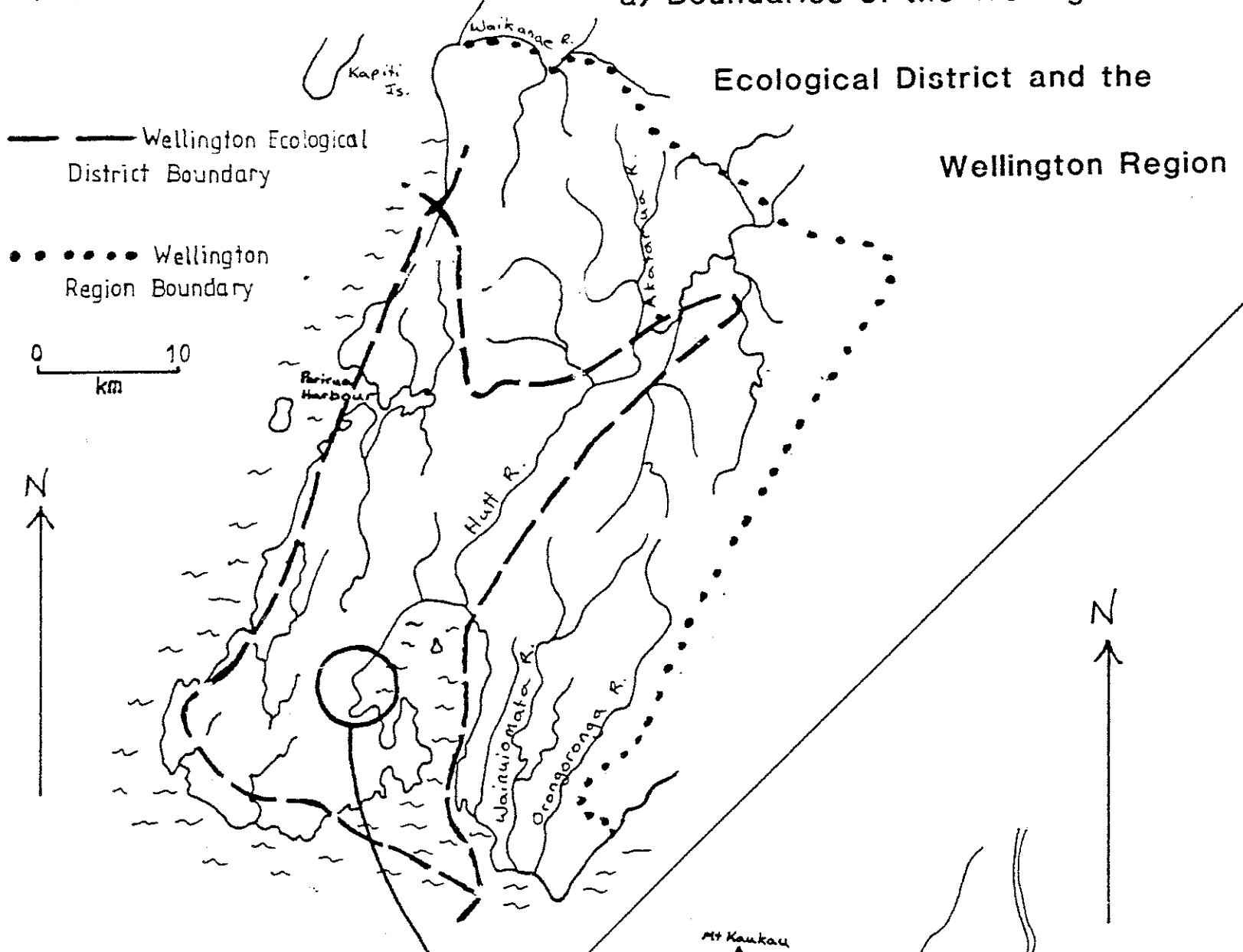


FIG 1 LOCALITY MAP

a) Boundaries of the Wellington Ecological District and the Wellington Region

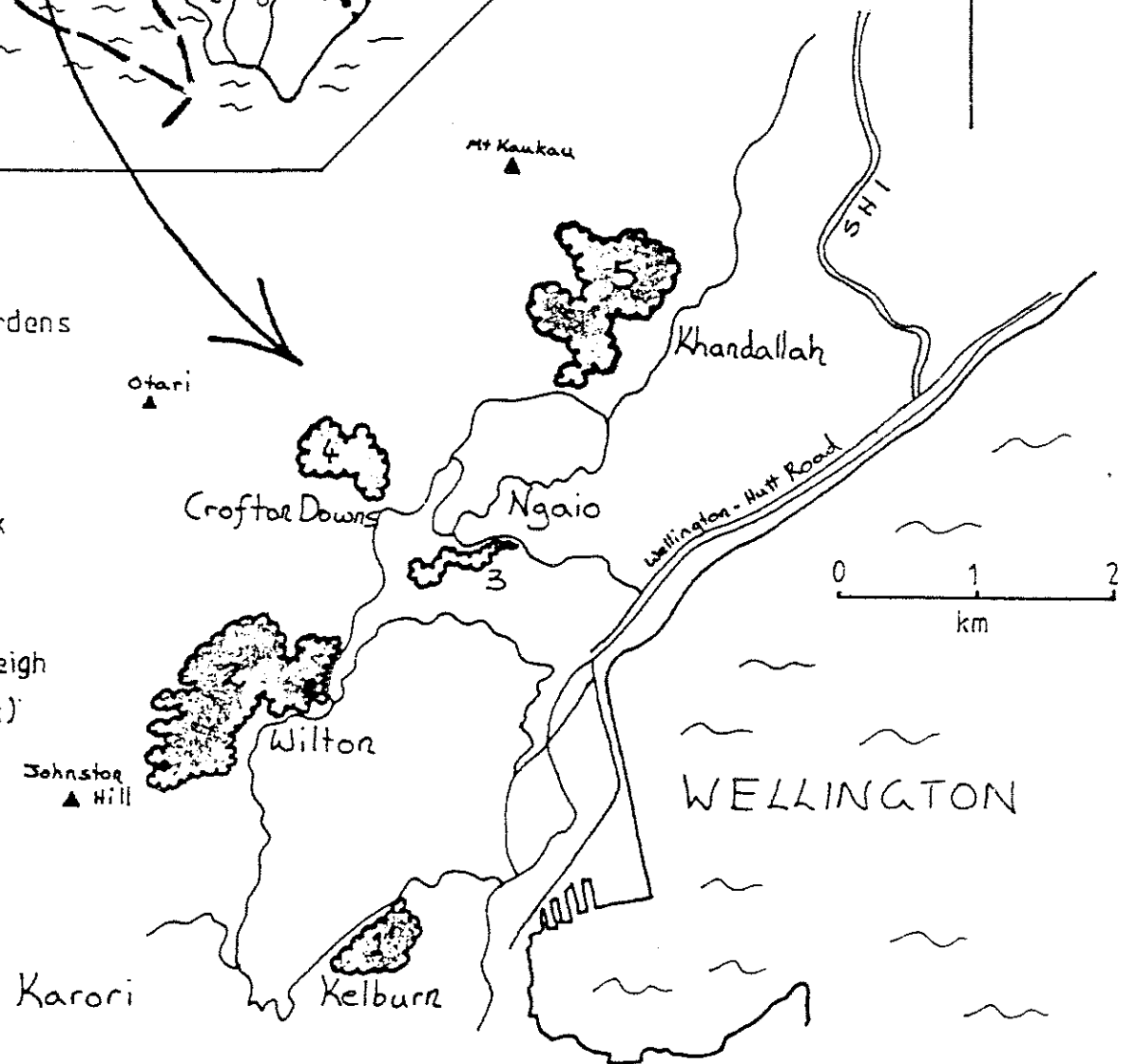


KEY :

- 1. Wellington Botanic Gardens
- 2. Otari Open Air Native Plant Museum
- 3. Ngaio Gorge (Trelissick Park)
- 4. Crofton Downs (Huntleigh Park)
- 5. Khandallah Park

Major Roads

▲ Trig Station



b) Location of the Surveyed Sites within Wellington City

WELLINGTON BOTANIC GARDENS NATIVE FOREST REMNANTS	GRID REF NZMS 260 R27 580900
<p>LOCATION The valley and hill slopes adjacent to the suburbs of Kelburn, Thorndon and Northland.</p> <p>AREA DESCRIPTION The Wellington Botanic Gardens contain areas of exotic and mixed native and exotic plantings, lawn and ornamental bedding and native forest. The native forest occupies three main areas:</p> <ol style="list-style-type: none"> 1. Broadleaved forest on the western slope of Fern Glen Stream extending also on the eastern side through two valleys. 2. Broadleaved forest in Stable Gully, fringed by kanuka forest. 3. An extensive area of kanuka forest, with pockets of broadleaved forest, on the hillside south of the Rose Gardens. <p>Prior to the 1840's the land occupied by the gardens and surrounding areas was covered in dense broadleaved-podocarp and coastal broadleaved forest. Most of this forest was lost with the progress of pioneer settlement in Wellington³. With the establishment of the Botanic Gardens in 1869, however, further destruction was prevented in this area³. The majority of the forest remaining in the gardens at the time of establishment still exists today.</p> <p>ACCESS Easily accessible because of its proximity to the city centre and cable car. Entrances via Glenmore Street, the upper Cable Car Terminus and most streets around the perimeter of the gardens.</p>	<p>AIR PHOTO</p> <p>AREA 8 ha native forest within 26 ha Botanic Gardens</p> <p>CONTROL W.C.C.</p> <p>STATUS/CURRENT PROTECTION Established in 1869 to create a Botanic Gardens and to save the remaining areas of original forest³. The land was vested in the WCC in 1891. The native forest remnants are to be preserved but in some sites exotics and other native species are to be planted, for comparison with the original native areas¹.</p>

BIOLOGICAL DESCRIPTION	% area	Res Wgtn	native ex			regen	NAT	trend	exotics
Community Types			1°	2°	Ind				
1. Broadleaved forest in valleys and hill slopes above stream. (a) Mixed broadleaved forest. On the hill slopes, kohekohe-hinau-titoki forest with mahoe, ponga, karaka, tarata, ngaio and scattered rewarewa. Mahoe, pukatea, kotukutuku, mamaku and titoki are abundant in the stream valleys.	50.7	NO	✓			M	H	S	M
(b) Kohekohe dominant broadleaved forest. Mahoe, hinau, titoki, tarata, karaka and mapou also in the canopy. Tawa is present in the area of forest in Stable Gully.	13.0	NO	✓			M	H	S	M
2. Kanuka forest with rewarewa and five finger in the canopy. Mapou, manuka, five finger, rewarewa, ponga and lancewood form the understorey.	34.8	YES		✓	✓	H	H	I	M
3. Pocket of kamahi forest fringed by kanuka and manuka. Broadleaved species form the understorey.	1.5	YES		✓		M	H	S	M

Comments on species

- A large hinau tree in Stable Gully is possibly the oldest tree in the Gardens.
- Two large northern rata trees grow in the Gardens; in Stable Gully and near Horseshoe Bend.

VALUES

Scientific

A remnant of pre-European Wellington vegetation and of regenerating kanuka forest. Listed as a forested area of potential value for wildlife⁴.

Scenic

The native forest provides a contrasting natural feature amongst the ornamental and exotic plantings, representative of the original Wellington native vegetation.

Recreation

Closest area of native forest to Wellington city centre. High intensity of use by public and by schools and scout groups.

MODIFICATIONS AND TRENDS

Due to the small size and relative isolation of this remnant native forest, its species diversity has reduced since European settlement. The large podocarp trees (miro, totara, rimu, kahikatea), present in 1875² have now disappeared from the forest, probably having been milled out³. Along with them, the native parasite species i.e. *Loranthus micranthus*, *Tupeia antarctica* and *Korthalsella salicornioides*, and many of the epiphyte species e.g. *Astelia* sp. and orchid species, listed by Buchanan have also gone. Adventive species, particularly *Tradescantia*, *Clematis vitalba*, blackberry, barberry and *Selaginella* have recently spread into most of the native remnants. Exotic tree leaf litter also falls from nearby plantations into the forest. *Tradescantia* is found through much of the broadleaved forest, especially in moist areas, while *Clematis vitalba* has established on a section of Hinau path and as seedlings elsewhere.

Many native species not endemic to the Botanic Gardens² have established within the native forest from plantings elsewhere in the Gardens. Karaka is the most vigorous of these and has established as a canopy species in some areas of broadleaved forest, while nikau has established in much smaller numbers predominantly in Stable Gully. *Pittosporum ralphii* was originally planted as a border-hedge species and has established in the kanuka forest as a pioneer species and on the margins of the broadleaved forest. Seedlings of several native podocarp species (miro, kauri and rimu) have also recently been planted in selected places amongst the native forest by the Parks & Recreation Department.

Tracks run through much of the native forest and some damage has occurred from overuse. Water runoff from these paths has also become a problem, particularly from the Hinau and Rangiora paths. Possum browsing has caused some damage to the vegetation and may be preventing regeneration of many of the broadleaved species.

THREATS

1. Clearance or modification of the forest remnants for horticultural planting.
2. Spread of adventive and introduced native plants (although only karaka appears to be altering the original composition of the bush).
3. Drying out of the forest floor during summer in areas unprotected on the edge. This creates a fire risk and prevents regeneration.
4. Erosion, caused by water runoff from tracks on some of the steeper slopes.
5. Modification of natural litter layer by the spread of exotic leaf litter.
6. Damage by possum browsing.
7. Damage from overuse by public.

IMPROVEMENTS NEEDED

1. Total protection and preservation of all remaining areas of native forest, as was the objective of the Botanic Gardens Act 1869³. This should be written into the Management Plan.
2. Publicity provided at the Information Centre regarding historical value, forest structure and ecology of the native forest.
3. Control of adventives, particularly *Tradescantia*, barberry and *Clematis vitalba*. Clearing of leaf litter where possible.
4. Further planting of native hedges around the perimeter of the forest to provide a buffer, particularly at Horseshoe Bend. Water sprinklers should also be used to minimise forest floor desiccation.
5. Improvement of tracks to prevent erosion and runoff.
6. Control of possums if feasible.
7. Re-establishment of original native species listed by Buchanan in 1875². Local seed sources could be used and plantings, especially of the podocarp species, could be made in selected areas.

COMMENTS, RECOMMENDATIONS

The lowland broadleaved forest in the Botanic Gardens is directly derived from the original forest once found in that area of Wellington^{2,3}. Although modified from this original forest, particularly by the disappearance of the old podocarp trees, invasion by adventive plants and by human interference and animal browsing, a large proportion of the native species listed by Buchanan in 1875² are still present today. The native forest remnants, therefore, have a very important historical and scientific value for Wellington.

Possibly the most diverse and botanically interesting remnant of forest in the Gardens exists in 'The Glen' extending up into 'Horseshoe Bend'. Here a wide variety of species form the canopy, including a number of native species, a pukatea, an old northern rata and a large kaikomako. The area in Horseshoe Bend is the most fragile since it is not well buffered on the edges, contains a high proportion of *Tradescantia*, and the forest floor is prone to desiccation. The forest in Stable Gully is of slightly different species composition, being dominated by kohekohe and is buffered on the edges by kanuka forest.

Lowland forest remnants are generally rare in the New Zealand reserve system. The proximity of the Wellington city centre makes this site of regional significance for preservation. It is urgent that the management objectives and policies for the native forest be changed so as to preserve the area as a remnant of Wellington's original lowland broadleaved forest.

REFERENCES

1. Botanic Gardens Management Plan. Parks & Recreation Dept, WCC.
2. Buchanan, J. (1875). Notes on the Colonial Botanic Gardens Wellington and its Flora. Unpub. Nat. Mus.
3. Cook, W. and Shephard, W. History of the Wellington Botanic Gardens. In preparation.

INDIGENOUS HIGHER PLANTS OF WELLINGTON BOTANIC GARDENS

NATIVE FOREST REMNANTS

Trees and Shrubs

SCIENTIFIC NAME	MAORI/COMMON NAME
<i>Alectryon excelsus</i>	titoki
<i>Aristotelia serrata</i>	wineberry
<i>Beilschmiedia tawa</i>	tawa
<i>Brachyglottis repanda</i>	rangiora
<i>Carpodetus serratus</i>	putaputaweta
<i>Coprosma grandifolia</i>	raurekau
<i>C. lucida</i>	karamu
<i>C. rhamnoides</i>	
<i>C. robusta</i>	karamu
* <i>Corynocarpus laevigatus</i>	karaka
<i>Dodonaea viscosa</i>	akeake
<i>Dysoxylum spectabile</i>	kohekohe
<i>Elaeocarpus dentatus</i>	hinau
<i>Fuchsia excorticata</i>	kotukutuku
<i>Geniostoma ligustrifolium</i>	hangehange
<i>Griselinia lucida</i>	puka
<i>Hebe stricta</i>	
<i>Hedycarya arborea</i>	pigeonwood
<i>Hoheria populnea</i>	houhere, lacebark
<i>Knightea excelsa</i>	rewarewa
<i>Kunzea ericoides</i>	kanuka
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum scoparium</i>	manuka
<i>Leucopogon fasciculatus</i>	mingimingi
<i>Lophomyrtus bullata</i>	ramarama
<i>Macropiper excelsum</i>	kawakawa
<i>Melicope ternata</i>	wharangi
<i>Melicytus ramiflorus</i>	mahoe
<i>Metrosideros robusta</i>	northern rata
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	mapou
<i>M. salicina</i>	toro
<i>Nestegis cunninghamii</i>	black maire
* <i>Olearia paniculata</i>	akiraho, golden akeake
<i>O. rani</i>	heketara
<i>Pennantia corymbosa</i>	kaikomako
* <i>Pittosporum crassifolium</i>	karo
<i>P. eugenioides</i>	lemonwood, tarata
<i>P. ralphii</i>	
<i>P. tenuifolium</i>	kohuhu
* <i>Pomaderris apetala</i>	
<i>Pseudopanax arboreus</i>	five-finger
<i>P. crassifolium</i>	lancewood
<i>P. edgerleyi</i>	raukawa
<i>Pseudowintera axillaris</i>	pepper tree
* <i>Rhopalostylis sapida</i>	nikau
<i>Schefflera digitata</i>	pate
* <i>Vitex lucens</i>	puriri
<i>Weinmannia racemosa</i>	kamahi

Climbers and Lianes

Clematis hookeriana
C. paniculata
Freycinetia baueriana ssp. *banksii*
Metrosideros diffusa
M. fulgens
M. perforata
Muehlenbeckia australis
M. complexa
Parsonsia heterophylla
Passiflora tetrandra
Ripogonum scandens
Rubus cissoides

Grasses and like plants

Microlaena avenacea
Uncinia banksii
U. uncinata

Herbs

Dianella nigra
Haloragis erecta
Microtis unifolia
Phormium tenax
Pterostylis banksii
P. trullifolia
Thelymitra longifolia

Ferns

<i>Adiantum cunninghamii</i>	<i>Histiopteris incisa</i>
<i>A. viridescens</i>	<i>Hymenophyllum demissum</i>
<i>Asplenium bulbiferum</i>	<i>Lastreopsis glabella</i>
<i>A. flaccidum</i>	<i>L. hispida</i>
<i>A. oblongifolium</i>	<i>L. velutina</i>
<i>A. polyodon</i>	<i>Leptopteris hymenophylloides</i>
<i>Blechnum capense</i>	<i>Phymatosorus diversifolius</i>
<i>B. chambersii</i>	<i>P. scandens</i>
<i>B. filiforme</i>	<i>Pneumatopteris pennigera</i>
<i>B. membranaceum</i>	<i>Polystichum richardii</i>
<i>Cyathea dealbata</i>	<i>Pteridium esculentum</i>
<i>C. medullaris</i>	<i>Pyrrosia serpens</i>

* Planted native species or natives outside their natural range

Common Adventive Plants Found in the Native Forest Communities

SCIENTIFIC NAME	COMMON NAME
<i>Allium triquetrum</i>	onion weed
<i>Berberis darwinii</i>	barberry
<i>Clematis vitalba</i>	Old Man's Beard
<i>Cytisus scoparius</i>	yellow flowered broom
<i>Rubus fruticosus</i>	blackberry
<i>Selaginella</i> sp.	
<i>Tradescantia fluminensis</i>	wandering jew
<i>Ulex europaeus</i>	gorse