Lake Waikaremoana, Te Urewera National Park, Anniversary Weekend Camp 25-28 January 2013

Leslie Haines (compiler)

For the Anniversary Weekend Camp 36 of us headed into the centre of the North Island to Lake Waikaremoana, Te Urewera National Park. We stayed at Camp Kaitawa situated southeast of Lake Waikaremoana and adjacent to Lake Wherowhero and Lake Kaitawa. Lake Kaitawa, originally a spring-fed wetland, was modified into a lake for the Tuai power scheme commissioned in 1949. However, it still has a beautiful natural spring at the top end, which is a leakage from the natural dam that created Lake Waikaremoana. This location gave us good access to some of our trips around the southern end of the lake and the rest in the Aniwaniwa area where the Department of Conservation (DoC) Visitors Centre is situated (Fig. 1).

The programme

Day 1 January 25: it took most of the day driving there so only time for some meandering around the camp.

Day 2 January 26: the group walked to Lake Waikareiti for a latish lunch by the shelter, while about half the group went further on, to the Ruapani Circuit Track to visit some wetlands including Puna Hokoi, before retracing our steps.

Day 3 January 27: we climbed Panekiri Bluffs for lunch, with a smaller group extension to Baldy Knob.

Day 4 January 28: three small but very interesting sites were visited - Onepoto Caves at the base of the Lake; Lake Kiriopukae at the base of the Panekiri Bluff Track; Tawa Walk near the Waikaremoana Motor Camp.

Day 5 January 29: set off for home.

Participants: *Warren and Colleen Brewer, Jan Butcher, Lisa Clapperton, Janeen Collings, Louise Cotterall, Brian Cumber, Geoff and Bev Davidson, Claire De Luen, Gael Donaghy, Leslie Haines, Richard Hursthouse, Chris and Olwyn Green, Graham Jane, Margi Keys, Helen and Marcel Lyons, John Millett, Vivienne Paterson, Cj and Carol Ralph, Juliet and Helen Richmond, Stella and John Rowe, Josh Salter, Jenny Shanks, Angela Simpson, Claire Stevens, Val Tomlinson, Alison Wesley, Mike Wilcox (leader), Philip Wrigley, Maureen Young (camp mother).*

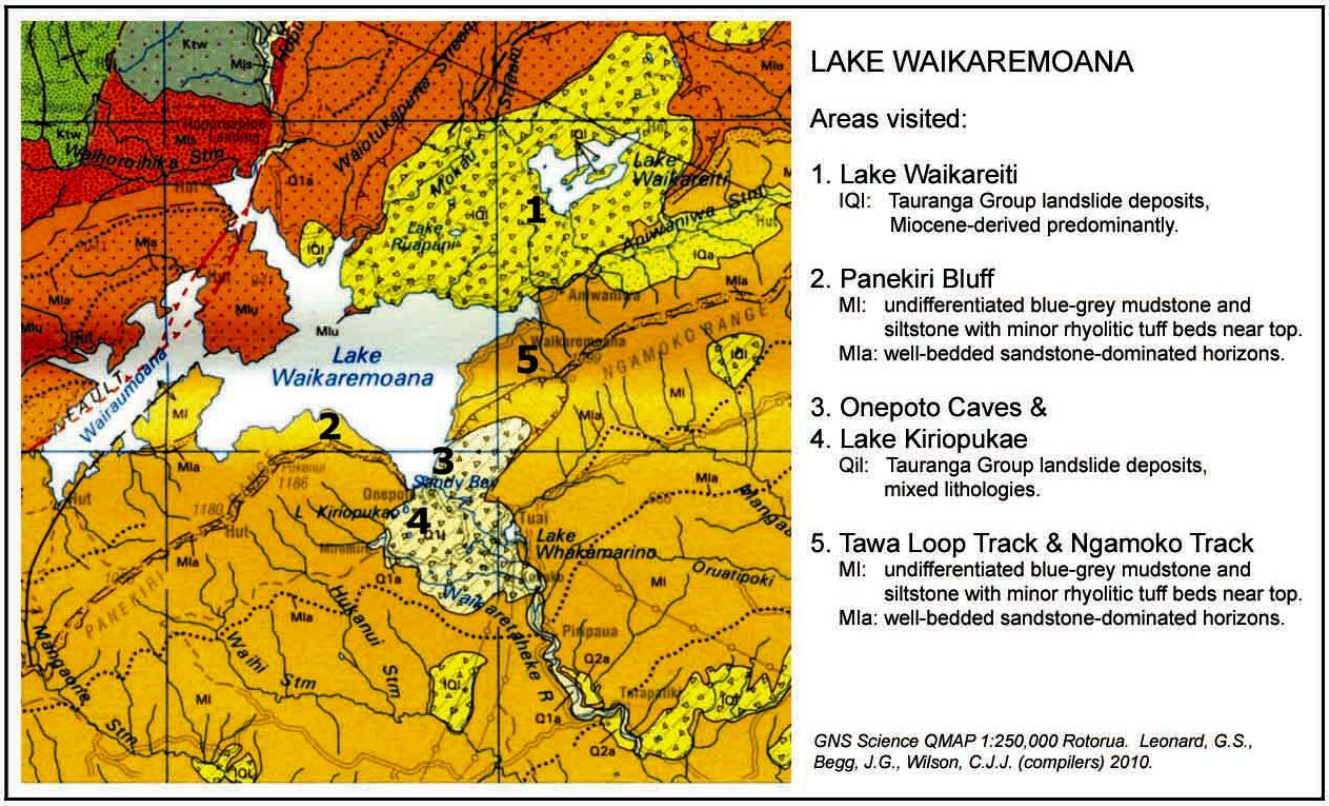

Fig. 1. Areas visited on this trip. Map adapted from GNS Science QMAP by Louise Cotterall and Joshua Salter.

Lake Waikaremoana geology

Louise Cotterall

The country around Waikaremoana, with the high ridges of Panekiri and Ngamoko Ranges, is geologically part of the Wairoa Basin, which formed some 20-30 million years ago when the oldest rocks in the park, the Urewera Greywackes (140-190 million years ago), had already been partly uplifted. The Wairoa Basin rocks are a mixture of sandstone, siltstone, conglomerate and limestone. The beds have been tilted, and erosion has revealed some of the harder layers which today form the spectacular ridges of the Panekiri (and Ngamoko) Ranges.The Wairoa Basin rocks are younger and softer than those in the remote interior of the park (Ikawhenua and Huiarau Ranges), which are part of the 700 km long backbone of the North Island stretching from Wellington to East Cape.

Lake Waikaremoana was formed about 2,200 years ago, when a huge landslide dammed the Waikaretaheke River, possibly triggered by an earthquake (Davies et al. 2006). A large part of the southwest end of the Ngamoko Range, undermined by the Waikaretaheke River, collapsed into a gorge near the present location of Tuai. The landslide debris is c. 2.2 km^3 in volume and includes a large nearly intact block (Fig. 2) and smaller blocks of Late Miocene sandstone and mudstone in a fine-grained matrix. It must have moved rapidly on a gently dipping slide plane.

Onepoto caves at the base of the slump were formed in two stages: debris from the first landslide (over 200m thick and 4km long) blocked the deep narrow gorge of the Waikaretaheke River between the Panekiri and Ngamoko Ranges (Fig. 3). Shortly afterwards a second landslide of similar size occurred when the end of the Ngamoko Range slid down to ram into the earlier debris and settle in an almost intact block on top. The Caves seen today were formed in this 'intact block' of strong layered sandstone as it fractured and bent under the stresses of sliding, and the subsequent impact, causing the 'jigsaw' effect of interlocking rock shapes with caves and tunnels forming narrow slots between them.

Further downstream from the landslide was formed the hummocky topography with many small lakes seen around the Raekahu-Kokako road area, which is the surface of the landslide material. Lake Kiriopukae, accessed from the left fork track at the start of the Lake Waikaremoana Great Walk, reveals weathered scattered blocks, low turf and wetland with two small lakes that, after wet periods may fill to form a single lake.

Lake Waikareiti Track

Janeen Collings

Starting at about 600 m asl, the track heads north, climbing 300 m to follow the south-western margin of Lake Waikareiti before heading east to the north-eastern tip of the lake (Sandy Bay). Lake Waikareiti formed in hollows of debris created by a landslide to the north-west of the lake about 18,000 years ago. The water quality of the lake is outstanding and it is free of exotic aquatic plants (DoC, 2013). The track is joined by the Ruapani Circuit Track that heads west passing wetlands and lakes which some of the group explored. The botany was so very interesting it took 4 hours to walk approximately 2 km along the gentle gradient to the edge of the lake.

Possum-free islands in Lake Waikareiti are home to the rare mistletoes *Peraxilla tetrapetala, P. colensoi* and *Alepis flavida* (Merrett 1999). The islands have never had deer, goats or possums and the forest is noticeably different from that on the mainland, with large leaved *Coprosma* and *Pseudopanax* species featuring in the understory, these being largely absent from the mainland forest (James & Wallis 1969, Merrett 1999). Due to logistical considerations we were unable to take up the hire of boats to access these islands. The Lake Waikareiti walk was however full of botanical delights.

High rainfall around 2540 mm per annum (James & Wallis 1969) and old trees provide good conditions for epiphytes. Epiphytic ferns include *Microsorum novae-zelandiae, Rumohra adiantiformis* and filmy ferns including the large tufted *Hymenophyllum pulcherrimum*. The nest epiphytes include *Astelia solandri* and, interestingly, *Collospermum hastatum* and *C. microspermum* can occasionally be found on the same host. The liane *Metrosideros diffusa* is abundant throughout, being so prolific in places it seems to occupy every available surface, and the draping feathery moss *Weymouthia* sp. lends the forest a velvet muted quality.

At lower altitudes the forest is podocarp/ beech with rimu (*Dacrydium cupressinum*) emergent over red and silver beech. Red beech (*Nothofagus fusca*) is the canopy dominant here with silver beech (*N. menziesii*) in small groves, and sometimes scattered throughout with occasional tawa (*Beilschmiedia tawa*) and miro (*Prumnopitys ferruginea*). This old-growth forest is also home to the rifleman and a few of us were delighted to hear the characteristic 'squeaky wheel, zit-zitting' of a small flock.

At the beginning of the track the tree ferns are diverse and common, including *Cyathea smithii* (Fig. 4) *Dicksonia squarrosa*, *D. fibrosa*, and *D. lanata* var*. lanata*, only the latter persisting in any great numbers with increasing altitude. The sub-canopy and shrub layer is diverse, comprising *Ixerba brexioides, Weinmannia racemosa, Eleaocarpus hookerianus, Pseudowintera colorata, P. axillaris, Carpodetus serratus, Griselinia littoralis* and *Coprosma tenuifolia,* with occasional *Raukaua edgerleyi*, *R. anomalis* and *Fuchsia excorticata*. Ground cover is dominated by ferns including *Blechnum discolor, B. fluviatile*,

Leptopteris superba, Hypolepis rufobarbata and *H. lactea.*

As the track gains altitude, silver beech becomes the canopy dominant and diversity within the sub-canopy drops, with *Ixerba brexioides, Weinmannia racemosa, Pseudowintera colorata* and *Pseudowintera axillaris* becoming co-dominant. The area has a long history of deer browse with red deer (*Cervus elaphus scoticus*) introduced as early as 1899 and reported to be well established by the 1920s (James & Wallis 1969). The James and Wallis study compared vegetation on the mammal-free Rahui Island in the lake with the mainland forest, and found differences in forest composition between browsed and non-browsed sites. Interestingly they stated '*It appears that there has been insufficient time for less preferred species to completely fill the niche created by the elimination of highly preferred species.*' (James & Wallis 1969:5). However, 44 years on, in some areas there is nothing much present in the 'browse tier' other than *Pseudowintera colorata* and *P. axillaris* over a swathe of *Dicksonia lanata.* It would be an interesting exercise to repeat the study today.

Mike Wilcox mentioned he had seen *Jovellana repens* 35 years ago and we were hoping to see it. Sure enough it didn't disappoint, occurring at the same place it was found in 1978. It densely covers an area of approximately 30 m^2 along a damp mossy bank with plenty of showy flowers dappled over the greenery. There was stiff competition for the most photographed plant between the delicate carpet of *Jovellana repens* (Fig. 5) and the quirky adders tongue, *Ophioglossum coriaceum*. The *Ophioglossum coriaceum* occurred on a damp bank with other herbaceous plants including *Plantago raoulii, Epilobium rotundifolium, Hydrocotyle moschata* var. *moschata, Ranunculus reflexus* and *Uncinia zotovii.*

The first orchid spotted was *Pterostylis banksii* at the beginning of the track. *Nematoceras trilobum* occurs throughout and *Simpliglottis cornuta* was found in flower. A monocot of note for me was the *Luzuriaga parviflora* with its zig-zag architecture and substantial fruit.

Approaching the lake, the forest changes to occasional rimu and red beech as emergents over a canopy dominated by silver beech and kamahi (*Weinmannia racemosa*). The track then follows the south western margin of the lake where the canopy dominants are toatoa (*Phyllocladus toatoa*), and neinei (*Dracophyllum latifolium*), with occasional quintinia (*Ixerba brexioides*) and kamahi and a lowering of the canopy height to approx. 6 to 9 m.

On the return drive we kept an eye out for *Senecio banksii*, which had previously been noticed when, on our first day travelling through, we had been obliged to stop for a covered wagon drawn by two shirehorses, on the narrowest windy bit along Lake Waikaremoana. This splendid flowering herb was growing at the road edge on the papa cliff under a dripping overhang (Fig. 6).

Puna Hokoi

Mike Wilcox

The Ruapani Circuit Track passes seven natural clearings (wetlands or tarns), each of different character and flora (Druce 1991). After our visit to Lake Waikareiti we carried on along to the junction of the tracks to Sandy Bay and the Ruapani Circuit, and proceeded to the first large wetland clearing known as Puna Hokoi (Fig. 7). It covers several hectares. There was no standing water, though the ground was wet.

Puna Hokoi is a frost hollow and is ringed by a narrow thicket of cold-hardy divaricating shrubs, principally *Coprosma propinqua*. Other shrubs present were *Coprosma rigida*, *C. dumosa* (= *C. tayloriae* G.T.Jane), *Dracophyllum filifolium*, *Griselinia littoralis*, *Leptospermum scoparium*, *Leucopogon fasciculatus*, *Myrsine divaricata* and *Pseudowintera colorata*. Prominent lianes were *Muehlenbeckia australis*, *Rubus cissoides* and *R. schmidelioides*. Plants within or on the margins of thickets included the ferns *Blechnum fluviatile*, *B. penna-marina*, *Histiopteris incisa*, and *Hypolepis millefolium* (Fig. 8), the club-moss *Lycopodium fastigiatum*, and an interesting grass with a horizontally-nodding raceme, *Stenostachys gracilis*. Prominent native herbs were *Acaena anserinifolia*, *Centella uniflora*, *Gonocarpus micranthus*, *Hydrocotyle novae-zelandiae*, *Nertera scapanioides*, *Ranunculus reflexus*, *Viola cunninghamii* and *V. lyallii*.

The clearing is obviously a favoured place for deer. Fresh droppings were plentiful, and much of the vegetation appeared browsed to a short turf. Foremost were *Lobelia angulata* and *L. carens* (Fig. 9), the latter with star-shaped tiny white flowers and previously known as *Hypsela rivalis*. There were abundant patches of *Potentilla anserinoides*, local colonies of *Drosera spatulata*, *Sphagnum* moss, and the buttercups *Ranunculus royi* and *R. amphitrichus*. *Myriophyllum pedunculatum* and *M. propinquum* were both present. Near a sinkhole on the margin grew robust plants of *Rorippa palustris*. Dandelions scattered through the clearing were possibly the native *Taraxacum magellanicum*.

Sedges were a prominent component of the vegetation, with *Lepidosperma australe* the dominant tall plant in the centre of the wetland. *Carex echinata*, *C. gaudichaudiana*, *Eleocharis acuta* and *E. gracilis* were common on damp ground in the open, while *C. dipsacea*, *C. dissita*, *C. sinclairii* and *C. virgata* grew along the damp margins. *Oreobolus pectinatus* grew as cushions in the peaty parts of the

Fig. 2. Intact block of sandstone, supporting windswept black beech trees, Onepoto Caves. Photo: Josh Salter, 28 Jan 2013.

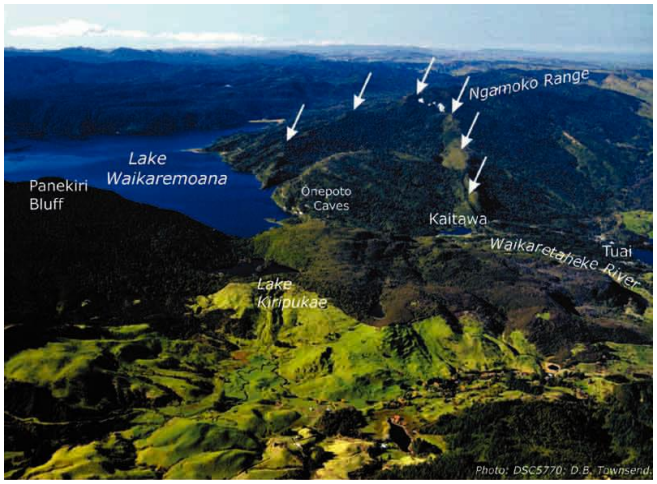

Fig. 3. A view of the landslide looking NE shows landslide debris (hummocky terrain in foreground), its headscarp (arrows) and the resultant Lake Waikaremoana. Photo: D.B. Townsend, n.d.

Fig. 4. Tree ferns and a fallen beech tree across a gully, Lake Waikareiti Walk. Photo: Josh Salter, 26 Jan 2013.

Fig. 5. *Blechnum fluviatile* and *Jovellana repens*, Lake Waikareiti Walk. Photo: Janeen Collings, 26 Jan 2013.

Fig. 6. *Senecio rufiglandulosus* on wet road-side bank, Lake Waikaremoana. Photo: Josh Salter, 25 Jan 2013.

Fig. 7. Puna Hokoi. Photo: Mike Wilcox, 26 Jan 2103.

Fig. 8. *Hypolepis millefolium*, Puna Hokoi, Photo: Mike Wilcox, 26 Jan 2013.

Fig. 9. *Lobelia carens*, Puna Hokoi. Photo: Mike Wilcox, 26 Jan 2013.

Fig. 10. View of Lake Waikaremoana from Panekiri Bluff trig (1181m). Photo: Viv Paterson, 27 Jan 2013.

Fig. 11. *Euphrasia cuneata*, Baldy Knob. Photo: Viv Paterson, 27 Jan 2013.

Fig. 12. *Carmichaelia odorata*, Panekiri Bluff. Photo: Viv Paterson, 27 Jan 2013.

Fig. 13. *Chaerophyllum* sp., Panekiri Bluff. Viv Paterson, 27 Jan 2013.

clearing. The windgrasses *Lachnagrostis elata* and *L. striata* were found here, the latter being particularly characteristic of damp lake margins, and other native grasses to have been recorded there are *Agrostis personata*, *Poa breviglumis* and *Rytidosperma gracile* (Druce 1991). The small rush *Juncus novae-zelandiae* was seen here.

Several exotic species were thoroughly entrenched in Puna Hokoi, common ones being browntop (*Agrostis capillaris*), marsh bedstraw (*Galium palustris*), Yorkshire fog (*Holcus lanatus*), purging flax (*Linum carthartícum*), lotus (*Lotus pedunculatus*), silverweed (*Potentilla anserinoides*) and selfheal (*Prunella vulgaris*).

Waikaremoana - Panekiri Bluffs

Vivienne Paterson and Lisa Clapperton

Our day started with slightly overcast weather so our long climb up to the Panekiri Bluffs wasn't too hot and arduous. By the car park we investigated an 'exclosure' for ngutukaka, kakabeak (*Clianthus maximus*), that was crowded with flax (*Phormium cookianum)*, prompting many to wonder why such excellent snail habitat was being used as shelter for a plant so vulnerable to snail predation. Needless to say we saw only one or two scrawny kakabeak.

Young regenerative growth at the start of the track included wineberry *(Aristotelia serrata*), tutu (*Coriaria arborea*), hangehange (*Geniostoma ligustrifolium*), *Griselinia littoralis*, mahoe (*Melicytus ramiflorus*), kawakawa (*Piper excelsum*), five finger (*Pseudopanax arborea*) and *Hoheria sexstylosa* with a full range of foliage from juvenile to adult on one plant. Some species were very different from those we see in the north, including *Sophora tetraptera* with its much larger leaves than our northern species and *Pittosporum ralphii* with its handsome foliage. The early colonisers, kanuka (*Kunzea ericoides*) and manuka (*Leptospermum scoparium*), were only present occasionally in the canopy. Track-sides were clothed with handsome ferns: *Adiantum cunninghamii, Asplenium bulbiferum, Blechnum chambersii, B. novae-zelandiae, Microsorum novae-zelandiae*, *Pneumatopteris pennigera* and *Pteris macilenta.* A very nice adult specimen of pokaka (*Elaeocarpus hookerianus*) was found growing beside the track after seeing numerous juvenile plants.

We passed relics of the Onepoto Redoubt used by Armed Constabulary in 1870 to 1880 during the land wars. Graffiti on the rock was fenced off to protect it from further additions, and remnants of the stone walls of the redoubt are still present but being colonised by the regenerating bush.

The regenerative growth soon gave way to the beech forest in which three beech species were seen during the day. At lower altitudes red beech grew, with black beech (*Nothofagus solandri* var. *solandri*) occurring along the drier northerly exposed cliff. At the higher wetter altitudes only silver beech grew.

Long tailed cuckoos were heard throughout the day, each in its own territory and sighted by a lucky few. Groups of whiteheads were common, making a racket when they were aware of the cuckoo nearby. We were also treated to frequent sightings of tomtit, rifleman and robin. Presumably predators are controlled here, but sadly not the deer, as indicated by the predominance of crown fern (*Blechnum discolor*) at lower altitudes and bush rice grass (*Microlaena avenacea*) higher up. From about half way up were flowering *Luzuriaga parviflora*, *Libertia micrantha* and *L. ixioides* with seed pods. Orchids seen flowering were *Microtis unifolia* and *Thelymitra pauciflora,* a blue sun orchid, while leaves of *Nematoceras macrantha* were common.

Our lunch spot at the Panekiri Bluffs trig (Fig. 10) was enhanced by flowering alpine species including *Celmisia spectabilis* subsp. *spectabilis*, *Euphrasia cuneata* (Fig. 11)*, Olearia arborescens* as well as *Lagenifera pumila* and *L. strangulata* (with smaller flowers), *Anaphaloides bellidioides* (everlasting daisies), *Wahlenbergia pygmaea* var. *pygmaea, Oxalis magellanica,* a *Myosotis venosa, Schizeilema trifoliolatum, Viola filicaulis, Ranunculus reflexus*, *Parahebe lanceolata* and *Dracophyllum filifolium.*

Cloud coming and going when we reached the higher altitudes added an ethereal quality to the 'goblin forest' below Baldy Knob, reminding us why the forest was thickly draped in moisture-loving mosses and liverworts. The roots of the gnarled, windswept silver beech formed a tangle above ground and the forest floor was clothed in a swathe of bush rice grass indicating the high impact deer are having on the forest. A single stunning specimen of toi (*Cordyline indivisa*) was growing on a fallen tree.

A few specimens of speargrass (*Aciphylla squarrosa*) lurked at the track edge near the bluff (not flowering) and a species of *Craspedia*. Other alpines common along the higher parts of the ridge included *Ourisia macrophylla* subsp. *robusta, Gaultheria* sp. and *Chionochloa cheesemanii* which was in the under-storey along the track in the higher altitudes.

Some of us continued along to Baldy Knob (1161 m asl; Lake Waikaremoana is 582 m asl) from where we enjoyed magnificent views east towards Wairoa and the ocean, north over the Urewera and across to Lake Waikareiti. Out on the edge of the bluff were several interesting treasures. Browsed *Carmichaelia odorata* (Fig. 12) with dense regrowth 50 cm or so high had a few purple flowers hiding inside, and Graeme Jane said he had seen much smaller plants there several months ago that had been heavily

browsed by deer. We noted plenty of deer and possum prints in the nearby wet clay. We also saw *Anisotome aromatica* (Fig. 13), *Anaphalioides subrigida*, *Ophioglossum coriaceum* and *Raoulia glabra*.

From along the Panekiri Bluffs we looked almost vertically down on to slip debris that historically was the northern side of Panekiri and is now supporting closed canopy bush with emergent trees, possibly including tawa, beech species, rimu and kahikatea (*Dacrycarpus dacrydioides*) (Fig. 14).

Magnificent views of the lake were even better on the way down. The sun came out and the lake reflected the vivid blue of the sky making it a photographer's dream.

At dinner time we were fascinated by a Dobson fly, an uncommon sight, which provided much entertainment between courses from beneath an upturned glass, with photographers vying for position.

Onepoto Caves

Angela Simpson

On Monday morning we explored the Onepoto Caves track (Figs. 2 & 15). From the car park, before we began, it was impressive to view the bluff we had climbed all the way along yesterday. The track wound through and between a jumble of rocks derived from a major landslide 2,200 years ago. This landslide divided the valley between Panekiri and Ngamoko and formed Lake Waikaremoana.

Heteroblastic lacebark, *Hoheria sexstylosa* (Hohere = "to tie") was noted before we even set off on the track. *Polystichum wawranum* was abundant, distinguished from the more common *P. vestidium* by its indusium lacking a dark centre. *Fuchsia excorticata* thrived in the moist gully, with ripe berries that were popular for jams of early settlers. On an overhanging cliff we spotted flowering *Earina autumnalis* and drooping *Metrosideros colensoi.* Black beech supported significant epiphytic communities of *Griselinia* and *Collospermum*. Juvenile black beech was found next to the track. The single glossy green tree in the valley was confirmed, with binoculars, as tawa.

The track wove around a valley with lookouts on both sides so we could see our fellow botanists on the other side. The group spread out a lot over this walk. The section through the caves was pretty tight and narrow. Chris found a group of chequered gold mine cave weta (*Gymnoplectron uncata*) under a ledge in the cave near the far end. Our walk back along the road was a lot quicker and easier than the path through the giant rocks.

Lake Kiriopukae

Jan Butcher

An easy ten-minute walk off the Panekiri Bluff track led us through a tree-lined track to the Lake (Fig. 16). Though most of the plants were familiar to us, the ones not commonly seen in the Auckland region were a narrow-leaved form of heketara (*Olearia rani* var. *colorata*), *Coprosma rigida* distinguished by its few minute hairs at the tip of a bluntly rounded leaf, long-leaved lacebark, houhi ongaonga (*Hoheria sexstylosa*), and the bush lawyer, tetaromoa (*Rubus schmidelioides*). Also seen was kaikomako (*Pennantia corymbosa*), the only sighting of this species on the weekend.

During our lunch stop in this picturesque area we were able to enjoy sitting on rocks of all shapes and forms (Fig. 17). On the edge of the water, which was receding, was an abundance of the exotic freshwater snail *Lymnaea stagnalis*. On the slopes were swards of *Carex gaudichaudiana* with silverweed (*Potentilla anserinoides*) threading through, with a tree-lined fringe of which the main species were mingimingi (*Coprosma propinqua*) and large-leaved kowhai (*Sophora tetraptera*). The green-stemmed mistletoe, pirata (*Ileostylus micrantha*) was found on the *Coprosma.* A gap led us to explore and discover a flood plain beyond (Fig. 18) with *Carex gaudichaudiana, C. sinclairii*, the seed heads of spike rush (*Eleocharis acuta*) showing up as a brown patch, and exotic willow weeds (*Persicaria hydropiper, P.maculosa*), the latter being the prominent species. A stream flowing through had the red pondweed, manihi (*Potamogeton cheesemanii*).

Further exploration led us to another smaller lake with a finger of higher ground between the two lakes. On the drier slope of this finger of land was an abundance of *Lobelia perpusilla*, with its dainty white flowers, and a few native dock (*Rumex flexuosus)* and adders tongue (*Ophioglossum coriaceum*). The turf plants of interest around the lakes were sneeze weed (*Centipeda aotearoana*), *Lilaeopsis ruthiana*, and lots of the exotic yellow marsh cress (*Rorippa palustris*). Special note should be made of a small knotweed (*Polygonum plebium*), a native but rarely seen. This lake had a sink hole shown to us by Brian Cumber.

The trees on the higher ground (Fig. 19) and amongst the backdrop to the Ranges were kahikatea, turepo (*Streblus heterophyllus*), cabbage trees (*Cordyline australis*) and kanuka. Some of the trees were measured at dbh: titoki (*Alectryon excelsus*) 57.5 cm; totara (*Podocarpus totara*) 124 cm; rohutu (*Lophomyrtus obcordata*) 76 cm. Other larger rohutu were seen but not measured. As this land had been farmed many years ago, there were a number of weeds, tarweed (*Parentucellia viscosa*) and pennyroyal (*Mentha pulegium*) being more prevalent,

Fig. 14. Closed canopy forest on slip debris below Panekiri Bluffs. Photo: Josh Salter, 27 Jan 2013.

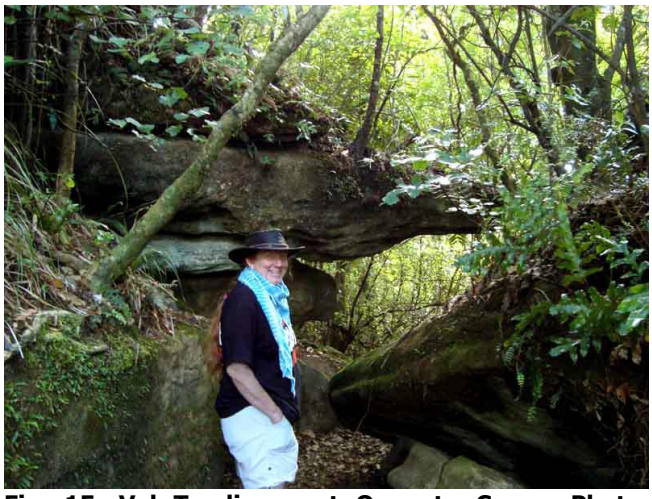

Fig. 15. Val Tomlinson at Onepoto Caves. Photo: Margi Keys, 28 Jan 2013.

Fig. 16. Lake Kiriopukae (first lake near the track). Photo: Josh Salter, 28 Jan 2013.

Fig. 17. Lunch on the rocks, Lake Kiriopukae. Photo: Josh Salter, 28 Jan 2013.

Fig. 18. Lake Kiriopukae floodplain. Photo: Leslie Haines, 28 Jan 2013.

Fig. 19. Regenerating forest above second lake at Lake Kiriopukae. Photo: Mike Wilcox, 28 Jan 2013.

Fig. 20. Some appreciative botanists at the giant rata (*Metrosideros robusta*), Ngamoko Track. Photo: Josh Salter, 28 Jan 2013.

Fig. 21. Epiphytes on the giant rata. Photo: Alison Wesley, 28 Jan 2013.

Fig. 22. The moss *Cyathophorum bulbosum* on an iron post, near a spring feeding into Lake Kaitawa. Photo: Josh Salter, 25 Jan 2013.

Fig. 23. Brick-red *Chandonanthus squarrosus* and other liverworts and filmy ferns, on black beech, Panekiri Bluff, near the trig. Photo: Josh Salter, 27 Jan 2013.

Fig. 24. The moss *Papillaria flavo-limbata* on shrubs and saplings, beech forest near Panekiri Bluff trig. Photo: Mike Wilcox, 27 Jan 2013.

Fig. 25. The moss *Acrocladium chlamydophyllum* covering a rotting log, Onepoto Caves. Photo: Josh Salter, 28 Jan 2013.

and a number of exotic grasses, though windgrass (*Lachnagrostis striata)* was also present. We reluctantly left this tranquil place and headed off for our next stop. At least the four pied stilts would be happy to have the place to themselves.

The Tawa Track and large *Metrosideros robusta*

Alison Wesley

The last adventure for the afternoon of Monday was to walk the loop Tawa Track and then a short distance up the Ngamoko Track to view the giant rata. This walk contained rimu, tawa, kamahi and hinau forest and probably had the greatest density of tawa that we had seen all weekend with only occasional red beech.

At the start of the walk a small group of several *Cordyline banksii* was noted. A small patch of *Alseuosmia pusilla* was also noted after only having been seen in isolated areas on other days. This plant is notable for its mimicry of *Pseudowintera colorata* with leaves on the upper side being indistinguishable, but the white bloom on the underside of *P. colorata* distinguishes the two plants. One *Myrsine salicina* was noted, again being an uncommon tree on previous days.

Apart from the tawa, the very large rimu trees were magnificent and a number of large Northern rata (*Metrosideros robusta*) were seen, one adjacent to a large rewarewa (*Knightia excelsa*) and another wrapped around a large rimu, the diameter of which was less than a quarter the size of the rata.

None of the earlier rata could match the size of the giant tree on the Ngamoko Track which was estimated to be between 800 and 1000 years old. It had a diameter of 13 metres around the base (Fig. 20) and was probably formed from three main vines which have intertwined together and grown down from a now dead rimu.

Epiphytes observed on this rata included tawa*, Griselinia lucida, Collospermum*, hinau, *Coprosma lucida* and *C. grandifolia*, pigeon wood, *Earina mucronata*, *Asplenium polyodon* and various filmy ferns (Fig. 21).

Five-finger–kohuhu forest at Lake Waikaremoana

Mike Wilcox

The tall forests of Waikaremoana are mostly red and silver beech forests with some miro and tawari, or rimu/rata forests with tawa and hinau. However, at lower elevations, 400-600 m at the southern end of Lake Waikaremoana around Onepoto, Lake Kaitawa, Lake Wherowhero, and Lake Kiriopukae, the hills are

densely covered in a low, mixed broadleaved forest dominated by five-finger (*Pseudopanax arboreus*) and kohuhu (*Pittosporum tenuifolium*). The canopy height is 5-6 m, with the dominant five-finger having stout trunks and rather small crowns. Common associates are mahoe, lacebark (*Hoheria sexstylosa*), large-leaved kowhai, wineberry, *Pittosporum ralphii*, hangehange, pigeonwood (*Hedycarya arborea*), tree fuchsia (*Fuchsia excorticata*), mamaku (*Cyathea medullaris*) and silver fern (*C. dealbata*). Some exotic species are abundant near Camp Kaitawa, notably tree lucerne (*Chamaecytisus palmensis*) and tree cotoneaster (*Cotoneaster glaucophyllus*).

On the margins there is tutu, koromiko (*Hebe stricta*), rangiora (*Brachyglottis repanda*), kawakawa, karamu (*Coprosma robusta*), *Coprosma grandifolia* and pohuehue (*Muehlenbeckia australis*).

What is the origin of this scrub forest, and is it a successional stage in the development of high forest? Nicholls (1969) describes it as the aftermath of Maori or early European burning. Much of this area – a region of comparatively high rainfall – would have been subject to burning, both by pre-European Maori, and later on in the 19th century, the primary coloniser in this area being bracken fern (*Pteridium esculentum*). Bracken fern root (*aruhe*) was the most important food for the early Urewera Maori, with repeated burning necessary to maintain and replenish the resource. With the arrival of the potato in the 1830s, the digging of fern-root gradually declined as a source of food. Burning and shifting cultivation was the early system of cultivating potatoes. As Elsdon Best remarks (Best 1977:79) "If man and fire leave fern-land alone long enough it becomes scrub-land, and eventually forest-land". Mark Smale (pers. comm.) observes that five-finger – and to a lesser extent, kohuhu – commonly invade bracken fern-land, their bird-dispersed seeds being heavy enough to penetrate the dense sward. Then, it seems, various other broadleaved shrubs and tree ferns later become established, to form this low forest so common in the area. Wind-dispersed kanuka and kamahi while present in the area, do not here play an important role in early succession from fern-land, their fine seeds being unable to reach the soil through the dense bracken (Mark Smale pers. comm.).

But does the low five-finger-kohuhu forest progress to high forest? Mark Smale (pers. comm.) says that the lifespan of five-finger is unknown, but probably not much more than 100 years. The lifespan of kohuhu may not be much more than 50 years. Much of this low forest does not seem to have long-lived, tall-growing trees present, so its future seems unclear. However, on the hills above Lake Kiriopukae (Fig. 19) the forest has developed a sparse scattering of emergent trees. These were not examined closely, but probably include kamahi, kanuka, rimu, tawa, rewarewa and totara, and in places, cabbage trees. So at least here the succession to forest seems

assured. McKelvey (1955) describes how at Whirinaki fire-induced bracken on the forest edge becomes invaded by *Pittosporum* and *Pseudopanax*, which in turn becomes invaded by podocarps.

Bryophytes of Waikaremoana

Joshua Salter

In the absence of any proper bryologists, it has fallen to me to say something about the mosses and liverworts we saw. While they collectively enhance the beauty of their forest habitats, their own individual beauty is often only fully appreciated when seen magnified.

Bryophytes lack roots, and therefore take up water directly through their leaves, so they are usually confined to wet or damp locations or places of frequent rainfall. Different species have different light and moisture requirements, some thus being found only in dark damp overhangs by streams or tracks, and others only in high-light situations on branches or rocks. So long as the light and water regime is to their liking, the substrate is not so important. A striking example was a vigorous colony of the moss *Cyathophorum bulbosum* growing on an iron post, within the splash zone of a weir (Fig. 22), in the small stream flowing from the spring into Lake Kaitawa, close to our school camp.

Beside the track through tall silver and red beech forest to Lake Waikareiti, the abundance of bryophytes on the ground, and on rotting logs and living tree trunks reflected the abundance of rainfall in the Urewera generally. The stand-out moss for everyone was probably *Dendroligotrichum dendroides* which, as its name so vehemently asserts, has a tree-like form. Several separate colonies, both female and male, were seen, forming large mounds by the track. Other mosses noted by me were usually (and inevitably, given my limited knowledge) the more common and obvious ones (Table 1).

In these forests, as in most New Zealand rainforests, liverworts are often very diverse and/or abundant, the soft fresh green or bronzy-green coverings and cushions of leafy liverworts being frequently mistaken for mosses. However, once you get your eye in, the two groups are readily distinguishable; for instance, liverworts never have tough durable capsules on a wiry stalk, or a nerve in the leaf (Allison & Child 1975; Beever et al. 1992). Some of the more obvious leafy liverworts we saw have been listed in Table 1 just to give some sense of the diversity. Several thalloid (ribbon-like or fleshy) liverworts were also seen, but have been omitted for the simple reason that I have difficulty putting names to them.

On our second day, bryophytes were noticeably fewer on the lower slopes at the start of the Panekiri Bluff Track. However, towards the top of the bluffs we entered cloud forest, where huge bryophyte cushions (mostly liverworts) occupied every available space on the higher branches of the beech trees. The most abundant appeared to be *Plagiochila* and *Bazzania* liverwort species, with occasionally the distinctive liverwort *Chandonanthus squarrosus*, this last sometimes clearly visible at a distance due to its tendency to be brick red in high light conditions (Fig. 23). In the more sheltered understorey, the twigs and branches of shrubs and saplings were draped with mosses like *Weymouthia mollis* and *Papillaria flavo-limbata*, their long trailing stems hanging like lank hair from every horizontal perch (Fig. 24).

By our third day, I thought I was all bryophyted-out, but among the gigantic tumble of rocks at Onepoto Caves I couldn't ignore two delightful mosses: *Canalohypopterygium tamariscinum*, an umbrella moss on a damp shaded rock face, and *Acrocladium chlamydophyllum*, forming a pale

Table 1. Some bryophytes seen on ABS Summer Camp at Waikaremoana, 25-29 Jan 2013. This list is by no means exhaustive, but is intended simply to convey a sense of diversity.
LKL = Lake Kaitawa Loop; LWT = Lake Waikareiti Track; PBT = Panekiri Bluff Track; OCT = Onepoto Caves Track.

Taxon	LKL	LWT	PBT	OCT
Mosses:				
Acrocladium chlamydophyllum				+
Atrichum ? androgynum		+		
Camptochaete arbuscula		+		
Canalohypopterygium tamariscinum				+
Cyathophorum bulbosum	+	+		
Dendroligotrichum dendroides		+	+	
Dicranoloma billardieri		+		
Dicranoloma ? menziesii		+		
Dicranoloma plurisetum		+		
Dicranoloma robustum		+		
? Distichophyllum sp.			+	
Hypopterygium rotulatum		+		
Leucobryum javense		+	+	
? Mittenia plumula		+		
Papillaria flavo-limbata			+	
Ptychomnion aciculare		+	+	
Rhizogonium distichum		+		
Weymouthia mollis			+	
Papillaria flavo-limbata			+	
Liverworts:				
Bazzania adnexa		+	+	
Bazzania novaezelandiae		+		
Bazzania sp.			+	
Chandonanthus squarrosus		+	+	
Chiloscyphus ? cuneistipulus		+		
Hymenophyton flabellatum		+		
Lepidozia ? ulothrix			+	
Lepidozia concinna		+		
Plagiochila deltoidea		+		
Plagiochila sp.			+	
Schistochila nobilis		+		
Schistochila sp.		+		
Trichocolea lanata		+		
Trichocolea mollissima		+		

creamy cloak over a fallen log (Fig. 25). Jessica Beever very kindly identified these two species from my photographs, so at least these two names in this account are correct!

Some birds of Waikaremoana

Stella Rowe

The main bird habitats visited by our group were freshwater wetlands and native forest, with shrublands/residential areas adding several species, and two species reaching the sub-alpine zone on Panekiri Bluff.

Freshwater wetlands

On the lakes we saw black swans, paradise shelducks, mallards, grey ducks, NZ scaups, and little shags. Black swans and scaups were in good numbers near the Waikaremoana Motor Camp. On the ephemeral wetlands of Lake Kiriopukae we added two white-faced herons, an immature black shag and four pied stilts. A kingfisher was noted at Lake Waikaremoana, and welcome swallows, which overlap habitat boundaries using both lakes and clearings in native bush.

Native Forest

Birds seen and heard in the forest were NZ pigeons, long-tailed cuckoos, riflemen, grey warblers, bellbirds, tui, whiteheads, fantails, tomtits, silvereyes, the latter being the most commonly-seen bush bird. At no time however did we feel there was an abundance of bird life in the bush. Calls from bellbirds and tui were infrequent. It was pleasing though to ear every now and then the tiny high pitched 'tst' of a rifleman, especially on the Waikareiti Track.

Residential/Shrubland

In this area around Lake Kaitawa and the Lodge we added a pheasant with young, magpies, blackbirds, house sparrows and goldfinches. New Zealand pigeons regularly flew over the Lodge attracted by tree lucerne in the area.

Sub-alpine

In this zone on Panekiri Bluffs, two species were noted, swallows and chaffinches, both commonly seen at lower altitudes.

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A visit to the new Te Muri Regional Park
16 February 2013

Maureen Young

Participants: *Bruce Calvert, Ewen Cameron, Lisa Clapperton, Janeen Collings, Brian Cumber, Neil Davies, Frances Duff, Joe Grieg, Shelley Heiss-Dunlop, Wolfgang Heiss-Dunlop, Richard Hursthouse, Peter Hutton, John Lambert, Teresa Lebel, John Millett, Philip Moll, Brenda Osborne, Mark Paterson, Sian Potier, Helen Preston Jones, Juliet Richmond, Joshua Salter, Jennifer Shanks, Toby Shanley, Alison Wesley, David Wilson, Maureen Young (leader).*

Te Muri Beach and the headland to the north of the Puhoi River have long been part of the western portion of the 245 ha Mahurangi Regional Park. Te Muri-o-Tarariki Stream estuary has to be crossed to access the beach and this can only be done at low tide. In September 2010, just prior to the establishment of the greater Auckland Council in 2011, the 407 ha farm previously owned by Peter Schischka and adjoining Te Muri Beach, was