Makatiti Dome Field Trip

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Introduction

On 6 March 2021 nine members of Rotorua Botanical Society joined eight whanau from Rotoiti 15 Lands Trust for a field trip to explore the vegetation and flora of Makatiti Dome. The original plan for this trip was to spend the weekend exploring the forests of Makatiti Dome but a rainy forecast for Saturday night shortened the trip to a day. The field trip had been organised as a combined trip between Rotorua Botanical Society and Rotoiti 15 Trust led by Steve Henry and Mariana Te Rangi with the broad objectives as follows:

- describing and documenting the indigenous vegetation and flora of Makatiti Dome Scenic Reserve;
- learning and sharing the combined knowledge of this area between Rotoiti 15 trustees, whanau, Hunting Club members and the botanical community.

Background

Makatiti Dome is a gently sloping area of extensive indigenous forest covering the broad volcanic Dome from a range of 750–930 m asl. This is part of a complete vegetation sequence from lake shore to Dome top. The high altitude forests provide a scientific baseline for measuring the successional progress of the high altitude vegetation on Mt Tarawera. This area was proposed as a scientific reserve in 1977 to protect the highest altitude forest, albeit modified, in the Rotorua Ecological District. (Nicholls 1977). This block is part of a large area contiguous with Okataina Scenic Reserve to the west through to Lake Tarawera Scenic Reserve and Mt Tarawera to the east and south. Together these comprise the largest remaining contiguous forest tract in the Rotorua District. Makatiti Dome is part of the much larger Rotoiti 15 Trust block which runs north through to SH30 at Lake Rotoiti. However, the indigenous forest part of this block centred around Makatiti Dome of 2479 ha, is currently leased by the Department of Conservation until 2070 and gazetted as Makatiti Dome Scenic Reserve. The indigenous forest area was impacted historically by the Tarawera eruption and subsequently by logging of Hall's totara forest in the mid-1900s. There are a range of old logging roads and haul tracks throughout much of the block reflecting this history.

Makatiti Dome is an extensive forest tract that has not been thoroughly botanised. This is mainly due to its remoteness and relative difficultly of access. The only

extensive botanical survey undertaken in recent times was that of Clarkson (1986). This survey mapped and described the vegetation present and compiled a vascular plant species list. The Rotorua Botanical Society has had several trips to the margins of the block over the years including Okataina and Tarawera outlet ends but has not extensively botanised the higher altitude parts in the centre of the reserve on Dome tops. The lake had also been previously botanised for threatened flora species by Cashmore (2005).

Vegetation and Flora

We were able to drive in convoy to approx. 860 m asl to begin botanising, thereby giving the group immediate access to the higher altitude forest near the summit. The open areas around the road edge and the track up to the high point of 934 m asl contain extensive herbfield turfs comprising alpine blechnum *(Blechnum penna-marina* subsp. *alpina*), creeping willowherb (*Epilobium kormarovianum*), adder's tongue fern (*Ophioglossum coriaceum*), *Gonocarpus micranthus, Hydrocotyle microphylla* and *Geranium brevicaule* with the lichen *Cladonia* also present in places. These turfs are localised alongside roads, tracks, old skid sites and clearings where Spanish heath (*Erica lusitanica*) also dominates in places. In these frosty hollows *Coprosma dumosa* was also present with some debate over *Coprosma propinqua* and hybrids with *C. dumosa*. These open areas persist mainly because of extensive browsing by wallabies and to a lesser extent deer and maybe hares as well. Without the intense browsing these areas would most likely regenerate into tall secondary forest over time.

The track gradually closed in with the open turfs replaced by trees, shrubs and fern species. Of note here, present on a shady bank, were several specimens of parsley fern (*Botrychium biforme*) which is not commonly seen. The group eventually left the overgrown vehicle track and headed through the forest in a southerly direction. This provided a good opportunity to fully experience the high altitude forests on the Dome. The canopy is dominated by kamahi-broadleaf-tawari- (Hall's totara) forest (Figure 1). Kamahi (*Weinmmania racemosa*) is the dominant canopy tree with broadleaf (*Griselinia littoralis*) and tawari (*Ixerba brexioides*) common in places. Hall's totara (*Podocarpus laetus*) trees of varying sizes are scattered throughout, including some older dead trees in places. Most Hall's totara trees are somewhat short in stature with some older trees emergent above the canopy. Also present in the canopy are occasional toro (*Myrsine salicina*), putaputaweta (*Carpodetus serratus*) and

Figure 1: *Kamahi-dominated forest near the summit. Photo: Paul Cashmore.*

tawheowheo (*Quintinia serrata*). In the subcanopy horopito (*Pseudowintera colorata*), katote (*Cyathea smithii*) and *Coprosma tenuifolia* dominate with occasional toro and Hall's totara saplings. The understorey is generally relatively dense with ground ferns common, mainly prickly shield fern (*Polystichum vestitum*), kiwakiwa (*Blechnum fluviatile*), kiokio (*Blechnum novae-zelandiae*), and crown fern/piupiu (*Blechnum discolor*) along with more of the tree fern katote, and horopito.

After an hour or so of traversing through kamahi-broadleaf-tawari-(Hall's totara) forest in undulating terrain following small ridges and gully systems we came out into another small herbfield area of similar composition to that described above. We followed the old access track south to join the road to the radio repeater. Walking this road was much faster but through similar vegetation except that kanuka (*Kunzea robusta*) trees are more common along the drier pumice road edges.

Finally reaching the radio repeater on one of the summits provided a stop for lunch but also some good views across not only the Dome, but to the north and west, as well as Lake Rotorua and out to the distant islands of the coastal Bay of Plenty

Figure 2: *View from the repeater looking NW over the Dome forest with Lake Rotorua in distance. Photo: Paul Cashmore.*

(Figure 2). Of note here was a small stand of toatoa (*Phyllocladus toatoa*) growing on the rocky knob. From this vantage point we could get a get a good impression of the north-western part of the Dome forest canopy – a relatively homogenous tight canopy of kamahi with scattered live and dead Hall's totara trees present in and emergent above the canopy in places.

After lunch we headed back down the road stopping briefly to admire a large black maire (*Nestegis cunnighamii*) overhanging the road, which some had overlooked, and which had abundant *Earina* orchids present. From here we followed the road further south through several largish Spanish heath- dominated herbfield clearings to Lake Rotoroniu.

There was plenty of water in the lake, but the level had dropped enough that some of the group were able to circumnavigate the lake, while the remainder botanised the turfs near the track from the road to the lake. Some vigorous debate was had about the exotic aquatic macrophyte present in the lake, of which fragments had washed onto the shore, as to whether it was *Lagarosiphon major* or *Elodea canadensis*. Clarkson *et. al* (1983) had described the lake and its vegetation

mentioning the presence of lagarosiphon as had Cashmore (2005), and it was eventually agreed this was the species still present.

Figure 3: *Reflections of kamahi-dominated forest in waters of Lake Te Rotoroniu. Photo: Paul Cashmore.*

Marginal turf species *Glossostigma elatinoides*, *Limosella lineata, Elatine gratioloides* and *Myriophyllum pedunculatum* subsp. *novaezelandiae* were noted as still present along the lake margin in places. However, the "narrow belt of manuka" around the lake edge noted by Clarkson (1986) was no longer present. Of particular note also was the extensive stand of paopao (*Eleocharis sphacelata*) as shown in Figure 3, which was presumably not present at the time of the survey in 1983 as it was not recorded on the vascular plant species list in Clarkson (1986).

The forest vegetation around the lake was similar to that described above being kamahi-dominated with tawari, broadleaf and Hall's totara being less common throughout. After completing our exploration around the lake, the group decided there was not time to explore further south and it was time to return to the vehicles for the long drive out through the exotic forest.

This botanical survey covered only a very small part of the reserve, being the lake and high altitude forest around the summit. Approximately 29 plant species were

added to the initial vascular plant species list for the Dome recorded in 1983 (Clarkson 1986) of which eight were exotic species. While the reserve is still relatively free of significant ecological weed species it is interesting to note that several new weed species were now present which were not recorded in 1983. Gorse which is present in patches along roads and clearings and Spanish health which is very common along roads were not recorded in 1983. Thankfully these will only persist along road margins and open areas and will not impact on the wider forest so control of these is not considered a priority. A small infestation of previously unrecorded cotoneaster (*Cotoneaster glaucophyllus*) and grey willow (*Salix cinerea*) recorded growing beside the road near where we parked our vehicles were removed and stump- treated on the spot as these have the potential to spread more rapidly.

Animal Pest Issues

While the general impression of the forest canopy was that it was relatively intact, observations from high points noted dead and unhealthy trees sparsely scattered throughout in places. .No northern rata were noted in this part of the block but they are known to be present in parts of the block further to the south.

In terms of the forest understorey there is a general abundance of the indigenous shrub layer and ground ferns. This probably reflects the high moisture/rainfall levels of this high altitude forest. It should be noted however that most of the plant species observed are unpalatable species e.g. horopito, that are not targeted by deer and wallabies. The ongoing browsing impacts of wallabies in particular, but also deer, can be clearly seen in the herbfied turfs in the clearing and road edges. Here the vegetation is tightly-cropped and faecal pellets are abundantly present. This browsing pressure largely prevents any tree or shrub species establishing forest vegetation in these areas and will in the long-term be altering the forest species composition and structure. Similar impacts are likely to be present throughout the reserve and reinforce the need for more extensive and sustained animal pest control across the wider block.

Summary and Conclusions

This trip provided a good opportunity to further document the vegetation and flora of the higher altitude parts of the Makatiti Dome Scenic Reserve including Lake Rotoroniu and its margins. It has provided a useful comparison with the vegetation and flora described by Clarkson (1986). Although not a quantitative comparison, the overall vegetation in this area appears to be largely similar in composition and

condition to that present in 1983, when the survey was carried out, with the authors then noting the wild animal issue, in particular wallaby abundance. This survey has noted several new weed species which are present in the block and the opportunity was immediately taken to remove two of those species which were at low density and which were considered a high priority for control.

The trip has also provided a good opportunity for Rotorua Botanical Society botanists and Rotoiti 15 whanau to spend time together on the whenua and share knowledge and ideas which has been invaluable for all present. The trip was a good learning experience for all and can hopefully be expanded next year with a proposed follow up trip to explore further south into the block.

Acknowledgements

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References

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Clarkson, B.D. 1986: Makatiti Dome "Reserve". *Unpublished report.* D.S.I.R., Rotorua.

Nicholls, J.L. 1977: Proposed reserve Makatiti Dome. Letter to District Surveyor, Rotorua dated 16 August 1977. Copy held on File 31/6, Forest Research Institute, Rotorua.

Makatiti Dome summit area – species list

Compiled from visits by BC & BD Clarkson & M Smale, 11 April 1983;
G Jane & Rotorua Botanical Society, 6 March 2021

Map: BE38 Grid Ref: 1903910 5773120

*= exotic species
x= on earlier list and seen March 2021
N= on earlier list but not seen on March 2021 visit
1= addition to list on March 2021 visit

Gymnosperm trees and shrubs

1 *Dacrycarpus dacrydioides (Podocarpus)*
x *Dacrydium cupressinum*
x *Phyllocladus toatoa (P. glauca)*
x *Podocarpus laetus (P. hallii, P. cunninghamii)*
x *Prumnopitys ferruginea (Podocarpus ferrugineus)*

Dicotyledonous trees and shrubs

x *Alseuosmia macrophylla*
x *Aristotelia serrata*
x *Beilschmiedia tawa*
x *Brachyglottis repanda*
x *Carpodetus serratus*
x *Coprosma autumnalis*
x *Coprosma × cunninghamii (C. propinqua* x *C. robusta)*
x *Coprosma dumosa*
N *Coprosma foetidissima*
x *Coprosma lucida*
1 *Coprosma propinqua* var. *propinqua*
1 *Coprosma propinqua* x *C. dumosa*
N *Coprosma rhamnoides* agg.
x *Coprosma robusta*
x *Coprosma tenuifolia*
1 * *Cotoneaster glaucophyllus*
1 *Dracophyllum strictum*
x *Elaeocarpus dentatus* var. *dentatus*
1 * *Erica lusitanica*
x *Fuchsia excorticata*
x *Gaultheria antipoda*
x *Gaultheria oppositifolia*
x *Gaultheria paniculata*
N *Geniostoma ligustrifolium* var. *ligustrifolium*
x *Griselinia littoralis*
x *Hebe stricta* var. *stricta s.s.*
x *Hedycarya arborea*
x *Ixerba brexioides*
x *Kunzea robusta*
N *Laurelia novae-zelandiae*
x *Leptospermum scoparium* var. *scoparium*
1 *Leucopogon fasciculatus*
1 *Leucopogon fraseri*
N *Litsea calicaris*
x *Melicytus ramiflorus* subsp. *ramiflorus*
x *Myrsine australis*
x *Myrsine salicina*
x *Nestegis cunninghamii*
x *Olearia furfuracea*
x *Olearia rani* var. *colorata*
N *Pennantia corymbosa*
N *Pittosporum colensoi*
x *Pittosporum eugenioides*
1 *Pomaderris amoena*
N *Pseudopanax arboreus.*
x *Pseudopanax crassifolius*
x *Pseudowintera colorata*
x *Quintinia serrata* agg.
x *Raukaua edgerleyi (Pseudopanax)*
1 *Raukaua simplex (Pseudopanax; Neopanax)*
1 * *Salix cinerea*
N *Schefflera digitata*
1 * *Ulex europaeus*
x *Weinmannia racemosa*

Dicotyledonous lianes and related trailing plants

x *Clematis paniculata*
x *Metrosideros diffusa*

x *Parsonsia capsularis* var. *capsularis*
x *Rubus cissoides*
1 *Rubus schmidelioides* var. *schmidelioides*

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Psilopsids, Lycopods & Quillworts

x *Lycopodium fastigiatum*
x *Lycopodium scariosum*
x *Lycopodium volubile*
x *Phlegmariurus billardierei (Lycopodium)*

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Ferns

N *Asplenium bulbiferum*
x *Asplenium flaccidum s.s.*
x *Asplenium polyodon (A. falcatum)*
x *Blechnum chambersii*
x *Blechnum colensoi*
x *Blechnum deltoides*
x *Blechnum discolor*
x *Blechnum fluviatile (Cranfillia)*
N *Blechnum membranaceum*
x *Blechnum novae-zelandiae*
x *Blechnum penna-marina* subsp. *alpina*
1 *Blechnum procerum*
1 *Botrychium biforme*
x *Cyathea dealbata*
x *Cyathea smithii*
x *Dicksonia fibrosa*
x *Dicksonia squarrosa*
1 *Diplazium australe*
x *Histiopteris incisa*
x *Hymenophyllum bivalve*
x *Hymenophyllum demissum*
x *Hymenophyllum dilatatum*
x *Hymenophyllum flabellatum*
N *Hymenophyllum frankliniae (H. ferrugineum)*
x *Hymenophyllum multifidum*
x *Hymenophyllum nephrophyllum (Trichomanes reniforme)*
x *Hymenophyllum pulcherrimum*
x *Hymenophyllum rarum*
x *Hymenophyllum revolutum*
x *Hymenophyllum sanguinolentum*
x *Hypolepis ambigua*
N *Hypolepis rufobarbata*
N *Lastreopsis hispida*
N *Leptolepia novae-zelandiae*
x *Leptopteris hymenophylloides*
N *Microsorum novae-zelandiae (Phymatosorus)*
x *Microsorum pustulatum* subsp. *pustulatum (Phymatosorus)*
x *Notogrammitis angustifolia* subsp. *nothofageti*
x *Notogrammitis billardierei*
x *Notogrammitis heterophylla (Ctenopteris heterophylla)*
x *Ophioglossum coriaceum*
x *Paesia scaberula*
x *Pneumatopteris pennigera*
x *Polystichum vestitum*
x *Pteridium esculentum*
1 *Pteris macilenta*
1 *Pyrrosia elaegnifolia*
1 *Rumohra adiantiformis*
x *Tmesipteris elongata*
1 *Trichomanes venosum*

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Orchids

N *Corybas oblongus*
N *Corybas rivularis*
N *Corybas trilobus*
x *Earina autumnalis*
x *Earina mucronata*
N *Pterostylis banksii*

Grasses

1 * *Agrostis capillaris*
1 * *Aira caryophyllea* subsp. *caryophyllea*
x *Austroderia fulvida*
1 *Deschampsia chapmanii*
x *Deyeuxia avenoides*
1 *Deyeuxia quadriseta*
x *Lachnagrostis filiformis*
x *Microlaena avenacea*
1 *Poa breviglumis*
x *Rytidosperma gracile*
1 * *Rytidosperma racemosum*

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Sedges

x *Carex breviculmis*
N *Carex dissita*
1 *Carex healyi (Uncinia scabra)*
x *Carex imbecilla (Uncinia gracilenta)*
1 *Carex secta*
1 *Carex solandri*

x		*Carex testacea*
x		*Carex uncinata (Uncinia)*
x		*Carex virgata*
x		*Carex zotovii (Uncinia)*
1		*Eleocharis sphacelata*
N		*Gahnia setifolia*
1		*Morelotia affinis*
x		*Schoenus maschalinus*

Rushes and allied plants

x		*Juncus edgariae*
N	*	*Juncus tenuis* subsp. *tenuis*

Remaining Monocotyledonous herbs

N		*Astelia fragrans*
x		*Astelia microsperma (Collospermum)*
N		*Astelia solandri*
x	*	*Lagarosiphon major*
N		*Libertia micrantha (L. pulchella)*

Daisy-like herbs

N	*	*Carduus nutans*
x	*	*Cirsium arvense*
x	*	*Cirsium vulgare*
x	*	*Crepis capillaris*
x	*	*Erigeron sumatrensis*
x		*Euchiton delicatus (Gnaphalium)*
1		*Euchiton limosus (Gnaphalium)*
x	*	*Hypochaeris radicata*
x		*Lagenophora pumila (Lagenifera)*
x	*	*Mycelis muralis*
x		*Pseudognaphalium luteoalbum*
x		*Raoulia glabra*
x		*Raoulia tenuicaulis*
N		*Senecio minimus (Erechtites minima)*
1	*	*Sonchus oleraceus*

Dicotyledonous herbs other than Daisies

x		*Acaena anserinifolia*
x		*Acaena microphylla* var. *microphylla*
x	*	*Acaena novae-zelandiae*
1		*Callitriche petriei* subsp. *petriei*
x	*	*Callitriche stagnalis*
N		*Cardamine debilis* agg.
x	*	*Centaurium erythraea*
x	*	*Cerastium fontanum* subsp. *vulgare*
x		*Elatine gratioloides*
x		*Epilobium alsinoides*
x		*Epilobium brunnescens* subsp. *minutiflorum*
N		*Epilobium cinereum*
x		*Epilobium komarovianum*
x		*Epilobium pedunculare*
x		*Epilobium pernitens*
N		*Epilobium tenuipes*
x		*Geranium brevicaule*
x		*Geranium microphyllum 'mainland'*
x		*Glossostigma elatinoides*
x		*Gonocarpus micranthus*
x		*Hydrocotyle heteromeria*
x		*Hydrocotyle microphylla*
x		*Hydrocotyle moschata* var. *moschata*
x		*Limosella lineata*
x		*Lobelia angulata (Pratia)*
x	*	*Lotus pedunculatus*
x	*	*Lysimachia arvensis* subsp. *arvensis* var. *arvensis (Anagallis)*
x		*Myriophyllum pedunculatum* subsp. *novae-zelandiae*
x		*Nertera depressa* agg.
x		*Oxalis exilis*
x	*	*Prunella vulgaris*
N		*Ranunculus reflexus*
x	*	*Rumex acetosella*
x	*	*Sagina apetala*
N	*	*Sagina procumbens*
x	*	*Solanum nigrum*
x		*Stellaria parviflora*
x		*Urtica sykesii*
x	*	*Veronica serpyllifolia*