

Botany of Tuff Crater (Tank Farm), Auckland's North Shore

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A small group from the Auckland Botanical Society met with Forest & Bird North Shore representatives to have a look at the vegetation of this unique landscape beside the motorway in Northcote on Saturday 8 November 2008. The trip was led by Richard Hursthouse and the objective was to add to the existing species list and make suggestions for possible future plantings in the Tuff Crater Reserve. We set a 3 hour deadline for the trip around the crater and surprisingly kept pretty much to this in order to get away to place our votes for the national election.

As the reserve title suggests, this area is a tuff crater – a circular rim formed by an eruption around 30,000 years ago (Cameron et al. 1997) - and is more or less intact, although the north-eastern area was quarried for the motorway development and the flattest areas along the northern side were modified during the war to accommodate storage tanks for fueling ships. The soil is not lava or volcanic in the sense of the isthmus soils, but is derived from lithic tuff – ‘thin graded beds of grey mud- to sand-sized ejecta’ with fragments of rock (Kermode 1992). The eastern rim is breached and the tidal sediment base of the crater is saturated with mangroves. Apparently listed as a ‘Site of Natural Value’ as part of the Auckland volcanic field which is ‘high priority for immediate World Heritage listing’. It is designated by North Shore City District Plan as a Site of Special Wildlife Interest with a designated Notable Grove of Trees at the southern tip. The area is a Recreation Reserve owned by North Shore City Council with Crown Foreshore.

We set off from Warehouse Way, the north-eastern entrance to the reserve which took us through the Forest & Bird Millennium Forest plantings that have been implemented over the past 8 years predominantly by Romily Atkinson and other Forest and Bird members. This area is outside the crater rim and is mostly anthropomorphic soil resulting from the earth works for development of the adjacent industrial sites and motorway. The plantings are dominated by *Leptospermum scoparium* and *Coprosma robusta* with *Metrosideros excelsa*, *Pittosporum crassifolium*, *Cordyline australis*, *Myoporum laetum*, *Sophora microphylla* and *S. tetraptera* amongst these. The more recent plantings are more varied: *Cordyline australis*, *Melicytus ramiflorus*, *Aristotelia serrata*, *Coprosma robusta*, *C. repens*, *Hoheria populnea*, *Myrsine australis*, *Pittosporum crassifolium*, *Phormium tenax*, *Hebe stricta*, with more future canopy species amongst the shrubs such as *Pseudopanax crassifolius*, *Vitex lucens*, *Alectryon excelsus*, *Knightia excelsa*, *Griselinia lucida*, *Dacrycarpus dacrydioides* and *Podocarpus totara*. Around the stormwater pond *Coprosma propinqua*, *C. rhamnoides* and *Pomaderris*

kumeraho have been included. Beneath the earlier plantings the common regenerating species are *Coprosma robusta* and *Ligustrum sinense*.

As we moved west of the plantings along the northern edge we came into areas dominated by weeds. In particular here are several very large swathes of *Elaeagnus × reflexa* and a dominance of pampas (*Cortaderia selloana* and *C. jubata*).

Along the steeper sides of the rim bordering the Northbridge Residential Community there is an area planted around 25 years ago which includes *Kunzea ericoides*, *Pittosporum tenuifolium*, *Hoheria populnea*, *Podocarpus totara*, *Pittosporum crassifolium*, *Metrosideros excelsa*, *Vitex lucens*, *Griselinia lucida*, *Pittosporum eugenioides*, *Cordyline australis*, *Olearia* sp., *Pomaderris apetala*, *Pomaderris* sp., *Dacrycarpus dacrydioides*, *Pisonia brunonianum*, *Dysoxylum spectabile*, *Myoporum laetum*, *Dacrydium cupressinum*, *Corynocarpus laevigatus*, *Pseudopanax lessonii*, *Dodonaea viscosa*, and *Coprosma crassifolia*.

Of particular interest on the northern edge are the nine large circular patches that were cut out in preparation for the oil storage tanks for the American Army. Only some of these were installed but never used before the war ended and each now has its own naturalised plant community due to varying conditions such as hydrology. Some tank sites are grass and weeds such as pampas, gorse and wattle while others are permanently wet and have raupo and willow dominating. (see Appendix for Forest & Bird species list for each tank site).

The western slopes have residential housing almost to the tidal edge. Here garden species such as *Impatiens sodenii*, *Hedychium gardnerianum*, *Zantedeschia aethiopica*, ladder fern (*Nephrolepis cordifolia*), onion weed (*Allium triquetum*), kikuyu (*Pennisetum clandestinum*), creeping buttercup (*Ranunculus repens*), *Mentha spicata*, German ivy (*Senecio mikanioides*), and blackberry (*Rubus fruticosus* agg.) flow into the narrow reserve area.

The southern boundary of the crater has some steeper slopes which have restricted housing to the higher crater rim. As a result some large trees have survived in a patch of native forest. On the ground it is difficult to identify the boundary between the private property and reserve which is very narrow on this coastal margin. This reserve and private land is a designated Coastal Conservation Area and has a Notable Grove of Trees to be protected.

The predominant species is kohekohe (*Dysoxylum spectabile*) with more than thirty large trees, a larger number of younger canopy trees and numerous saplings and seedlings that are mostly in the northeastern end near the opening of the crater. The forty or more large *Sophora chathamica* are scattered along the length of the southern forest, and amongst these dominant species are a couple of large *Vitex lucens* and a very large stump of an old fallen tree. Other large natives include a number of *Kunzea ericoides*, a couple of *Alectryon excelsus*, and some *Metrosideros excelsa*. The native understorey has the typical mix of *Macropiper excelsum*, *Myrsine australis*, *Coprosma macrocarpa*, *Melicytus ramiflorus* and *Geniostoma ligustrifolium*, found in most Auckland native forests.

A narrow strip along each side of the track beside the forest slope has plantings of *Coprosma macrocarpa*, *Metrosideros excelsa*, *Myrsine australis*, *Phormium tenax*, *Pittosporum tenuifolium*, *P. crassifolium*, *Podocarpus totara*, and *Vitex lucens*. Naturally occurring *Plagianthus divaricatus*, *Muehlenbeckia complexa* and *Apodasmia similis* grade into mangroves.

Tree privet (*Ligustrum lucida*, and Chinese privet (*L. sinense*) have been common but are currently undergoing some ad hoc weeding, resulting in a more open understorey. Other common weeds are climbing asparagus (*Asparagus scandens*), Kahili ginger (*Hedychium gardnerianum*), *Elaeagnus ×reflexa*, woolly nightshade (*Solanum mauritianum*), *Jasminum polyanthum*, bone-seed (*Chrysanthemoides monilifera*) and honeysuckle (*Lonicera japonica*).

Tuff Crater has around 30% of the weeds listed as invasive weeds (ARC 2006). The most conspicuous is pampas (*Cortaderia selloana*) which is dominant on the northern slopes but present throughout the

reserve and common in the adjacent Onepoto Crater. However there are a number of weeds that are also widespread such as *Elaeagnus ×reflexa*, *Ligustrum lucidum*, *L. sinense*, *Hedychium gardnerianum*. *Asparagus scandens*, *Lonicera japonica*, and *Jasminum polyanthum* are in lesser numbers. Woody, herbaceous and climbing weeds are a problem over the whole reserve but are dominant on the northern and western sides.

There are a number of freshwater seepages at the base of the slopes. The large swampy zone at the base of the northern slope below Northbridge has *Carex lessoniana* and raupo (*Typha orientalis*) merging with *Selliera radicans*, *Apodasmia similis* and a small patch of *Samolus repens* then into mangroves. *Baumea juncea*, bracken (*Pteridium esculentum*), raupo (*Typha orientalis*), *Ficinia nodosa*, *Apodasmia similis*, and *Juncus kraussii* are on the western margins of the saltmarsh with *Baumea juncea* patches also occurring on the southern margin.

During our visit native tui were most obvious on the southern slopes with the large puriri and kowhai while the kingfisher and gulls are seen amongst the mangroves. The urban exotic birds such as finches, blackbird, starling and thrush, spreading the elaeagnus and privet, are concentrated on the northern slopes.

Although there is a framework for public access to the reserve, only the southern area has all-weather tracks. The northern pathways are undeveloped and the ground is excessively boggy in patches during wet weather. A management plan is currently being developed driven by the North Shore Forest & Bird which will give direction for the reserve and a plan for the removal of the worst invasive weeds and a conversion to appropriate native species.

References

- Auckland Regional Council, 2006: Regional Pest Management Strategy 2007-2012. Auckland Regional Council.
Cameron, E.; Hayward, B.; Murdoch, G. 1997: *A Field Guide to Auckland: exploring the region's natural and historic heritage*. Godwit.
Kermode, L, 1992: *Geology of the Auckland Urban Area: geological map 2*. Institute of Geological & Nuclear Sciences.

Appendix. Native Plants of Tuff Crater

By R. Hursthouse, 30 March 2008

† = Auckland Botanical Society additions November 2008

| Ferns and Fern Allies | Notes |
|-----------------------------------|-------------------------------|
| <i>Adiantum cunninghamii</i> † | |
| <i>Adiantum hispidulum</i> † | |
| <i>Asplenium oblongifolium</i> † | shining spleenwort |
| <i>Blechnum novae-zelandiae</i> † | kiokio Tank 9 |
| <i>Cyathea medullaris</i> | mamaku, black tree fern |
| <i>Cyathea dealbata</i> | ponga, silver fern |
| <i>Dicksonia squarrosa</i> | wheki |
| <i>Doodia australis</i> | pukupuku south under kohekohe |

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|--|-------------------|
| <i>Microsorium pustulatum</i> [†] | |
| <i>Paesia scaberula</i> | scented fern |
| <i>Pteris tremula</i> [†] | |
| <i>Pteridium esculentum</i> | bracken |
| <i>Pyrrosia eleagnifolia</i> | leather leaf fern |

Gymnosperms

| | | |
|---|-----------|-------------------------|
| <i>Dacrycarpus dacrydioides</i> | kahikatea | |
| <i>Dacrydium cupressinum</i> | rimu | May 09, nr. Northbridge |
| <i>Phyllocladus trichomanoides</i> [†] | tanekaha | |
| <i>Podocarpus totara</i> | totara | |

Dicots

| | | |
|---|----------------------------------|-----------------|
| <i>Alectryon excelsus</i> | titoki | |
| <i>Aristotelia serrata</i> | makomako | |
| <i>Avicennia marina</i> | mangrove | |
| <i>Beilschmiedia tarairi</i> [†] | taraire | planted |
| <i>Coprosma areolata</i> | | |
| <i>Coprosma × cunninghamii</i> [†] | coprosma hybrid | |
| <i>Coprosma macrocarpa</i> | coastal karamu | |
| <i>Coprosma repens</i> | taupata | |
| <i>Coprosma robusta</i> | karamu | |
| <i>Coprosma propinqua</i> | | edge of water |
| <i>Corynocarpus laevigatus</i> | karaka | |
| <i>Cotula coronopifolia</i> [†] | | |
| <i>Dysoxylum spectabile</i> | kohekohe | |
| <i>Geniostoma ligustrifolium</i> | hangehange | |
| <i>Griselinia lucida</i> | puka | |
| <i>Haloragis erecta</i> | toatoa | herby plant |
| <i>Hebe stricta</i> | koromiko | |
| <i>Hoheria populnea</i> | lacebark | |
| <i>Knightia excelsa</i> [†] | rewarewa | planted |
| <i>Kunzea ericoides</i> | kanuka | |
| <i>Ipomoea cairica</i> | pouwhiwhi, coastal morning glory | |
| <i>Leptospermum scoparium</i> | manuka | |
| <i>Leucopogon fasciculatus</i> [†] | mingimingi | |
| <i>Lobelia anceps</i> [†] | | |
| <i>Lophomyrtus bullata</i> | ramarama | |
| <i>Macropiper excelsum</i> | kawakawa | |
| <i>Melicope ternata</i> [†] | wharangi | |
| <i>Melicytus ramiflorus</i> | mahoe | |
| <i>Meryta sinclairii</i> [†] | puka | planted SE area |
| <i>Metrosideros excelsa</i> | pohutukawa | |
| <i>Muehlenbeckia complexa</i> | pohuehue | |
| <i>Myrsine australis</i> | mapou | |
| <i>Myoporum laetum</i> | ngaio | |
| <i>Olearia rani</i> | heketara | |
| <i>Olearia solandri</i> | coastal tree daisy | |
| <i>Parsonsia heterophylla</i> [†] | kaihua | on cabbage tree |

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|--|------------------------|---------------------|
| <i>Pisonia brunoniana</i> | parapara | |
| <i>Pittosporum crassifolium</i> | karo | |
| <i>Pittosporum eugenioides</i> | lemonwood | |
| <i>Pittosporum tenuifolium</i> | kohuhu | |
| <i>Plagianthus divaricatus</i> | salt marsh ribbonwood | |
| <i>Pomaderris apetala</i> | tainui | rear of Northbridge |
| <i>Pomaderris kumeraho</i> | kumarahou | |
| <i>Pseudopanax lessonii</i> | houpara | |
| <i>Samolus repens</i> [†] | maakoako, sea primrose | |
| <i>Sarcocornia quinqueflora</i> | glasswort | tidal edge |
| <i>Selliera radicans</i> [†] | remuremu | |
| <i>Senecio glomeratus</i> [†] | native fireweed | |
| <i>Senecio hispidulus</i> [†] | native fireweed | |
| <i>Solanum laciniatum</i> | poroporo | |
| <i>Sophora chathamica</i> | kowhai | |
| <i>Sophora tetraptera</i> | kowhai | planted |
| <i>Vitex lucens</i> | puriri | |

Monocots

| | | |
|--|----------------------|---------|
| <i>Apodasmia similis</i> | oioi | |
| <i>Austrostipa stipoides</i> [†] | coastal needle grass | |
| <i>Baumea juncea</i> [†] | | |
| <i>Bolboschoenus caldwellii</i> [†] | | |
| <i>Bolboschoenus medianus</i> [†] | | |
| <i>Carex dissita</i> | | |
| <i>Carex flagellifera</i> [†] | | |
| <i>Carex lessoniana</i> [†] | | |
| <i>Carex lambertiana</i> [†] | | |
| <i>Carex secta</i> [†] | purei | by pond |
| <i>Carex virgata</i> [†] | | |
| <i>Cordyline australis</i> | cabbage tree | |
| <i>Cortaderia fulvida</i> | toetoe | |
| <i>Cortaderia splendens</i> [†] | coastal toetoe | planted |
| <i>Cyperus ustulatus</i> | giant umbrella sedge | |
| <i>Eleocharis acuta</i> [†] | sharp spike-sedge | |
| <i>Ficinia nodosa</i> [†] | knobby clubrush | |
| <i>Isolepis cernua</i> [†] | slender clubrush | |
| <i>Isolepis prolifera</i> [†] | | |
| <i>Juncus edgariae</i> [†] | | |
| <i>Juncus kraussii</i> [†] | sea rush | |
| <i>Juncus pallidus</i> [†] | | |
| <i>Juncus sarophorus</i> | | |
| <i>Lachnagrostis filiformis</i> [†] | | |
| <i>Oplismenus hirtellus</i> [†] | | |
| <i>Phormium tenax</i> | flax | |
| <i>Phormium cookianum</i> | mountain flax | |
| <i>Rhopalostylis sapida</i> [†] | nikau | |
| <i>Schoenus apogon</i> [†] | | |
| <i>Scheonoplectus tabernaemontani</i> [†] | | |

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|--|-------------|
| <i>Triglochin striata</i> [†] | arrow-grass |
| <i>Typha orientalis</i> | raupo |
| <i>Uncinia uncinata</i> | hook grass |

Plants in Tuff Crater adventive – cultivated, naturalising or invasive

Ferns and Fern Allies

| | |
|--|-------------------|
| <i>Nephrolepis cordifolia</i> | tuber ladder fern |
| <i>Selaginella kraussiana</i> [†] | |

Gymnosperms

| | |
|-----------------------------------|---------------|
| <i>Cupressus macrocarpa</i> | macrocarpa |
| <i>Pinus radiata</i> [†] | Monterey pine |
| <i>Taxodium distichum</i> | swamp cypress |

Dicots

| | |
|---|----------------------|
| <i>Acanthus mollis</i> [†] | bear's breeches |
| <i>Acacia longifolia</i> | Sydney golden wattle |
| <i>Anagallis arvensis</i> var. <i>arvensis</i> [†] | scarlet pimpernel |
| <i>Anagallis arvensis</i> var. <i>coerulea</i> [†] | blue pimpernel |
| <i>Anredera cordifolia</i> [†] | mignonette vine |
| <i>Callistemon</i> sp. [†] | bottlebrush |
| <i>Cestrum nocturnum</i> | queen of the night |
| <i>Chrysanthemoides monilifera</i> [†] | bone-seed |
| <i>Conium maculatum</i> [†] | hemlock |
| <i>Cotoneaster glaucophyllus</i> | cotoneaster |
| <i>Crataegus monogyna</i> | hawthorn |
| <i>Daucus carota</i> [†] | wild carrot |
| <i>Elaeagnus</i> × <i>reflexa</i> | elaeagnus |
| <i>Eriobotrya japonica</i> [†] | loquat |
| <i>Erythrina</i> × <i>sykesii</i> | flame tree |
| <i>Escallonia rubra</i> [†] | red escallonia |
| <i>Eucalyptus botryoides</i> [†] | |
| <i>Euphorbia pepulus</i> [†] | milkweed |
| <i>Ficus pumila</i> [†] | climbing fig |
| <i>Ficus microphylla</i> | Morton Bay fig |
| <i>Galium aparine</i> [†] | cleavers |
| <i>Geranium purpureum</i> [†] | small herb Robert |
| <i>Hedera helix</i> | ivy |
| <i>Helminthotheca echioides</i> [†] | oxtongue |
| <i>Impatiens sodenii</i> | large busy lizzy |
| <i>Jasminum polyanthum</i> | jasmine |
| <i>Ligustrum lucidum</i> | tree privet |
| <i>Ligustrum sinense</i> | Chinese privet |
| <i>Lonicera japonica</i> | Japanese honeysuckle |
| <i>Malus</i> × <i>domestica</i> | apple |
| <i>Mentha pulegium</i> [†] | pennyroyal |
| <i>Mentha spicata</i> [†] | peppermint |

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| <i>Mentha suaveolens</i> [†] | apple mint |
| <i>Myosotis sylvatica</i> [†] | garden forget-me-not |
| <i>Paraserianthes lophantha</i> | brush wattle |
| <i>Passiflora mollissima</i> | banana passionfruit |
| <i>Persea americana</i> [†] | avocado |
| <i>Physalis peruviana</i> [†] | cape gooseberry |
| <i>Plantago australis</i> [†] | swamp plantain |
| <i>Plantago coronopus</i> [†] | buck's horn plantain (saltmarsh) |
| <i>Plantago lanceolata</i> [†] | narrow-leaved plantain |
| <i>Plectranthus ciliatus</i> | plectranthus |
| <i>Populus deltooides</i> | necklace poplar |
| <i>Populus</i> sp. | (narrow erect form) |
| <i>Prunus campanulata</i> [†] | Taiwan cherry |
| <i>Pyrus communis</i> [†] | pear |
| <i>Quercus palustris</i> [†] | pin oak |
| <i>Ranunculus repens</i> [†] | creeping buttercup |
| <i>Rosa rugosa</i> | rose |
| <i>Rubus fruticosus</i> agg. | blackberry |
| <i>Rumex</i> spp. [†] | dock - 2 species |
| <i>Salix cinerea</i> | pussy willow |
| <i>Salix fragilis</i> | crack willow |
| <i>Salix matsudana</i> 'Tortuosa' | corkscrew willow |
| <i>Senecio angulatus</i> | Cape ivy |
| <i>Senecio mikanioides</i> | German ivy |
| <i>Solanum nigrum</i> [†] | black nightshade |
| <i>Solanum mauritianum</i> | woolly nightshade, tobacco weed |
| <i>Sonchus oleraceus</i> | sow thistle |
| <i>Syzygium smithii</i> (<i>Acmena smithii</i>) | monkey apple |
| <i>Taraxacum officinale</i> [†] | dandelion |
| <i>Tropaeolum majus</i> [†] | nasturtium |
| <i>Ulex europaeus</i> | gorse |
| <i>Verbena bonariensis</i> [†] | purple-top |

Monocots

| | |
|--|-----------------------------|
| <i>Agapanthus praecox</i> | agapanthus |
| <i>Allium triquetum</i> [†] | onion weed |
| <i>Alocasia brisbanensis</i> | taro, elephant ears |
| <i>Araujia hortorum</i> | moth plant |
| <i>Arundaria</i> spp. – at least two types | bamboo |
| <i>Arundo donax</i> | giant reed |
| <i>Asparagus asparagoides</i> | smilax |
| <i>Asparagus densiflorus</i> [†] | bushy asparagus |
| <i>Asparagus scandens</i> | climbing asparagus |
| <i>Calystegia silvatica</i> | convolvulus, great bindweed |
| <i>Carex divisa</i> [†] | (wattle area on marsh edge) |
| <i>Carex divulsa</i> [†] | |
| <i>Chasmanthe bicolor</i> [†] | |
| <i>Cortaderia jubata</i> | purple pampas grass |
| <i>Cortaderia selloana</i> | pampas grass |

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|---|-----------------------|
| <i>Crocsmia ×crocsmiiflora</i> | montbretia |
| <i>Cyperus congestus</i> [†] | purple umbrella sedge |
| <i>Cyperus eragrostis</i> [†] | umbrella sedge |
| <i>Cyperus involucratus</i> [†] | |
| <i>Cyperus rotundus</i> [†] | nut grass |
| <i>Ehrharta erecta</i> [†] | veld grass |
| <i>Gladiolus undulatus</i> [†] | wild gladiolus |
| <i>Hedychium gardnerianum</i> | kahili ginger |
| <i>Juncus effusus</i> [†] | soft rush |
| <i>Parthenocissus quinquefolia</i> [†] | Virginia creeper |
| <i>Pennisetum clandestinum</i> | kikuyu grass |
| <i>Phoenix canariensis</i> | phoenix palm |
| <i>Pseudosasa japonica</i> | bamboo |
| <i>Setaria palmifolia</i> | palm grass |
| <i>Tradescantia fluminensis</i> | wandering Jew |
| <i>Zantedeschia aethiopica</i> | arum lily |
| <i>Watsonia bulbillifera</i> [†] | bulbil watsonia |

Vegetation of Tank sites (from North Shore Forest and Bird)

Tank site 1: pampas, elaeagnus

Tank site 2: raupo, elaeagnus, willow, gums

Tank site 3: willow, raupo

Tank site 4: pampas, elaeagnus, phoenix, climbing asparagus

Tank site 5: eucalyptus, pampas, phoenix, raupo, grass

Tank site 6: mamaku, cabbage trees

Tank site 7: pampas, gorse, wattle, pohutukawa, kanuka, dead pine

Tank site 8: privet

Tank site 9: pampas, mamaku

Goldie Bush Scenic Reserve, Waitakere Ranges, 21 February 2009

Sandra Jones

Participants: Steve Benham (leader), Jan Butcher, Lisa Clapperton, Colleen Crampton, Donna D'Costa, Simon Grant, Peter Hutton, Sandra Jones (recorder), Elaine Marshall, Gretta McLeay, Barrie McLeay, Juliet Richmond, Shirley Tomlinson, Alison Wesley, Mike Wilcox, Maureen Young.

Although it is obvious enough when you get there, trying to describe the track system through Goldie Bush can be a bit of a challenge. There is a loop track which follows three tracks with different names: Goldie Bush Walkway, Mokoroa Stream Track, and Mokoroa Falls Track. To complicate things further, only a section of the Goldie Bush Walkway forms part of the loop track. The other section of the Walkway passes through Motutara Scenic Reserve before it exits at Muriwai on Constable Road. For the record, Goldie Bush is often incorrectly called "Goldie's Bush" and maps, signs and brochures describing the Reserve are confused about the spelling of

"Horsman/Horseman Rd". However, it should be Horsman - so named after the Horsman family who farmed at the end of the road from around the 1890s until the 1930s (Graeme Murdoch pers. comm. to Ewen Cameron).

Steve's plan had been to walk the Goldie Bush loop track from Horsman Rd, along the first section of Goldie Bush Walkway, then upstream on the Mokoroa Stream Track to the falls and back up the hill on the Mokoroa Falls Track to Horsman Rd. But he was concerned that heavy rain the previous day may have put paid to this, because the Mokoroa Stream Track involves a number of stream crossings.

The sixteen-strong party spent a happy couple of hours botanising along the upper track, reaching the Mokoroa Stream in time for lunch. We found the stream in minor flood with fast flowing brown water. A reconnoitre a short way upstream convinced Steve