Waikato Botanical Society Newsletter No. 44, 2019

President's Report

Note from the President – Winter newsletter 2019

Warm winter greetings to all our readers! Now that the shortest day has come and gone, we can start to look forward to longer (and warmer) botanising days. That said, there are still some great winter Bot Soc activities ahead of us that won't require warm clothes or gumboots (and some that do). For updates and reminders, keep an eye out on the Waikato Botanical Society website http://waikatobotsoc.org.nz/, or public Facebook page www.facebook.com/WaikatoBotSoc/, or If you are looking for a bit more - those members who are savvy online come and join the Waikato Bot Soc members only facebook group; a less public (non-members of the group cannot see content) place for sharing botanical news, discussions, information, photos etc https://www.facebook.com/groups/305094990166310/.
Your committee has worked hard to put together a great programme of field trips and evening talks over the coming months – I encourage you all to come along and support these events; they are proving to be very popular - great social occasions and guaranteed to ignite (or re-ignite) your interest in things botanical. Also, ahead in this newsletter – write-ups and photos of the interesting activities that the Bot Soc has been up to over the past few months. Many thanks Linda and Kerry for doing an excellent job of putting this newsletter together and to all those who contributed content. It is a good read – please enjoy!

I look forward to seeing you at future Bot Soc events 
Catherine

Elected Committee Members 2019

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Arnold's Bush (Piarere) Joint field trip 24 February 2019
Organised and led by Mark C. Smale

Arnold's Bush from the north. (Photo: Dr Yanbin Deng)

A good muster from Waikato and Rotorua Botancial Societies gathered on a late summer's day to visit Arnold's Bush, Piarere (sometimes mis-spelt 'Pairere'), a 3.8 ha fragment of what was once a 400 ha kahikatea (*Dacrycarpus dacrydioides*) forest in the 'Hinuera Gap'. Interestingly, this represents about 1% remaining of the original, the figure applying to kahikatea forest as a whole in the Waikato Region. We were particularly pleased to have along several generations of the Arnold family, who farmed the property from 1952 till 1969. They have provided some valuable additional information about the history of the Bush.

Arnold's Bush is one of several places in the Waikato visited and described in the 1950s and 1960s in *Transactions of the Royal Society of New Zealand* by Hamilton Boys High School teacher, the late Michael Gudex MSc MA. This was a remarkable achievement because he after contracting poliomyelitis in his late 20s, he was left with impaired mobility. Although long unfenced, stock probably hardly penetrated the interior of Arnold's Bush, which was fenced some time after 1969. The outer margin was fenced much later, evidently around the mid 1990s. The Bush occupies a river flat fed coninually by springs at the base of the Ongatiti Ignimbrite ('Hinuera Stone') bluffs to the west, and is still seasonally waterlogged, in fact underwater at times in winter and spring. Thus in contrast to most other kahikatea forest left in the region which suffers from dessication due to drainage of the surrounding landscape, it is an example of 'wet' kahikatea forest as described by de Lange (2014).
Despite this, Gudex described it in 1962 as "considerably drier" than on his first visit 12 years earlier due to drains having been dug around it. A shallow drain had been re-dug on the northern and western side in the months before our visit, and a line of marginal kahikatea trees was dying or dead, probably from dumping of spoil on their rootplates, possibly from dessication during the recent summer drought as well.

The original property of 122 ha was part of the huge Matamata Estate, balloted out by the Crown in 1904. The successful buyer was Harry Storey Wyatt, an English labourer and carpenter who had arrived in Cambridge in 1888 at the age of 19 and became a horse breeder. Adjacent Piarere School, now closed, was opened in 1911 to serve the children of local farming families. The height of the stand, estimated at over 30 m in 1962, suggests that the stand may pre-date clearance of the larger forest and therefore be of pre-European origin. Neighbouring smaller unfenced kahikatea stands indicate the likely former extent of the forest. Harry Wyatt, who also owned land at Fencourt near Cambridge, died unmarried in 1939. The property was subsequently bought by the ...., then in 1952 by J.G. Arnold, after whom the Bush is now named.

[*Any additional information from the Arnold family would be greatly appreciated.*]

Our group soon split into several smaller groups, and some folk had to leave early to attend to other business. We spent the morning in cool showery weather marvelling at the array of understory shrubs and combing the Bush for species, enjoying a late lunch in an adjacent paddock in the afternoon sunshine before visiting the nearby ignimbrite bluffs which are such a feature of the Hinuera Gap. They still support some plant species not present in the Bush itself, not surprising given their inaccessibility to stock and the very different habitat they present from the adjacent flats. Farm manager Alan Haines arrived on his quad bike and entertained us with the light and sound system installed in an amazing grotto-like space amongst the bluffs.

Gudex (1962) pointed out a number of unusual features of Arnolds's Bush, almost all of them still evident.

(1) The occurrence of seven species of native conifer in a relatively small area.

All are still present.

(2) The great height of the trees, estimated by Gudex in 1962 as "much over 100'".

(3) The great number of pokaka (*Elaeocarpus hookerianus*) trees, some with trunks over 2.5' in diameter, on the eastern side of the Bush.

The number of trees is undoubtedly smaller now and as in other kahikatea fragments in the Waikato, there is no replacement.

(4) The profusion of divaricating shrubs, especially small-leaved mahoe (*Melicytus micranthus)*, poataniwha (*Melicope simplex)*, milk tree (*Streblus heterophyllus)*, small-leaved *Coprosma* species, and juvenile matai (*Prumnopitys taxifolia)*.

All are still present, although juvenile matai are now rare.

(5) The absence of mature tree ferns and palms, attributed to cattle grazing.

Nikau (Rhopalostylis sapida) *is now present, albeit only as juveniles.*

(6) The absence of pukatea (*Laurelia novae-zealandiae*), *Coprosma grandifolia, C. lucida*, ramarama (*Myrtus bullata*), *Metrosideros perforata*, *Oplismenus imbecillus*, and *Alseuosmia* species.

The absence of pukatea, a characteristic species of this forest type, at Piarere is puzzling. The tree is common in other inland valley floors and basins in the region, which presumably are as cold – if not colder than – Piarere.

Oplismenus imbecillus *and* Metrosideros perforata (bluffs only) *are now present.*

(7) A "fair" regeneration of all the podocarps except kahikatea.

Very little regeneration of any conifer species is now evident.

Gudex (1962) did not record adventive species. In common with many other kahikatea fragments in the region, several threatening weed species are present which are spreading inexorably through the Bush and which, if left uncontrolled, will destroy most of the value of this forest. All were noted on the author's first visit in 2001. They comprise two lianes, ivy (*Hedera helix*) and Japanese honeysuckle (*Lonicera japonica*) and two trees, flowering cherry (*Prunus serrulata*) and Taiwan cherry (*Prunus campanulata*).

Gudex recorded 99 indigenous vascular plant species in the Bush and on the nearby bluffs in 1962; we recorded 129 species and hybrids. The additional species are mostly herbs and as always, it is difficult to know whether species were missed in the earlier survey or whether they have arrived since then. One can safely say only that of the species present earlier, rewarewa (*Knightia excelsa*) and the filmy fern *Hymenophyllum sanguinolentum* have been lost, while nikau (*Rhopalostylis sapida*), titoki (*Alectryon excelsus*) and karaka (*Corynocarpus laevigatus*) have arrived.

The 129 indigenous vascular plant species is similar to the number (122) found in White Pine Bush at Whakatane West, a 4 ha old-growth stand that was never logged or grazed (Smale 1984). However, it is considerably less than the 180 species recorded by Peter de Lange (2014) in total from 4 'wet' kahikatea forest fragments in the region.

Arnold's Bush is certainly one of the best examples of wet kahikatea forest left in the Waikato lowlands. As such, it deserves concerted effort to control invasive weeds which, if left to spread, will destroy most of the value of this remarkable place in the foreseeable future.

We are grateful to current owner Lance O'Sullivan and farm manager Alan Haines for kindly allowing us to visit the property.

References :

de Lange PJ 2014. The indigenous flora of the 'dry' kahikatea forest remnants of the southeastern Hamilton Basin. *Wellington Botanical Society Bulletin 55*: 2-31.

Gudex MC 1962. The native flora of Arnold's Bush, Piarere. *Transactions of the Royal Society of New Zealand: Botany 1:* 29-32.

Smale MC 1984. White Pine Bush – an alluvial kahikatea remnant in eastern Bay of Plenty, New *Zealand. New Zealand Journal of Botany 22*: 201-206.

A big thank you to Mark Smale for organising and leading the trip and for the write up.
Species list in Appendix of this newsletter.

Working with the DOC Vegetation Monitoring team in the South Island summer 2018/19.

By Kerry Jones

Hi Everyone,

Firstly thanks for all your good wishes when I took off to the West Coast back in August. Wayne Bennett summed it up the best – "Take a rain coat just in case".

I joined the Hokitika DOC vegetation monitoring team in late August and booked into a camping ground which was going to be my home away from home for the rest of the summer. I joined another 12 keen people in the vegetation monitoring team. I was the only newby on the block. All the others had done between 1 and 6 previous seasons. There were another 28 people doing other biodiversity monitoring in Hokitika for the summer.

Our plots were 20m X 20m and are set out on an 8 km grid. Each plot is visited every 5 years to assess changes. We measured diameter of all trees > 1.35m in height and diameter > 2.5cm. We counted all trees >1.35 m and < 2.5 cm diameter. We measured 24 seedling plots on each plot. All large pieces (>30cm long and >10cm in diameter) of dead fallen wood were also measured. Lastly a full species list was made and estimates of

coverage for each species at 6 tiers.

All data is loaded into the national vegetation survey database at Lincoln in Christchurch.

The first week I was there we had induction which consisted of mainly admin type stuff and health and safety. We had some river crossing training which involved practical deep wading and back floating in a cold west coast river. We also did helicopter training.

Our plots ranged from sea level at Farewell Spit (plot was half gorse) to about 1500 metres.

Some plots were remote requiring 20 minute helicopter trip. One plot had a quiet road running through it.

Our accommodation ranged from tents to reasonable motels and everything in between.

Our schedule was about 12-13 days on and 5-7 days off.

My first week we were based in the office and came back each evening. They were low altitude plots close to Hokitika and I knew most of the plants.

As time went on we went further afield sometimes higher – sometimes up around Westport and into Kahurangi (where plant diversity increases) – I started to come across more and more plants I hadn't seen before.

In total I visited 36 plots in the 6 months I was down there.

Here are some of my new plants.

Hutu : *Ascarina lucida* – I hadn't seen this in the North Island but apparently it does occur up here.

Dracophyllum elegantissimum (West Coast / Kahurangi distribution)

Hymenophyllum vilosum. – I hadn't come across this in the North Island before but it does occur south of Mt Pirongia and can get confused with *Hymenophyllum sanguinolentum*.

Asplenium richardii – this occurs south of Ruapehu.

Below: Blechnum montanum : this occurs from Pirongia southwards (I've never seen it on Pirongia).

Well that was a bit of a sneak preview of my talk that I will be giving on the 18th July.

See you then, Kerry

Thanks so much, Kerry. We are all looking forward to your talk on Monday 15 July.

2019 Botanical Night Talks

"Maanuka: the Plant behind the Honey"

Dr Michael Clearwater

The Botanical Night talks have started with a highly successful presentation given by Mike.

He iti he iti kahikatoa

The little tree with a big story to tell

Mike told us about the latest research on maanuka, from it's genetics to the biology of nectar production. He addressed the questions of how the plant makes nectar, why the nectar contains it's active ingredients, and for some of us, the most interesting question on the old debate.. is it really the same plant as grown and claimed by the Australians?

Manuka belongs to the Myrtaceae or Myrtle family which contains many species worldwide. Manuka is polyheletic, that is, it has colonised New Zealand more than once, possibly with 2 major lineages.

From reviled weed to treasured medicinal plant, our view of manuka has always depended on its role in our lives.

Biochemist Professor Peter Molan discovered and worked on the antimicrobial activity of honey as a wound dressing. Ongoing research and clinical evidence supports the fact that applied topically it is effective.

There are differing opinions as to the effectiveness of manuka honey as an all round health supplement.

Manuuka is valued , not only, for its unusual honey but also for its essential oils.

And so the manuka honey industry has expanded rapidly with millions of seedlings being planted, and landowners, bee keepers and exporters competing fiercely for access to a limited resource. Prices have sky-rocketed.

There are now approx. 800,000 hives in New Zealand and the honey is fetching up to 150$ a Kg.

Along with the expansion has come a set of issues such as theft, fraud, plantation production, apiary competition, and MPI standards relating to the strength of active ingredients contained in the honey.

The question was posed that maybe unintended consequences could allow manuka to lose it's edge.

Just maybe this might allow the diversification of obtaining honey and oils with medicinal properties from other worthy native plants.

Thankyou, Mike for a wonderful talk which created a lot of discussion and interest.

Botanical Travels on the Big Island of Hawai'I

Dr Catherine Beard

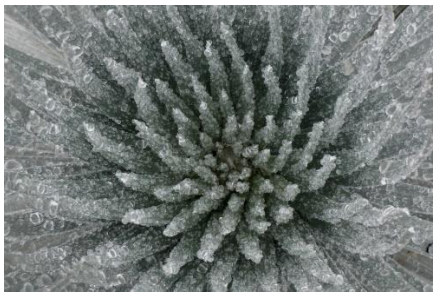
Following our AGM in June, Catherine talked about her recent visit to Hawai'I exploring some of the flora in the ' not so touristy' parts.

Argyroxiphium sandwicense subsp. sandwicense

In the alpine area above the treelines Catherine came across the Silversword *Argyroxiphium sandwicense subsp. sandwicense*.

A member of the daisy family there are at least 50 different species and the plant specifically adapts to its own particular environment. Flowering time must be spectacular.

Catherine admitted this was her favourite plant of the trip !



Argyroxiphium sandwicense subsp. sandwicense looking spectacular enhanced with rain droplets

The mountain/alpine area is often shrouded in low cloud, mist and fog thus the necessity of the following sign!

Growing on lower parts of the land *Sophora chrysophylla* and *Myoporum sandwicense* (naio)were widespread across the volcano.

Sophora chrysophylla, (mamane) similar to our native kowhai, was an important source of nectar for endangered birds e.g. palila

Sophora chrysophylla in flower

The first colonisers of the lava flows were the Metrosideros polymorpha and Nephrolepsis species (sword fern).

The first colonisers of recent lava flows

Metrosideros polymorpha,with a red flower just like our own pohutukawa, appeared growing in all sorts of places. Unfortunately, in the last 10 years, it has become prone to a fungus infection (Ceratocystis) which is killing large areas. (Rapid Ohi'a Death.)

Let's hope this infection never reaches our shores !

Many thanks, Catherine, for such a fascinating glimpse into some of the flora of Hawai'i.

Botanical Night Talks for 2019.

Venue : The Links, Fellowship Room, cnr. Te Aroha and River Rd

Time : 6.00-8.00

Dates : Every 3rd Monday May to October

Plenty of easy parking/Gold coin donation each night

Monday 15 July Kerry Jones

Working with the DOC Vegetation Monitoring team in the South Island summer 2018/19.

Monday 19 August Thomas Emmitt

What is that green stuff? (Bryophytes for Beginners)

NZ's non vascular flora is amazing! Come and learn about the green stuff that grows amongst the other green stuff and how to tell the difference.

Monday 16 September Dr Colin Meurk.

Colin is a Research Associate at Landcare Research in Lincoln

Topic to be announced.

Monday 21 October

Dr Kiri Joy Wallace & Sarah Busbridge(University of Waikato)

A Forest on our Doorstep: Restoring Aotearoa.

If by any chance we need to make changes to the topic or speaker we will update information on the website waikatobotsoc.org.nz and through our facebook page www.facebook.com/WaikatoBotSoc

We look forward to seeing you at the talks

Waikato & Rotorua Botanical Society Auckland Anniversary Trip 2019 – Turangi

By Thomas Emmitt

Again this year the Waikato and Rotorua botanical societies gathered for their annual Auckland Anniversary trip. Based from a lovely little bach in Turangi (with amazingly bountiful plum trees) a group of enthusiastic bot-soccers set out to explore some of the regions southernmost walks including Lake Rotopounamu (Day 1), the Umukarikari track (Day 2) and the Kiko loop track (Day 3).
After gathering at the bach on the Friday night, the first walk of the weekend was a short stroll around Lake Rotopounamu. Sign posted as only a 2hr easy walk, surely it wasn't going to take us all day.

Setting off from Turangi in the morning the weather had the look of becoming a scorcher, inducing thoughts about swimming. Arriving at the carpark we found we were so unprepared for the wintery weather that awaited us. Setting off rugged up in whatever clothes we could muster up from the boot of the car, we started ticking the species off the existing list, looking forward to getting to the lake. The vegetation started off a mixture of broadleaf species such as kamahi, mahoe and broadleaf and it wasn't long before we started to notice the taller podocarps. The vegetation changed very little as we headed towards the track junction. One species of note was *Asplenium hookerianum* which at first was thought to be *Asplenium bulbiferum*, the most obvious difference giving away its identity being *A. hookerianum* having the pinnules held on slender stalks.

Nearly two hours later (the total track time for the whole walk) we made it to the track junction where the track loops around the lake. From this point we started to pick up the pace, but only slightly. Helped by not seeing many new species and by our desire to complete the walk.

As we started to round the lake, we began to get into some red beech forest and we also picked up a solo *Gastrodia cunninghamii* in flower which was amazing to see. Once the lake shore was reached that slowed us down again as a debate ensued about the rush that grows in swards around the lake. After a bit of work in the evening it was eventually agreed that it was *Machaerina arthrophylla*.

The other species of interest as we wandered around the lake was several *Tupeia antarctica* growing on the marbleleaf *(Carpodetus serratus*) around the lake margins

Gastrodia cunninghamii on the track

Lake Rotopounamu

We nearly made it around the lake without seeing any adventive species until the last bay before we headed back into the forest where we stumbled across the only patch of gypsywort (*Lycopus europaeus*) that we noticed around the lake. Busily pulling it all out delayed a number of us a further 15 minutes. Hopefully we got it all. We eventually made it back to the cars 8 hours later. Could this be the record for slowest botanical society walk? Probably not.

On Day two we set out on what was supposed to be the longest walk of the weekend (now heavily contested by day one) to get up into the alpine vegetation on the Umukarikari track in the Kaimanawa ranges. Starting off in the beech forest the walk, apart from being much steeper was going to be much different vegetation. The aim was to make it to the snowline by lunchtime so off we set.

On our way up the hill it was great to see several uncaged *Peraxilla tetrapetala* growing amongst the beech forest. Even better not to see any browse on the plants we saw.
After a steep and steady climb about 100 metres before we broke out onto the tops we were surprised by some *Caladenia atradenia* spotted flowering along the edge of the track.

Soon after it was time for lunch, a very quick lunch though as the appeal of some interesting alpine botany proved too much.

Caladenia atradenia beside the track

Although not the peak time for flowering alpines there was still plenty going on.

Epilobium glabellum, *Forstera tenella*, *Wahlenbergia pygmea* and *Euphrasia zelandica* were all putting on a great show.

A great show of *Euphrasia zelandica* and other flowers above the treeline

Unfortunately, while on the tops we also spotted many grey willow (*Salix cinerea*) and dutifully pulled them all out as we spotted them.

At last we had to drag ourselves away from the amazing botany on the tops to head down for the final trip of the long weekend.

The last trip was around the kiko loop track in the Kaimanawa Forest Park at the end of Kiko Road.

Not having found a species list for the track and none of the members having walked the track before we weren't quite sure what to expect and were surprised and amazed by the majestic and ancient red beech.

Myrsine nummularia foliage on the Umukarikari Track.

Unfortunately though in many places there was a serious lack of understory, potentially due to the presence of deer in the forest. We aimed to be back for lunch so in terms of a botanical society trip we did a quick whip around the track. One of the plants that caused us to pause was *Azorella hookeri*, formerly *Schizeilema trifoliolatum*. Interestingly it is supposedly widespread throughout the North and South Islands from Awhitu south but this is the first time I have come across this species in the Waikato. Very similar to a *Hydrocotyle*, it may be easily missed. One to watch out for on future trips. As we had all left our lunches we didn't linger for long and it wasn't long before we were back at the bach raiding the plum trees.

Overall a great weekend with great company and some fantastic botany. Can't wait till next year.

Upcoming Botanical Trips

August 4 Fitzgerald Glade

Combined with Rotorua Botanical Society a trip to Glovers Farm, Waiohotu Rd, Fitzgerald Glade, Western Mamakus

Leader : Jacqui Bond.

September 15 Gudex Memorial Park

Maungakawa Reserve Cambridge

Leader : Catherine Beard

October 12 Hapuakohe Ecological Area.

Combined trip with Auckland Botanical Society.

Date : Saturday 12th October.
Trip Leader : Kerry JONES.
Contact : km8j1s@gmail.com / 027 747 0733.
Meet : 8:15 AM at Porritt Stadium Car Park off Crosby Road for Carpooling.
Or : 9:00 AM at Hoe-O-Tainui Hall. Corner of Mangawara Road and Tahuna Road.

A t the entrance is a very small wetland with some swamp maire. The Eastern entrance is at about 100 m above sea level. We will head down into a small creek area and then make a climb up on to the main ridge which we will follow for the rest of the day. At the 220 m asl - 250 m asl zone we will come across examples of Kauri - Hard beech association. We will also see kohekohe and quintinia. With a bit of luck we will be getting up to a high point called Hapuakohe at 505 m asl.

Grade : Medium-Hard.

November 17 Four Brothers Reserve

Leader : Antoinette van der Weerden

December 7th Xmas Gully Crawl Leader Kerry Jones

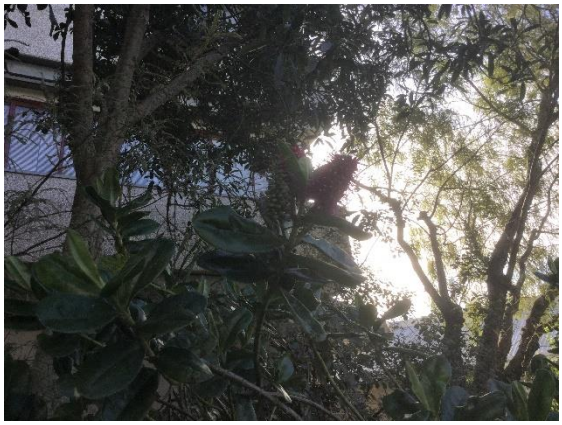
A gully ramble with possible catering along the way. Visiting Humare Park Gully, possibly Seeley's bush, Hillary Park Gully.

(possible trip to Auckland Botanical Gardens Endangered Garden/date to be finalised)

Keep an eye out on the Bot Soc web page, Bot Soc Facebook page, and for further emails sent to you all with detailed information.

Endangered Plant Garden at University of Waikato

New endangered garden growing well



Hebe Speciosa in flower

Photo: *Dactylanthus taylorii* tuber uncovered in Waikato threatened plant garden, February 2019.

An Update on the threatened plant garden

written by Liz Overdyke

The threatened plant garden is looking good after a tidy up in February, thank you to those who came to the working bee where we weeded and cleaned up the signs. We checked on the *Dactylanthus taylorii* plants and the three tubers found appeared to have some buds. However, they showed no sign of opening to flowers and may have been aborted due to dry conditions or may open next year. With the dry summer Linda and David set up a new watering system for the garden which Catherine Kirby, from the University, kindly offered to turn on during dry spells.

We noticed a large dying kowhai in the back of the garden and sure enough later in February the University had an arborist carefully taking this tree out and also pruning the adjacent large Pseudopanax trees which are the likely hosts for the dactylanthus tubers.

Dell collected some *Olearis pachyphylla* seeds and cuttings from the garden during pruning and is having an attempt at raising these at the Waikato Ecological Restoration Trust nursery at Mystery Creek. Linda also has grown on some plants of cuttings that have rooted from the *Veronica (Hebe) speciosa* and the native broom *Carmichaelia williamsii* that are growing in the garden so we will be able to fill in any gaps.

Waingaro Landing Bush Trip

Sunday 17 February 2019 Led by Yanbin Deng and Catherine Beard

Thanks to Te Kauri Trustees for giving us permission

On a wonderful, sunny, 17 February, Sunday, approximately 22 members from the Waikato & Rotorua Botanical Society, Kevin Collins's family and an international conservation expert Dr Don Barger met at the corner of Ohautira and Ruakiwi roads.

As many of you may be aware this trip was on the agenda for last year but due to wet weather it had to be cancelled. We were more fortunate this year with a fine day.

Waingaro Landing Bush, adjoins the north side of the Raglan Harbour between the Tawatahi and Kerikeri Rivers.

There are several different ecosystem types on this land. These ecosystem types are naturally connected from mangrove, to salt marshes, freshwater wetlands, through to scrubland and forests.

With the Te Kauri Trustees and Kevin Collins family's support, and other Bot. Soc. members we headed further up north using 4WD vehicles to explore the 'never before' botanised, Te Kauri Bush. The Te Kauri Trustees gave us a welcome speech at the gate of the bushland.

Ms Karen Huirama from Te Kauri and Dave and Mike were wonderful guides.
We had a shared lunch on the estuarine area.

Olearia solandri in flower

Salt Marsh Area

Lunch under Kanuka and Sophora trees

Bot. Soc. Members looking around the tomo area

Kevin Collins was kindly invited us to have afternoon tea at his Joymar Bach when we had finished our botanising, and some of the members visited this amazing batch spot as well.

The Kauri Trustees agree with the Bot.Soc that more explorations are necessary to look at and compile a biodiversity inventory on their land.

Thank you to Te Kauri Trustees for giving us permission to visit their land, and assisting us in providing guides for our trip.

Thanks to Yanbin and Catherine for the organisation, photos and write -up for the trip.

And a very big thankyou to all of you who have contributed to this newsletter.

We have had an exciting first half of the year with still many more wonderful events to come.

Conifers

Dacrycarpus dacrydioides
Dacrydium cupressinum
Phyllocladus trichomanoides
Podocarpus laetus
Podocarpus totara
Prumnopitys ferruginea
Prumnopitys taxifolia
Monocot trees and shrubs
Cordyline australis
Cordyline banksii
Rhopalostylis sapida

Dicot trees and shrubs

Alectryon excelsus var. excelsus
Aristotelia serrata
Beilschmiedia tawa
Carpodetus serratus
Coprosma areolata
Coprosma rhamnoides
Coprosma robusta
Coprosma rotundifolia
Coprosma tenuicaulis
Coriaria arborea var. Arborea
Corynocarpus laevigatus
Elaeocarpus dentatus var. Dentatus
Elaeocarpus hookerianus
Fuchsia excorticata
Geniostoma ligustrifolium var. Ligustrifolium
Hebe stricta var. Stricta
Hedycarya arborea
Knightia excelsa
Leptospermum scoparium var. Scoparium
Leucopogon fasciculatus
Litsea calicaris
Melicope simplex
Melicytus micranthus
Melicytus ramiflorus
Mida salicifolia
Myrsine australis
Myrsine salicina
Neomyrtus pedunculata
Nestegis cunninghamii
Nestegis lanceolata
Piper excelsum ssp. Excelsum
Pittosporum eugenioides
Pittosporum tenuifolium sl
Pseudopanax arboreus
Pseudopanax crassifolius
Raukaua anomalus
Schefflera digitata
Streblus heterophyllus
Weinmannia racemosa

Monocot lianes

Freycinetia banksii
Ripogonum scandens

Dicot lianes

Calystegia sepium ssp. Roseata
Clematis paniculata
Clematis forsteri
Metrosideros diffusa
Metrosideros perforata
Muehlenbeckia australis
Parsonsia capsularis var. Capsularis
Parsonsia heterophylla
Passiflora tetrandra
Rubus australis
Rubus schmidelioides var. Schmidelioides
Veronica stricta

Ferns

Asplenium bulbiferum ssp. Bulbiferum
Asplenium bulbiferum X flaccidum
Asplenium bulbiferum X hookerianum
Asplenium flaccidum ss
Asplenium hookerianum var. Hookerianum
Asplenium oblongifolium
Asplenium polyodon
Blechnum chambersii
Blechnum filiforme
Blechnum membranaceum
Blechnum minus
Blechnum novae- ealandiae
Blechnum parrisiae
Cyathea dealbata
Cyathea medullaris
Deparia petersenii ssp. Congrua
Dicksonia fibrosa
Dicksonia squarrosa
Dipla ium australe
Hymenophyllum demissum
Hymenophyllum nephrophyllum
Hymenophyllum sanguinolentum
Lastreopsis glabella
Lastreopsis hispida

Lastreopsis microsora ssp. Pentangularis
Leptopteris hymenophylloides
Microsorum pustulatus ssp. Pustulatus
Microsorum scandens
Pellaea rotundifolia
Pneumatopteris pennigera
Polystichum vestitum
Pteridium esculentum
Pyrrosia eleagnifolia
Rumohra adiantiformis
Trichomanes endlicherianum
Trichomanes venosum

Orchids

Earina autumnalis
Earina mucronata
Thelymitra longifolia

Grasses

Microlaena avenacea
Microlaena stipoides
Oplismenus hirtellus

Sedges

Carex cyanea
Carex dissita
Carex geminata
Carex imbecilla
Carex lambertiana
Carex lessoniana
Carex ochrosaccus
Carex solandri
Carex subdola
Carex subviridis
Carex umbricola
Carex uncinata
Carex virgata
Machaerina tenax

Rushes and allies

Juncus edgariae

Other monocot herbs

Astelia grandis
Astelia hastata
Astelia solandri
Dianella nigra
Phormium tenax

Dicot herbs

Acaena anserinifolia
Callitriche muelleri
Cardamine dolichostyla
Dichondra repens
Epilobium rotundifolium
Geranium homeanum
Lobelia angulata
Nertera depressa
Nertera dichondrifolia
Oxalis exilis
Ranunculus glabrifolius
Solanum nodiflorum

Adventives

Agrostis stolonifera
Anthoxanthum odoratum

Berberis glaucocarpa
Bidens frondosa
Bromus catharticus ssp. Catharticus
Calystegia silvatica
Calytriche stagnalis
Cirsium arvense
Crocosmia X crocosmiiflora
Cyperus eragrostis
Dactylis glomerata
Digitaria sanguinalis
Echinochloa crus-gallii
Erechtites hieraciifolia
Erica lusitanica
Erigeron summatrensis
Euphoprbia peplus
Galium aparine
Galium palustre
Geranium robertianum
Ginkgo biloba
Hedera helix
Holcus lanatus
Hypericum androsaenum
Juncus articulatus
Lapsana communis
Ligustrum sinense
Lonicera japonica
Lycopus euraopaeus
Mycelis muralis
Myosotis laxa ssp. Caespitosa
Panicum capillare
Panicum schinii
Paspalum dilatatum
Persicaria hydropiper
Persicaria macuolsa
Phytolacca octandra

Prunella vulgaris
Prunus campanulata
Prunus serotina
Prunus serrulata
Quercus robur
Ranunculus repens
Rubus fruticosus agg.
Rumex conglomeratus
Rumex pulcher
Rumex flammula
Senecio bipinnatesectus
Solanum nigrum
Solanum pseudocapsicum
Sonchus arvensis
Taxodium distichum
Viola riviniana

Kiko Loop Track
28/01/2019

Authors – T Emmitt, P Cashmore and the Waikato/Rotorua Botanical Society

Gymnosperm Trees

Dacrycarpus dacrydioides
Podocarpus laetus
Prumnopitys ferruginea
Prumnopitys taxifolia

Monocotyledonous Trees and Shrubs

Cordyline australis
Cordyline indivisa

Dicotyledonous Trees & Shrubs

Aristotelia serrata
Carpodetus serratus
Coprosma foetidissima
Coprosma grandifolia
Coprosma lucida
Coprosma microcarpa
Coprosma rhamnoides
Coprosma robusta
Coprosma tenuifolia
Elaeocarpus dentatus
Elaeocarpus hookerianus
Fuscospora fusca
Fuchsia excorticata
Geniostoma ligustrifolium
Griselinia littoralis
Hebe stricta
Leucopogon fasciculatus
Leptecophylla juniperina subsp. juniperina
Leycesteria formosa
Lophozonia menziesii
Melicope simplex
Melicytus ramiflorus
Myrsine australis
Neomyrtus pedunculata
Nestegis lanceolata
Pennantia corymbosa
Pittosporum eugenioides
Pittosporum tenuifolium
Polystichum vestitum
Pseudopanax crassifolius
Pseudowintera colorata
Schefflera digitata
Weinmannia racemosa

Dicotyledonous Lianes and Related Trailing Plants

Clematis paniculata
Metrosideros diffusa
Parsonsia capsularis var. capsularis
Rubus cissoides

Lycophytes (clubmosses, selaginella, quillworts)

Lycopodium scariosum

Ferns

Asplenium bulbiferum
Asplenium flaccidum
Asplenium hookerianum
Asplenium polyodon
Austroblechnum colensoi
Blechnum deltoides
Cranfillia fluviatilis
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Dicksonia fibrosa
Dicksonia lanata subsp. lanata
Dicksonia squarrosa
Diplazium australe
Histiopteris incisa
Hymenophyllum demissum
Hymenophyllum dilatatum
Hymenophyllum flabellatum
Hymenophyllum multifidum
Hymenophyllum sanguinolentum
Hymenophyllum scabrum
Lastreopsis microphylla
Leptolepia novae-zelandiae
Leptopteris hymenophylloides
Leptopteris superba
Lomaria discolor
Parablechnum novae-zelandiae
Parablechnum procerum
Microsorum novae-zelandiae
Microsorum pustulatum
Notogrammitis billardierei
Paesia scaberula
Pellaea rotundifolia
Pneumatopteris pennigera
Pyrrosia elaeagnifolia
Rumohra adiantiformis
Tmesipteris elongata
Trichomanes venosum

Orchids

Corybas trilobus
Earina autumnalis
Earina mucronata
Gastrodia cunninghamii

Grasses

Cortaderia fulvida
Holcus lanatus
Microlaena avenacea
Microlaena stipoides

Rushes and Allied Plants

Carex healyi
Carex horizontalis
Carex uncinata

Monocotyledonous Herbs

Astelia microsperma
Astelia solandri
Dianella nigra

Dicotyledonous Herbs – Composites

Lagenophora pumila
Mycelis muralis

Dicotyledonous Herbs other than Composites

Azorella hookeri
Cirsium vulgare
Epilobium pedunculare
Hydrocotyle dissecta
Hydrocotyle elongata
Hydrocotyle heteromeria
Hydrocotyle moschata var. moschata
Lotus pedunculatus
Nertera depressa
Nertera villosa
Ranunculus reflexus
Stellaria parviflora
Urtica sykesii

Mosses

Achrophyllum quadrifarium
Atrichum androgynum
Canalohypopterygium tamariscinum
Dendroligotrichum dendroides
Echinodium hispidum
Fissidens asplelenioides
Hymenodon pilifer
Hypopterygium filiculaeforme
Leucobryum javense
Papillaria flavo-limbata
Ptychomnion aciculare
Weymouthia cochlearifolia
Weymouthia mollis

Liverworts

Marchantia berteroana
Monoclea forsteri

Lake Rotoponamu

26/01/2019

Authors – T Emmitt, P Cashmore and the Waikato/Rotorua Botanical Society

Gymnosperm Trees

Dacrycarpus dacrydioides
Dacrydium cupressinum
Podocarpus laetus
Prumnopitys ferruginea
Prumnopitys taxifolia

Monocotyledonous Trees and Shrubs

Cordyline australis
Cordyline banksii

Dicotyledonous Trees & Shrubs

Aristotelia serrata
Brachyglottis repanda
Calluna vulgaris
Carpodetus serratus
Coprosma dumosa
Coprosma foetidissima
Coprosma grandifolia
Coprosma lucida
Coprosma rhamnoides
Coprosma robusta
Coprosma tenuifolia
Coriaria arborea
Elaeocarpus dentatus
Elaeocarpus hookerianus
Fuchsia excorticata
Fuscospora fusca
Gaultheria antipoda
Geniostoma ligustrifolium var. ligustrifolium
Griselinia littoralis
Hebe stricta var. stricta
Hedycarya arborea
Knightia excelsa
Kunzea serotina
Leptospermum scoparium var. scoparium
Leucopogon fasciculatus
Leucopogon fraseri
Melicope simplex
Melicytus ramiflorus
Myrsine australis
Myrsine salicina
Neomyrtus pedunculatus
Nestegis lanceolata
Olearia rani var. colorata
Pennantia corymbose
Pittosporum eugenioides
Pittosporum tenuifolium
Prunus sp.
Pseudopanax arboreus
Pseudopanax crassifolius
Pseudowintera axillaris
Pseudowintera colorata
Raukaua edgerleyi
Raukaua simplex
Schefflera digitata
Solanum laciniatum
Tupeia antarctica
Weinmannia racemosa

Dicotyledonous Lianes and Related Trailing Plants

Metrosideros diffusa
Muehlenbeckia australis
Parsonsia capsularis var. capsularis
Rubus cissoides
Rubus fruticosus agg.
Rubus schmidelioides var. schmidelioides

Monocotyledonous Lianes

Ripogonum scandens

Lycophytes (clubmosses, selaginella, quillworts)

Lycopodium deuterodensum
Lycopodium fastigiatum
Lycopodium volubile
Phlegmariurus varius

Ferns

Adiantum cunninghamii
Asplenium bulbiferum
Asplenium flaccidum
Asplenium gracillimum
Asplenium hookerianum var. colensoi
Asplenium hookerianum var. hookerianum
Asplenium oblongifolium
Asplenium polyodon
Austroblechnum lanceolatum
Austroblechnum colensoi
Blechnum deltoides
Cranfillia fluviatilis
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Dicksonia fibrosa
Dicksonia squarrosa
Diplazium australe
Gleichenia dicarpa

Histiopteris incisa
Hymenophyllum demissum
Hymenophyllum dilatatum
Hymenophyllum flabellatum
Hymenophyllum multifidum
Hymenophyllum nephrophyllum
Hymenophyllum rarum
Hymenophyllum revolutum
Hymenophyllum sanguinolentum
Hymenophyllum scabrum
Lastreopsis glabella
Leptolepia novae-zelandiae
Leptopteris hymenophylloides
Lindsaea trichomanoides
Lomaria discolor
Microsorum pustulatum
Notogrammitis heterophylla
Notogrammitis patagonica
Paesia scaberula
Parablechnum novae-zelandiae
Pneumatopteris pennigera
Polystichum vestitum
Pteridium esculentum
Pyrrosia elaeagnifolia
Rumohra adiantiformis
Sticherus cunninghamii
Tmesipteris elongata
Tmesipteris tannensis
Trichomanes venosum

Orchids

Earina autumnalis
Earina mucronata
Gastrodia cunninghamii
Microtis uniflora

Sedges

Carex comans
Carex corynoidea
Carex healyi
Carex horizontalis
Carex uncinata
Eleocharis sphacelata
Gahnia pauciflora
Lepidosperma australe
Machaerina arthrophylla

Grasses

Anthoxanthum odoratum
Austroderia fulvida
Dactylis glomerata
Hierochloe redolens
Holcus lanatus
Microlaena avenacea
Microlaena stipoides
Poa anceps

Rushes and Allied Plants

Juncus articulatus
Schoenus maschalinus

Monocotyledonous Herbs

Astelia fragrans
Astelia microsperma
Astelia solandri
Dianella nigra
Phormium cookianum subsp. cookianum
Phormium tenax

Dicotyledonous Herbs – Composites

Anaphalioides bellidioides
Cirsium vulgare
Crepis capillaris
Euchiton sphaericus
Hypochaeris radicata
Lagenophora pumila
Mycelis muralis
Pilosella officinarum

Dicotyledonous Herbs other than Composites

Acaena novae-zelandiae
Achillea millefolium
Cardamine debilis
Galium palustre subsp. palustre
Gonocarpus aggregatus
Gonocarpus micranthus subsp. micranthus
Haloragis erecta subsp. erecta
Hydrocotyle dissecta
Hydrocotyle heteromeria
Hydrocotyle pterocarpa
Lobelia angulata
Lotus pedunculatus
Lycopus europaeus
Myriophyllum propinquum
Nertera ciliate
Plantago lanceolata
Prunella vulgaris
Ranunculus flammula
Ranunculus reflexus
Trifolium repens

Mosses

Achrophyllum quadrifarium
Atrichum androgynum
Breutelia pendula
Calomnion complanatum
Canalohypopterygium tamariscinum
Campylopus clavatus
Cyathophorum bulbosum
Dawsonia superba
Dicranoloma menziesii
Echinodium hispidum
Fissidens asplenioides
Fissidens pallidus
Hymenodon pilifer
Leptostomum macrocarpum
Leucobryum javense
Plagiomnium novae-zealandiae
Pseudoscleropodium purum
Ptychomnion aciculare
Pyrrhobryum bifarium
Weymouthia cochlearifolia
Weymouthia mollis

Liverworts

Marchantia berteroana
Marchantia foliacea
Monoclea forsteri

Umukarikari Track

28/01/2019

Authors – C Beard, T Emmitt, P Cashmore and the Waikato/Rotorua Botanical Society

Gymnosperm trees and shrubs

Dacrydium cupressinum
Lepidothamnus laxifolius
Phyllocladus alpinus
Podocarpus laetus
Podocarpus nivalis
Prumnopitys ferruginea
Prumnopitys taxifolia

Monocotyledonous trees and shrubs

Cordyline australis
Cordyline banksii

Dicotyledonous trees and shrubs

Aristotelia serrata
Brachyglottis bidwillii
Brachyglottis repanda
Carpodetus serratus
Coprosma cheesemanii
Coprosma cunninghamii X Coprosma dumosa
Coprosma foetidissima
Coprosma grandifolia
Coprosma lucida
Coprosma microcarpa
Coprosma perpusilla ssp. perpusilla
Coprosma pseudocuneata
Coprosma rhamnoides
Coprosma tenuifolia
Coriaria pteridoides
Dracophyllum recurvum
Elaeocarpus dentatus
Elaeocarpus hookerianus
Epacris alpina
Fuchsia excorticata
Fuscospora cliffortioides
Fuscospora fusca
Gaultheria antipoda
Gaultheria colensoi
Gaultheria depressa var. novae-zelandiae
Geniostoma ligustrifolium
Griselinia littoralis
Hebe corriganii
Hebe odora
Hebe stricta var. stricta
Hebe tetragona ssp. subsimilis
Hebe venustula
Leptecophylla juniperina ssp. juniperina
Leptospermum scoparium var. scoparium
Leucopogon fasciculatus
Leucopogon fraseri
Melicope simplex
Melicytus ramiflorus
Myrsine australis
Myrsine divaricata
Myrsine nummularia
Neomyrtus pedunculata
Nestegis cunninghamii
Nestegis lanceolata
Olearia nummulariifolia
Olearia rani var. colorata
Pentachondra pumila
Peraxilla tetrapetala
Pittosporum eugenioides
Pittosporum tenuifolium
Pseudopanax arboreus
Pseudopanax crassifolius
Pseudowintera colorata
Raukaua simplex
Salix cinerea
Weinmannia racemosa

Dicotyledonous Lianes and Related Trailing Plants

Clematis paniculata
Metrosideros diffusa
Muehlenbeckia australis
Muehlenbeckia axillaris
Rubus cissoides

Lycophytes (clubmosses, selaginella, quillworts)

Lycopodium australe
Lycopodium fastigiatum
Lycopodium scariosum
Phlegmariurus varius

Ferns

Asplenium bulbiferum
Asplenium flaccidum
Asplenium polyodon
Austroblechnum penna-marina
Blechnum deltoides
Cranfillia fluviatilis
Cyathea colensoi
Cyathea dealbata
Cyathea smithii
Dicksonia fibrosa
Dicksonia lanata var. lanata
Dicksonia squarrosa
Histiopteris incisa
Hymenophyllum demissum
Hymenophyllum flabellatum
Hymenophyllum multifidum
Hymenophyllum nephrophyllum
Hymenophyllum rarum
Hymenophyllum sanguinolentum
Hypolepis rufobarbata
Leptopteris hymenophylloides
Leptopteris superba
Lomaria discolor
Microsorum pustulatum ssp. pustulatum
Notogrammitis billardierei
Notogrammitis heterophylla
Paesia scaberula
Parablechnum procerum
Parablechnum novae-zelandiae
Pneumatopteris pennigera
Polystichum vestitum
Pyrrosia eleagnifolia
Sticherus cunninghamii

Orchids

Aporostylis bifolia
Caladenia atradenia
Chiloglottis cornuta
Corybas trilobus
Earina mucronata
Prasophyllum colensoi

Sedges

Carex healyi
Carex horizontalis
Carex penalpina
Carex uncinata
Gahnia procera
Oreobolus pectinatus

Grasses

Austroderia fulvida
Chionochloa pallens ssp. pallens
Microlaena avenacea
Poa anceps ssp. anceps
Poa colensoi

Rushes and allied plants

Luzula subclavata

Monocotyledonous herbs

Astelia fragrans
Astelia microsperma
Astelia nervosa
Astelia solandri
Bulbinella gibbsii var. gibbsii
Dianella nigra
Libertia ixioides
Luzuriaga parviflora

Dicotyledonous Herbs – Composites

Anaphalioides alpina
Celmisia gracilenta
Celmisia spectabilis ssp. spectabilis
Helichrysum filicaule
Hypochaeris radicata
Lagenophora pumila
Lagenophora strangulata
Raoulia albosericea

Dicotyledonous herbs other than Composites

Acaena anserinifolia
Anisotome aromatica
Cirsium arvense
Cirsium vulgare
Epilobium chlorifolium
Epilobium glabellum
Euphrasia cuneata
Euphrasia zelandica
Forstera tenella
Hydrocotyle dissecta
Hydrocotyle heteromeria
Jovellana repens
Lobelia angulata
Mycelis muralis
Myosotis forsteri
Nertera depressa
Nertera villosa
Prunella vulgaris
Ranunculus reflexus
Stellaria parviflora
Viola filicaulis
Wahlenbergia pygmaea var. pygmaea

Mosses

Achrophyllum quadrifarium
Atrichum androgynum
Breutelia pendula
Cladomnion ericoides
Cyathophorum bulbosum
Dendroligotrichum dendroides
Dicranoloma billardierei
Dicranoloma menziesii
Fissidens asplenioides
Canalohypopterygium tamariscinum
Leucobryum javense
Lopidium concinnum
Papillaria flavo-limbata
Ptychomnion aciculare
Pyrrhobryum bifarium
Weymouthia mollis

Liverworts

Hymenophyton flabellatum
Marchantia berteroana
Treubia lacunosa