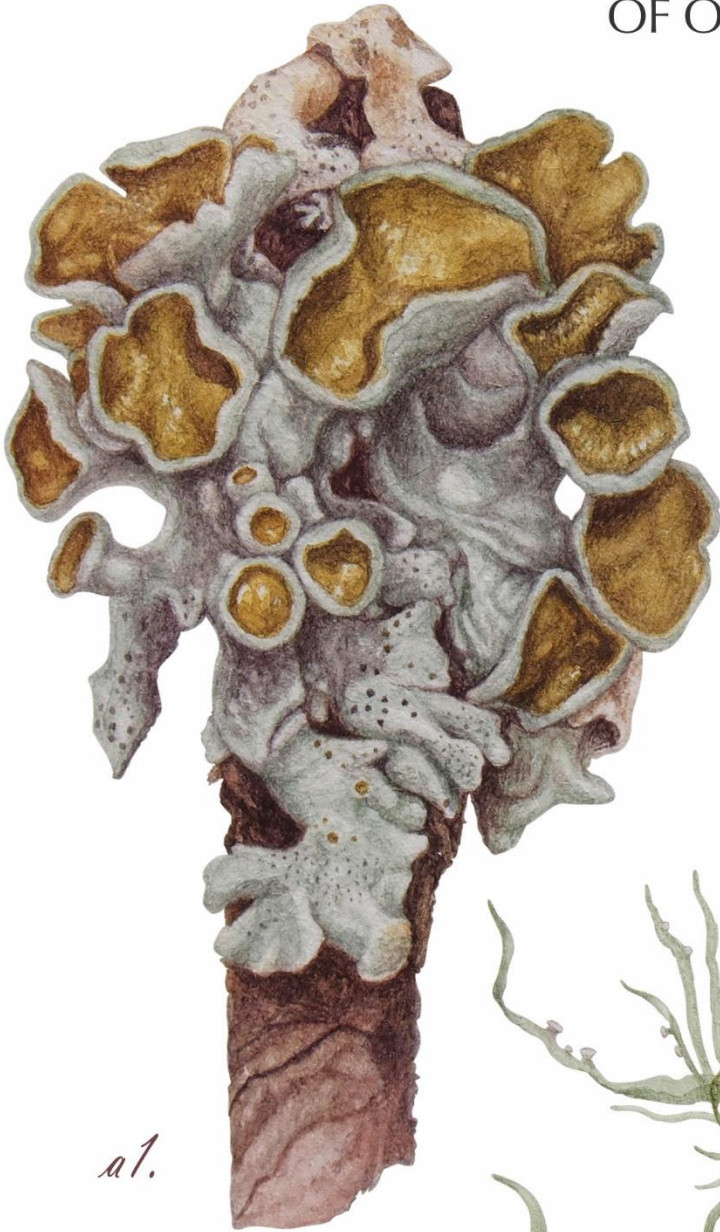


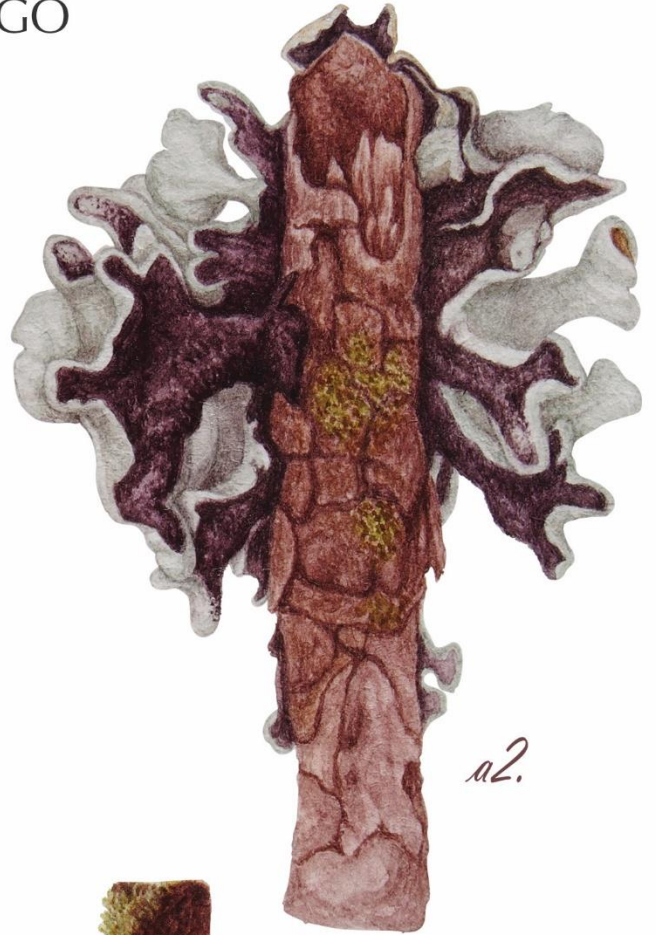


BOTANICAL SOCIETY
OF OTAGO



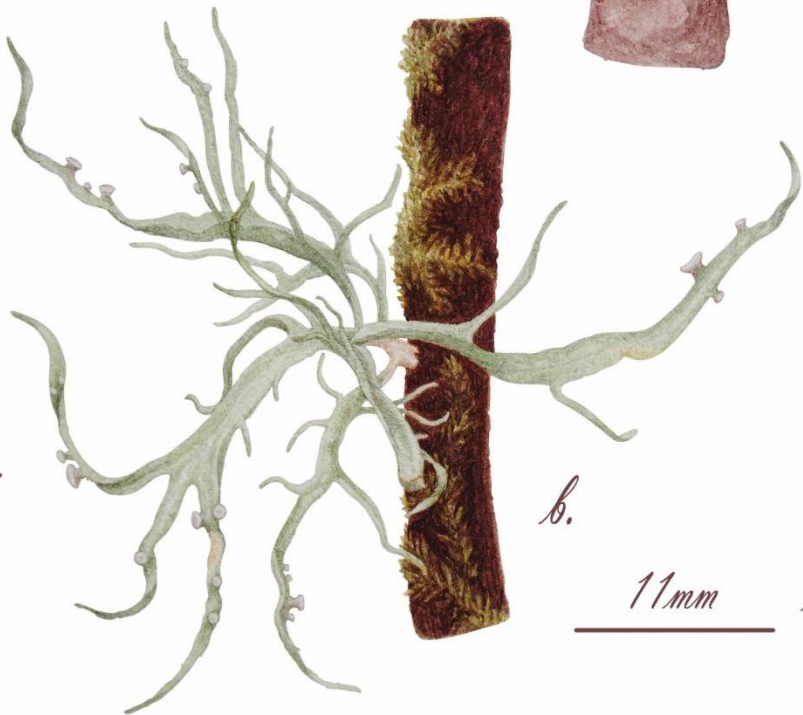
a1.

7.5mm



a2.

11mm



b.

11mm



Newsletter Number 94
October 2021

BSO Meetings and Field Trips October 2021 – March 2022

9th October, 9:00 am: Full day field trip to Herbert Forest. Herbert Forest is a predominantly exotic plantation forest in north Otago managed by Blakely Pacific Limited. Within its matrix however are significant native forest remnants that include some magnificent podocarp stands. We will do a loop track of about 10 km that links together these varied and interesting blocks of native forest. The tracks are well maintained by the North Otago Tramping & Mountaineering Club, but be prepared for numerous stream crossings. Meet at Botany Department carpark at 9am. Contact John Barkla 027 326 7917 or mjbarkla@xtra.co.nz. *Please note new date.*

13th October, 5:20 pm: Botanical Quiz. Instead of a talk, this month we are hosting a botanically themed quiz! It's about more than just identifying plants, so brush up on your general (planty) knowledge and come have some fun. Come as a team, or join one on the night.

10th November, 5:20 pm: Modelling Niches and Phylogeny in Celmisiinae (Asteraceae). Speaker: Duncan Nicol. This research is part of ongoing systematic, biogeographic, and ecological studies aiming to deepen the understanding of biodiversity. The subtribe Celmisiinae Saldivia (Asteraceae: Astereae) is a hypothesis of relationships between a number of unresolved genera in the Tasman region and contains ca. 159 species. These genera have a range from New Guinea through Australia and New Zealand. Celmisiinae has a number of interesting features making it useful as a study group to investigate questions with implications for biodiversity more broadly.

21st November 2021, 9:00 am: Truby King Recreation Reserve, Seacliff – tree mapping. The Truby King Recreation Reserve comprises much of the landscaped grounds of the former Seacliff Psychiatric Hospital. The Reserve is made up open grassed areas, mixed plantings of exotic deciduous and coniferous species, along with elements of the original coastal forest, and contains many great examples of significant specimen trees. The earliest plantings have been added to through successive plantings and, as such, provide a living record of changes in horticultural fashions spanning from the 1890s to the 1960s when the last major plantings were made. In 1991, a map and DBH measurements of the significant trees was made by Euan Cadzow. His map was partially updated in 2004 by Chuck Landis to include plantings post-dating those included in the original map. On this BSO trip we will be working with Truby King Reserve Committee to begin re-mapping and measuring the significant trees and assessing tree health. This will be a great trip to use and/or gain skills in tree measurement and GPS / mapping. The information we gather will be used by Truby King Reserve Committee to assist with the ongoing maintenance and management of this wonderful reserve. The reserve has a number of well formed grass walking tracks on slopes. Only part of the tree collection is bordering relatively flat ground; some of the mapping will be of trees off track and on uneven terrain. Moderate fitness required. For more details, contact Maia Mistral mistral.maia@gmail.com. The trip will depart from the Botany Department Carpark at 9am. Bring lunch.

9th February 2022, 5:20 pm: A Vegetation Map for Dunedin City. Speaker: Richard Ewans, Biodiversity Advisor, Dunedin City Council. In 2019, Dunedin City Council commissioned a vegetation cover map for Dunedin City which was completed in 2020. The map provides a detailed picture of vegetation cover across Dunedin City that compliments and enhances data sets from regional and national agencies. Together this information will be used to identify priority areas for ecological restoration and protection, and for district-wide monitoring of the extent of indigenous ecosystems to support improved outcomes for indigenous biodiversity in the city. I will give an overview of the map and its potential utility

for a range of users, show how the map is an improvement on what was previously available, and describe some of the limitations to be aware of when interpreting or using the map and underlying data.

12-13th February 2022: Tautuku weekend field trip. Join us for a weekend exploring the varied vegetation around the Lenz Reserve and Tautuku. The reserve is 550 hectares of conservation land owned and managed by Forest and Bird. There is something for everyone here: old growth podocarp forests, beech forests, peat bogs, and estuaries. In February the ratas should be flowering, the fungi popping up and, if it happens to drizzle, the lichens and bryophytes will be at their best. There are numerous adventurous tracks or easy paths to ramble along and, for the aquatically inclined, a kayak option to explore the estuary. Gavin White, trapper for the reserve, will be our guide for the weekend. Gavin will show us the hidden gems he had found over many years of working the reserve. There are options for all fitness levels: from well-formed tracks on level ground to rough routes up the hills. We will stay at the Forest and Bird Lodge on Saturday night (costs \$22 pp). BYO bedding, towels, etc. (more information about the lodge here: <https://www.forestandbird.org.nz/our-community/lodges/tautuku-forest-cabins>). You will need to bring your own breakfast, lunch and snacks. Bring a dish to share at the Saturday night potluck dinner. Space in the lodge is limited to 14 people, so book your spot early! Contact Gretchen Brownstein brownsteing@landcareresearch.co.nz for more information and to book.

9th March 2022, 5:20 pm: What's cooking with kānuka? Speaker: Matt McGlone, Manaaki Whenua-Landcare Research. As a successional tree species after fire or other disturbance, kānuka plays a key ecological role in the lowland and montane landscapes of New Zealand. It is also highly variable, with some populations contributing to lowland forest canopies 25 m or more in height and others consisting of scattered, low-growing, multi-stemmed shrubs on gravelly soils in frosty basins. Until recently, two species and several varieties were formally recognized - along with a swag of tag names. In 2014, a comprehensive revision of the kānuka group attempted to rationalize the situation and expanded the number of species to 10. The revision has had a mixed reception with many of the species proving difficult to confidently identify whether in the field or herbarium. In this talk I will present the results of a recently published genetic study of nearly 900 kānuka specimens spanning the entire geographic range of the complex and all the current species. I will discuss the implications for kānuka taxonomy but also for how we decide what is and what is not a 'species'.

Meeting details: Talks are usually on Wednesday evening starting at 5.20 pm unless otherwise advertised. Venue is the Zoology Benham Building, 346 Great King Street, behind the Zoology car park by the old Captain Cook Hotel. Please use the main entrance of the Benham Building to enter and go to the Benham Seminar Room, Room 215, located on the second floor. Please be prompt as we have to hold the door open. It will lock at 5:30 sharp. Items of botanical interest for our buy, sell and share table are always appreciated. The talks usually finish around 6.30 pm. Keen discussion might continue till 7 pm. Meetings may be held online via Zoom while gathering restrictions remain.

Field trip details: Field trips leave from Botany car park 464 Great King Street unless otherwise advertised. Meet there to car pool (10c/km/passenger to be paid to the driver, please). Please contact the trip leader before Friday for trips with special transport and by Wednesday for full weekend trips. A hand lens and field guides always add to the interest. It is the responsibility of each person to stay in contact with the group and to bring sufficient food, drink and outdoor gear to cope with changeable weather conditions. Bring appropriate personal medication, including anti-histamine for allergies. Note trip guidelines on the BSO web site: www.bso.org.nz

Contents

BSO Meetings and Field Trips.....	2
Chair’s Notes	5
Secretary’s Notes.....	5
Treasurer’s Notes.....	6
Editor’s Notes	6
Correspondence and News	7
Results of BSO members survey	7
Okahau dune project.....	8
2022 calendar on sale now	9
Identification of New Zealand mosses	9
Articles	10
Book review of <i>Banks</i> by Grantlee Kieza	10
Meeting and Trip Reports.....	11
Mahu Whenua and the End Peak alpine wetland complex, a talk by Cara-Lisa Schloots.....	11
Seaweed communities – responses to invasion, climate change and nutrients.....	12
Orokonui fungi, a talk by David Orlovich	14
A day of wonder: looking at lichens. Lichen foray at Orokonui	15
Almost an island – the remarkable flora and habitats of Banks Peninsula, a talk by Melissa Hutchinson	17
Field trip to Mt Kettle and Mt Cutten.....	20
Field trip to Racemans Track, Silverstream	22
Seaweeds at the doorstep: the diversity of coastal habitats and the species that are found in the Otago region, a talk by Wendy Nelson.....	25
Committee and BSO contacts	26
BSO Membership Form 2020	27

*Cover: Original artwork by Sharon Jones. Medium: Watercolour. Illustrations of lichen (a.) depict both upper (a1.) and lower (a2.) surfaces of **Hypogymnia turgidula**. Lichen (b.) is **Ramalina celastri**, expressing discoid apothecia along the margins of the narrow branches. Illustrated using wind fallen specimens, collected from Ross Creek Reserve, Dunedin, NZ. Many thanks to Allison Knight for assisting with identification!*

Chair's Notes

Gretchen Brownstein

Kia ora koutou.

Welcome to Spring! I trust everyone is staying safe and enjoying the pockets of fine weather. The Ngaio and Mahoe seedlings seem especially abundant this year. We're finding many seedlings of both species growing under the gorse on our place, so we are trialling leaving piles of cut gorse to protect the seedlings from sheep and strong winds (well that is our current excuse for not dragging it all up the hill...).

Due the latest outbreak of Covid, we had to postpone the 20th annual Baylis Lecture. Fingers crossed we will be able to hold it early next year.

It seems our Society is rather full of exceptional folk. Lala Fraser was awarded New Zealand Order of Merit in the Queens Birthday Honours for her contributions to conservation. Angelina Young and her team were awarded the Jan Tucker Trophy from the Keep Dunedin Beautiful organisation for the Okahua Dune Project.

The 2022 BSO calendar is now on sale. Many thanks to John Barkla for creating a wonderful calendar utilising some of the photos from the photography competition. You can buy your copy now for \$15 at the BSO meetings, or from the Botany Department, or order them on the website. Get in quick as the calendar always sells out!

Hope to see everyone at the upcoming talks and trips!

Gretchen

Secretary's Notes

Angela Brandt

Over the years I find the many values provided by Aotearoa New Zealand's botanical societies come up again and again. One specific recent example stuck with me as it relates to the talk I gave last November on the naturalised flora. In the September 2019 issue of the Wellington Botanical Society (WBS) newsletter, Dr. Leon Perrie (who gave the Baylis lecture in 2020) reported that tree lomatia (*Lomatia fraseri*) had naturalised near Wainuiomata (<http://www.wellingtonbotsoc.org.nz/newsletters/WBS-news-1909.pdf>). He had been alerted to the plant by another WBS member, posted his observations to iNaturalist, and discovered that Dr. Jon Sullivan had observed the same species growing wild near Christchurch in 2016 (https://inaturalist.nz/observations?place_id=6803&subview=table&taxon_id=321177).

A year later, the Greater Wellington Regional Council biosecurity report in the WBS's September 2020 newsletter confirms that tree lomatia has naturalised in Wellington and that MPI has been notified about it and is investigating (<http://www.wellingtonbotsoc.org.nz/newsletters/WBS-news-2009.pdf>). And Ngā Tipu o Aotearoa (the New Zealand Plant Names Database) classified tree lomatia as fully naturalised in New Zealand - citing Leon's 2019 WBS newsletter article. (And this means that tree lomatia was one of the 1798 naturalised plant species in the dataset I presented at my talk!) Leon and Dr. Lara Shepherd have since written up the full story of finding, documenting and reporting this new naturalisation for Te Papa's blog: <https://blog.tepapa.govt.nz/2021/08/16/lomatia-fraseri-an-australian-tree-newly-weedy-in-new-zealand/>.

This story really highlights for me how our community - both individual connections within our individual societies and connections with

keen natural observers across New Zealand through platforms like iNaturalist - and the stories we tell through our newsletters can really make important contributions to support kaitiakitanga of the natural world that we cherish so much.

Treasurer's Notes

Mary Anne Miller

Publications and Newsletters available on loan

The following hard copy publications were recently received by BSO:

Pipipi: Newsletter from Hinewai Reserve, Banks Peninsula No. 53, May 2021

Dunedin Naturalists Field Club: Newsletter No. 139, May 2021

New Zealand Botanical Society Newsletter No. 144 June 2021

New Zealand Botanical Society Newsletter No. 145 Sept 2021

Wellington Botanical Society Newsletter Sept 2021

If you'd like to borrow any of the above please contact me.

Publications for sale

Lichens of New Zealand: An Introductory Illustrated Guide by Allison Knight \$20

Mosses, Liverworts and Lichens: A Guide for Beginners \$18

Plus postage, if necessary.

Contact me if you would like to purchase the above.

maryanne.miller53@gmail.com

Editor's Notes

Lydia Turley

Thanks, as always, to all our wonderful contributors! I'd like to say a special thanks to Alex Wearing, who regularly writes talk reviews for the newsletter, and has three (!) reports in this edition. Your work is appreciated, and we have a chocolate with your name on it as thanks!

This edition is full of reports – our society must have been busy in recent months! My personal highlight is Stella's trip report, thoroughly illustrated with photos of all the right things to be looking at in ferns. Also of note are Sharon's stunning cover illustrations of lichens.

Suggestions and material for the newsletter are always welcome from our members. If you are keen to submit stories, drawings, reviews, opinions, articles, photos or letters – or anything else you think might be of botanical interest to our diverse range of members, don't hesitate to get in touch. Send your feedback, comments or contributions to lydiamturley@gmail.com. Copy for the next newsletter is due on 10 January 2022. Earlier submissions are most welcome.

Editor's guidelines: Try to aim for a 0.5–1 page of 14 pt. Times for news, trip/meeting reports and book reviews and 1–5 pages, including illustrations, for other articles. Electronic submission by email to lydiamturley@gmail.com is preferred. Remember to include photo captions and credits.

Disclaimer: The views published in this newsletter reflect the views of the individual authors and are not necessarily the views of the Botanical Society of Otago.

New Members

A warm welcome is extended to Juliana Child, Craig Stonyer, Michael Stuart, Ian Hankin, Kate Chibnall, Erin Gallagher, Tayla Hooker and Matt Spall. To our existing members, thank you for your continuing support.

Correspondence and News

Results of the BSO members survey

Lydia Turley

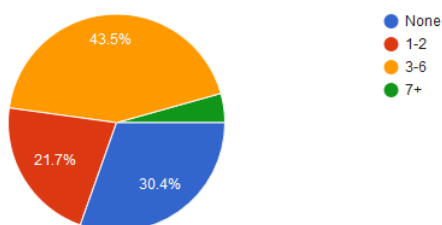
Earlier in the year, we sent out a survey to members, seeking to find out what factors influence attendance at talks and field trips. We wanted to find out what people actually want from BSO so that we can organise appropriate events. Results from the survey are summarised below.

Field trips summary:

30% of respondents do not (usually) attend field trips, and only half average 3 or more of the 10 trips we hold in a typical year. 35% of respondents had been on a trip in 2021 (the survey was sent out in May), 20% said the last trip they attended was in 2020 and 45% last came in 2019 or earlier. This data may be biased by covid, which caused disruption to our 2020 trip schedule.

How many field trips do you attend in a typical year?

23 responses



More than half of respondents said that they choose to go on trips to an interesting ecosystem (81%), trips led by an expert (76%), or trips to a location which they hadn't been to before (76%) or which is otherwise hard to access (67%). The main reasons given why people don't attend trips were busyness (I hear you!) (35%) and terrain that is too challenging for fitness level (35%). Trouble making the time/day was also cited.

Further comments were generally positive - thanks for your support! One respondent commented on the value of having knowledgeable people who can help with plant identification, while another expressed concern that people are put off by the BSO's academic

base. A third said they want a sense of purpose on trips, with clear expectations of what attendees will do, see or contribute.

BSO response:

People are busy and we can't do much about that. In response to concerns about fitness, we have resolved to include in our trip abstracts a mention of the terrain difficulty and fitness needed. Our trips vary in physical difficulty, so we hope that this information will allow people to identify and attend the trips which they can physically manage.

The free comments emphasised diversity in what people want from trips. We are trying to run different "types" of trips to cater to people's differing aims. For example, our November trip to Seacliff aims to survey and measure trees for the Truby King Reserve, while the August trip focussed on looking at bryophytes and ferns.

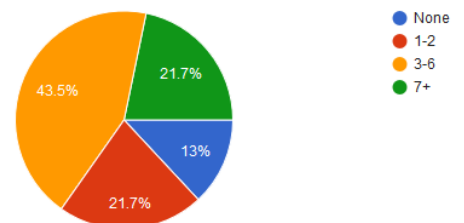
The trip locations suggested by respondents have been added to the committee's ideas list and we always welcome suggestions in this vein. If anyone is interested in running a trip, let us know! It would be great to have your perspective.

Talks summary:

Talks are much better attended than the trips. One third of respondents were at our AGM, a further 28% had last attended an earlier 2021 talk, and the remainder had been to a talk in 2020.

How many talks do you attend in a typical year?

23 responses



The main reason for attending a talk was an interesting topic, but socialisation and hearing a new speaker also featured strongly. The location was the biggest reason given for not attending talks, with Zoom mentioned as both a positive and a negative.

BSO response:

Talk attendance is pretty good. Since socialising came out as a reason for attending talks, we know that it is important to continue holding our talks in person when possible. However, due to the positive feedback about Zooming them we will continue to offer this as an additional option for those who can't or don't want to attend in person.

Other things of note:

We got 22 responses, which is approximately one quarter of our membership. That means that a lot of members' opinions have not been heard. In particular, only three students answered this survey. This may bias the answers away from the people who commonly attend field trips.

Okahau Dune Project

Angelina Young

Members might be interested to know about a dune restoration project taking place in Warrington/Okahau. The Okahau Dune Project has been set up by a small group of Warrington residents with the specific aim of re-establishing pikao at our local beach. No doubt members will be aware that *Ficinia spiralis* is the keystone species of dune ecosystems, endemic to Aotearoa, with a threat classification of "At Risk - Declining".



Site preparation

This year's inaugural public planting day was held on July 10th, and those who are interested can check out Paul Pope's excellent video (filmed on the day), posted on that date on his Facebook page: A

Beginner's Guide to Coastal Conservation. Prior to the planting day we spent some time with students from local schools (Purakaunui, Waitati, and Warrington) learning about pikao and dune ecosystems, and collecting, sowing, and caring for seed. To top it off we were hosted by Kāti Huirapa Rūnaka ki Puketeraki for a morning at the nursery potting up plants, and a ride on the waka across to Waikouaiti sandspit to plant some plants there - led by Brendan and Greg, thank you to the Rūnaka and Karitane Māori Tours! We also spent some time learning about the cultural importance of pikao within Māori culture and history, and its many uses as a weaving material. We hope that this population will flourish and continue to provide seed stock for other local plantings in Otago, and eventually a continued source of material for the weavers of Kāti Huirapa. Central to the project has been the opportunity for tamariki to engage with their local environment and practise the values of kaitiakitanga. We wish to acknowledge the support of DCC (Parks and Reserves) and Biodiversity fund in getting this project off the ground, and to the sterling effort made by 21 UniCrew students who braved high winds and the threat of snow to join us on planting day - long may the relationship continue!



Ready for planting with Warrington kids



Signage by kids

2022 calendar on sale now!

Calendars cost \$15 each and all proceeds go to the Botanical Society of Otago.

Available 1-3 pm from the Botany Department Reception, University of Otago, (correct amount of cash only) and at Society meetings.

For electronic payments email the Botanical Society of Otago (bsotago@otago.ac.nz) with your name, address and whether you want to collect the calendar from Botany Department reception or have it posted (add \$2.50 for mailing).



Identification of New Zealand mosses

Allison Knight

Now you can download *New Zealand Mosses: An Illustrated Key* by Bill and Nancy Malcolm and Jim Shevock from our website and the New Zealand Plant Conservation Network website:

<https://bso.org.nz/downloads>

https://www.nzpcn.org.nz/site/assets/files/0/03/945/nz_moss_key_2020-compressed.pdf

Articles

Book review of *Banks* by Grantlee Kieza

Angela Brandt

I should preface this review with the admission that I don't recall ever learning much about Sir Joseph Banks before I moved to Aotearoa New Zealand eight years ago. So this was my first in-depth foray into his life. It was certainly a good comprehensive introduction to his life as a naturalist and scholar, as well as his connections to many other naturalists and historical figures and events of the time period.

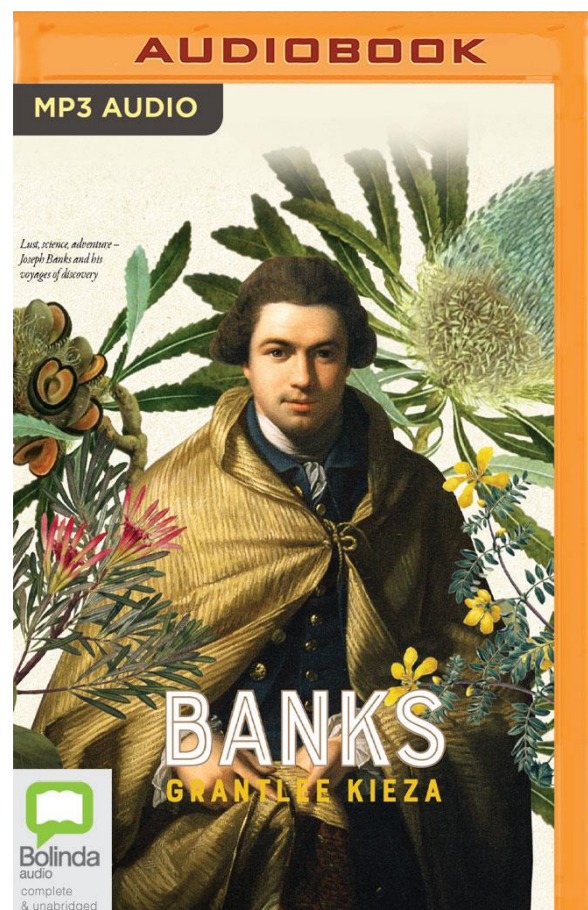
Roughly the first third of the book describes Banks's family history and upbringing, the second third his expeditions, and the final third his life in Britain leading the Royal Society and promoting settlement of Australia and uses of flora and fauna collected from around the world. I enjoyed the interactions the author described between Banks and other historical figures of the time, including Benjamin Franklin, but in particular that the author included James Cook's background in parallel with Banks's and a reasonable amount of detail on Daniel Solander. I also enjoyed learning more about the story of William Bligh and the infamous mutiny.

I was slightly disappointed by the relatively short treatment New Zealand gets in the book, but this makes sense given much of the book's focus (in line with that of Banks) is on the process of establishing the New South Wales colony. Similarly, there are mentions of New Zealand flora but not many. Several plant species are described to varying degrees throughout the book, though few botanical names are mentioned -- compared to extensive listings of Cook and others naming places they explore or pass on their voyages, including Poverty Bay and Young Nick's Head. The author does explicitly describe *Banksia* and *Bougainvillea* being named, but the keen botanist can make do with mention of other notable namesakes for species or genera, including Thomas Pennant and Pierre Brousset. But perhaps my favourite anecdote in the book is when a young Banks is mistaken for a highway robber and arrested when he's found crouched under a hedge near where the robbery

occurred - naturally, he was actually trying to identify a plant. It seems the habits of botanists really haven't changed in the past 250 years!

Inevitably, any biography about European exploration of the wider world will carry strong colonial perspectives, particularly about indigenous peoples. My impression of this biography (as a European-North American) was that the author was very conscious of this and other ways in which 18th century values and norms are not acceptable by our current standards - to the point of including an epilogue that addresses some of these tensions. I appreciated the care taken with language throughout the book and the inclusion of points that might not feature in earlier biographies, such as how certain figures, including Banks himself, promoted non-violence in interactions with indigenous peoples or use of less derogatory language to describe them in documents and records.

Banks was published in 2020. I listened to the audiobook (published 2021), which is available from the digital library website of the Dunedin Public Library. The book is also available in hard copy and the audiobook as a CD from the library.



Meeting and Trip Reports

Mahu Whenua and the End Peak Alpine Wetland Complex, a talk by Cara-Lisa Schloots, 10th March 2021

Alex Wearing

The post-European settlement environmental history of New Zealand's wetlands is a sorry tale. More than 90% of New Zealand's wetlands have been transformed into agricultural, forestry, and urban landscapes. Wetland damage and drainage is ongoing. Alpine wetlands have fared better than wetlands in lowlands, but some deterioration, diminution, and destruction has been caused by past grazing practices, the impacts of introduced plants and animals, and ski-field developments.

Cara-Lisa Schloots' gave an excellent talk, with some stunning photographs, on the structure and variability of an intact alpine patterned wetland complex at End Peak. Her talk was based on a Masters' thesis undertaken at the Department of Botany, University of Otago. New Zealand alpine wetlands have not been widely studied.

The End Peak wetlands are located in a south-facing basin (possibly a nivation hollow), at about 1800 metres in the Harris Mountains, on Motatapu Station, near Wanaka in Central Otago. The wetland complex feeds into Dead Horse Lake which flows into the Motatapu River. Motatapu Station is part of the Mahu Whenua Queen Elizabeth II Trust covenant created in 2015. At 53,000 hectares, Mahu Whenua is New Zealand's largest private land conservation agreement. Mahu Whenua comprises alpine and montane grasslands, alpine cushionfields and snowbanks, wetlands, shrublands, and forests.

The End Peak wetlands comprise a mosaic of string bogs, small lake, ponds, pedestals, stream, and ephemeral tarn, all linked together. They are

very variable at small spatial scales. The wetlands are generally snow-free from December to May.

End Peak wetlands have been assessed as highly intact, with very few introduced species. They had a light sheep grazing history, although sheep may have used the area as a temporary camp. Grazing stopped 15 years ago.

The aims of Cara-Lisa Schloots' research were: (1), to investigate water level patterns over the growing season, (2), to look at the distribution of plants between different water margins, and (3), to examine the composition of the seed bank.

Six photo-points were established at different sites to monitor changes in snow cover, water levels, and vegetation growth and dieback, from mid-December 2018 to mid-May 2019. Photos were taken daily aimed at measuring poles.

Snow had a smaller effect on water levels than precipitation events. An early freezing event followed by partial melt, resulted in water on top of the ice. Water level fluctuations in larger and smaller water bodies occurred at different times. The water level results were highly variable between sites. Some sites had a much larger response to rainfall and drought, while other sites had variable water level fluctuations from low to stable high water levels. But some seasonal changes were noted across all sites. The turnover point in vegetation structure and variability is when water levels change from summer to autumn patterns.

The photos also provided information on the presence of magpies (*Gymnorhina tibicen*) and paradise ducks (*Tadorna variegata*).

Vegetation data was collected using 10 metre transects, from water edge to tussock grassland margins, along which ten 25 cm x 25 cm quadrats were placed. The vegetation recorded was diverse. Plant assemblages varied across the wetland, although some species were present at all sites. The patterns were related to water level

regimes and micro-topography. The greatest plant species diversity was found at the lake edge where many obligate wetland species were present. There was lower species richness and fewer obligate wetland species where water level fluctuations were greater. Pedestals were dominated by *Carex* spp. The plant species recorded at the End Peak wetlands included: *Abrotanella inconspicua*, *Anisotome pilifera*, *Azorella exigua* (which is ‘naturally uncommon’), *Caltha obtusa*, *Gentianella amabilis*, *Marsippospermum gracile*, and *Myosotis glabrescens* (only the second population of this species found, and which is ‘data deficient’). Sphagnum moss was not recorded.

Plant species diversity will be influenced by altitude and length of growing season, but the presence of some species at altitudes higher than normal was attributed to the presence of relatively sheltered ground surface conditions and/or chance.

Seed bank data was obtained from four soil samples taken in spring and autumn. Seedlings were grown in sterilized potting mix. The soil seed bank contained both common and rare wetland species. Most species are rare within the string bogs. There was a high proportion of non-wetland specific grasses, and their presence shows the potential for grassland expansion during dry seasons. Introduced species were also present. If the water regime changes then there is potential for vegetation composition to also change. Of note, was presence of a thistle (*Cirsium* sp.), although no plants have been observed within four kilometres of End Peak wetland.

The plant species, water, and geomorphological diversity of these wetlands make it unlikely that there will be a uniform response to climate change. The most vulnerable plant species are likely to be those that occur at more stable sites,

which may be considered more vulnerable to extreme environmental fluctuations.

Coda

The vegetation, hydrological and geomorphological features of alpine wetlands at End Peak combine to form a superb near-natural landscape. Cara-Lisa Schloots is to be commended for studying these wetlands and establishing baselines to facilitate future monitoring, and assessments of change. Relatively remote though they may be, the End Peak wetlands are not shielded from climate-induced changes in water regimes and possible increased accessibility to the seeds of introduced species.

Seaweed communities – responses to invasion, climate change and nutrients, talks by Gaby Keeler-May, Isla Twigg, Ben Williams, and Nam Chand, 14th April 2021

Alex Wearing

The seaweeds themed meeting featured four very interesting and effectively presented talks that provided an excellent indication of the pure and applied research being undertaken on seaweeds by PhD students at the Department of Marine Studies at the University of Otago. The scope of the research and the scale of data collection and analysis were very impressive.

I. Control of the invasive kelp, *Undaria pinnatifida* in southern New Zealand, talk by Gaby Keeler-May

Undaria pinnatifida (Asian seaweed, wakame, ‘gorse of the sea’) is native to the Sea of Japan. It now occurs in temperate coastal waters all over the world. *U. pinnatifida* was first found in New Zealand in Wellington in 1987 and was recorded in Otago coastal waters in 1990. It has been

spread around New Zealand waters by coastal shipping. *U. pinnatifida* is found on rocky reefs, in intertidal and subtidal habitats, to a depth of 12 metres. It has a number of economic uses, but in New Zealand it is a threat to marine environments, and to fishing and tourism.

Gaby Keeler-May's research compares introduced *U. pinnatifida* and native seaweed biomass in kelp forests off the Karitane coast, Otago, and at Breaksea Sound, Fiordland. Her research: (1), investigates the distribution and spread of *U. pinnatifida* at sites with different dates of introduction, (2), assesses the impact of *U. pinnatifida* on native kelp abundance, and (3), measures the ability of *U. pinnatifida* to re-establish after large-scale removal.

U. pinnatifida was completely removed from study sites. Other species present were not removed. Changes to *U. pinnatifida* biomass over time in response to removal were assessed. The first removals were undertaken in 2019, and then repeated in 2020 and 2021. Juveniles and adults were counted. At Karitane, *U. pinnatifida* removal was over four tonnes from two sites, and over two tonnes from two sites. At Breaksea Sound, one year after *U. pinnatifida* removal there was a decrease in its numbers and biomass. *U. pinnatifida* removal is likely to have a positive effect on the density of other seaweed species.

II. Kelp forest microbial communities, talk by Isla Twigg

Microbial communities are ecosystem engineers. They can define habitat type, influence the availability of resources to other species, and alter the physical environment.

Isla Twigg's research investigates: (1), the ecological significance of microbial communities, (2), what influences the productivity of microbial communities in kelp forests, (3), how different stresses impact on the functioning of microbial communities, and (4), how biofilm communities compare to other

marine communities. Fiordland waters are being used as study sites.

Macrocystis pyrifera (giant kelp, bladder kelp) provides high quality habitat, and *Ulva* (sea lettuce) provides low quality habitat – a symptom of a bloom system – for microbial communities. In the coastal food web, microbes consume organic carbon and reintroduce carbon to the food web. Seaweed habitats have planktonic and biofilm heterotrophic bacterial communities. These influence the health and development of seaweeds.

Results show that microbial communities are influenced by seasonal changes in environmental conditions, and by changes in the species and biological productivity of the macroalgae present. The presence and intensity of different types of environmental stress will impact on the productivity of microbial communities.

III. Trends in *Macrocystis pyrifera* kelp forest decline and a reseeded approach for habitat restoration, talk by Ben Williams

Macrocystis pyrifera is one of the fastest growing organisms in the world and can form extensive kelp forests. It is a foundation species and an ecosystem engineer, which increases faunal diversity.

Ben William's talk was on kelp forest decline and kelp reseeded in the Marlborough Sounds.

M. pyrifera distribution patterns were mapped for 1942, 1988, and 2000. Between 1942 and 2000 there was a 50% decline in the number of sites where *M. pyrifera* was present. The main driver in distributional changes is linked to increases in sea temperatures. The increases in sea temperatures and declines in *M. pyrifera* were greatest in northern and western areas of the Marlborough Sounds. Warmer sea temperatures are driving compositional and structural changes in marine ecosystems. Some of the decline in *M. pyrifera* can be attributed to human influences.

Sedimentation from plantation forestry operations (especially during harvesting years) and mussel farms (harvesting of mussel lines, and faecal matter) have deleterious impacts on water quality.

A research programme is underway to promote retention and spread of kelp forest by reseeded. Site restoration involves: sporophyll collection, sporulation, bulking of gametophytes, seed spraying, nursery husbandry, and out-planting. Seeded ropes are secured to the sea floor at three different depths. There is ongoing monitoring of growth and environmental conditions.

Habitat restoration is feasible whilst water temperatures of the Marlborough Sounds remain within the thermal tolerance of *M. pyrifera*, and human activities can be managed to avoid damage to or destruction of kelp habitats.

IV. Ecosystem functioning and the role of soft-sediment red macroalgal communities in Otago Harbour, talk by Nam Chand

Macroalgal communities occurring in soft-sediment (sand, silt, and mud) habitats lack recognition. There is poor knowledge of macroalgal communities, and a lack of baseline information and monitoring. There are one green and four red key species of algae in Otago Harbour. These algae support increased overall species diversity.

Nam Chand's talk was on community habitat and ecophysiology of soft-sediment red macroalgal communities in Otago Harbour. Her research is on habitat conditions and epifaunal composition in meadows of *Adamsiella chauvinii*, an endemic red macroalga. Also under investigation is nitrogen uptake by *A. chauvinii* and other dominant macroalgae. In sheltered areas, bays, and harbours, *A. chauvinii* grows directly on soft-sediments, attached to shell fragments and stones, or unattached.

Otago Harbour was divided into inner, middle and outer harbour sites. Sea floor transects were established and catch-bags of species collected. The biomass of species was weighed. The outer harbour had the greatest biomass and greatest diversity, but *A. chauvinii* biomass is highest in the middle harbour where there are more stable environmental conditions, and adequate light and nutrients. Light conditions were better in the outer harbour than in the inner harbour. Despite turbid conditions, several species were present at inner harbour sites.

Coda

The four talks on seaweeds provided a revealing window underwater to appreciate the intrinsic interest of seaweeds, and the wide range of research that is being undertaken on seaweed species and communities, seaweed as an invasive species, and the return of seaweeds to previously occupied sites.

Orokonui fungi, a talk by David Orlovich, 9th June 2021

Andy Nilsen

David Orlovich took us through some of the highlights of almost 20 years of collecting fungi at Orokonui Ecosanctuary. Fungi collected at Orokonui were wide ranging, in part due to the vegetation types growing there, with unrecorded species being found on many visits. The talk was divided into three main sections according to the vegetation type which the fungi were collected from: *Eucalyptus*, *Kunzea* and other habitats.

David first took us through collections made under *Eucalyptus*. Many of these are Australian species and are ectomycorrhizal with *Eucalyptus*. How these Australian mycorrhizal fungi came to be associated with *Eucalyptus* here in New Zealand can only be speculated, but they were likely introduced by human activity.

Interestingly, several species found here lack formal identification or are taxonomic ambiguities, despite them having been known in Australia for many years. In particular, *Cortinarius* aff. *alboviolaceus* has been collected from the state of Victoria and has similarities to the northern hemisphere *Cortinarius alboviolaceus* but is phylogenetically distinct.

Similar to the collections made in *Eucalyptus*, *Cortinarius durifoliorum* found under *Kunzea* also shares trans-Tasman links. *Cortinarius durifoliorum* is a New Zealand native. It is morphologically almost indistinguishable from its Tasmanian sister species *C. sclerophyllorum*. In fact, people have distinguished between the two purely by which country they were found in. However, both of these species have now been found to be present in both countries, making identification of these species very difficult without additional molecular work.

Finally, David finished with recent, ongoing studies into fungi found in takahē dung. Fungi found in dung ranged from coprophilous to mycorrhizal. The fungi were identified by student Josie McGovern through culturing from takahē scats and DNA samples from internal scat samples. Interestingly, the mushroom *Flammulina velutipes* was able to be cultured from scat samples, indicating that at least this species can survive the gut passage of takahē. DNA sequences also recovered numerous ectomycorrhizal species from the genus *Cortinarius*. The jury is still out, though, if takahē ate mushroom fruit bodies, or if spores/tissue were incidentally ingested with plant material.

This was an enlightening presentation of some of the fungi from Orokonui and richly illustrated with photographs and phylogenies. One can only imagine how many more fungi there are still to discover at Orokonui.

A day of wonder: looking at lichens. Lichen foray at Orokonui, June 19th 2021

Kacey Hutchison

June 19th definitely put on the legendary “Dunner stunner” of a day for looking and learning about lichens at the Orokonui Ecosanctuary. With months of preparation and background work having been done, the Lichen Foray kicked off at 10:30am with a talk from our resident lichenologist, Allison Knight, before leading the (booked out!) group over to the start of the track. The group then split in two, to go either with Allison to start slightly further up the track, or with John Steel at the entrance. Members of the Thursday morning lichen group split evenly, and the *Tour of Orokonui Lichens* was able to begin.



Spread of the lichen groups, (photo: Jasmin Mosimann)

We all started together so that we could look at a patch right on the corner, nice and out of the way – not much more than some ground for trees to

grow on. A bit of *Nostoc* sp., a common partner of cyanobacterial lichens, was the first organism to be pointed out. Next, a patch of *Peltigera* sp. growing within close proximity, and then multiple *Cladonia* sp., some with vibrant red apothecia, others demonstrating the gorgeous ‘pixie cups’ we know and love.

From there, as it goes with every walk and talk with botanically-minded people and groups, we slowly got more and more spread out. The attendees of the foray were eager to know more, and ready to ask questions (some of which our student helpers were still struggling to answer).

We walked along the fence line, looking at the differences between crustose (like a crust), foliose (with leaf-like lobes) and fruticose (shrubby/bushy-like) lichens, alongside some of their other important features, like the apothecia (the fruiting bodies)! As we went around, the fence line turned into fallen logs and rocks clouded with different lichens, both cyanobacterial and algal, all-the-while in a race to keep up with the group while still getting as much information (and photos) as we could!

As we rounded a corner, we found another log full of wonders. It had fantastic lichens that could show the difference between *Hypogymnia* sp. and *Menegazzia* sp. – both have inflated lobes, but only *Menegazzia* sp. has perforated lobes. We could see both algal and cyanobacterial fungi, compare *Usnea* sp. and *Ramalina* sp., and there was a lot of clusters of *Cladonia* sp. - both with and without the ‘pixie cups’ on top. An exciting find of a pink lichenicolous fungus on a group of *Peltigera* sp. was sequenced later to be *Illosporopsis* sp. This is a pink fungus that prefers to grow on lichen and had made the *Peltigera* sp. its home in this case! An exciting thing to spot!



The pink lichenicolous fungus, *Illosporopsis* sp., on cyanobacterial lichen *Peltigera* sp. (photo: Stella Fish)



Apothecia of *Baeomyces heteromorphus* - a crustose lichen (photo: John Steel)

Towards the end of the track, our focus shifted to the trees as the groups began to mix. Large patches of lichens of all colours and patterns were visible at eye level, making them easier to spy! Of course, when it comes to lichen, you still can't dismiss what's below eye level and still growing on the rocks and the ground. While there were some bright and exciting species on the trees, the real excitement was where we'd normally look right past (as is often the case here)! *Baeomyces*

heteromorphus was an exciting one to spot – growing on a rock and under a fern. Unless you knew it was there it would be easy to miss! This was a crustose lichen, which had the apothecia sticking up like little mushrooms! On the same rock, we could see juvenile *Cladia* sp. without the apothecia! Just off the rock, we could see the same species with the little brown dots of apothecia growing on the tips!

Following the excitement of the walk, and full of new knowledge and enthusiasm towards lichens, the groups made it (slowly) back to where we started with the talk. A display table full of lichens was set up, alongside the microscopes (provided kindly by the University of Otago Botany Department), meaning that people had the chance to have a close-up look at the lichen structures, with the chance to ask more questions about what they were seeing! It was a great time all around, with various levels of [lichen] knowledge demonstrated across the board. A great opportunity for people to learn more about lichens, as well as for the Thursday morning lichen group (a group held by John Steel and Allison Knight that offers those in attendance an opportunity to practice keying out both lichens and bryophytes, and to further their understanding of the different terminology used in identification) to put their studies into practice!



Lichen display table (Photo: Stella Fish)

For a copy of the Orokonui lichen species list, please contact Allison Knight:

allison.knight.nz@gmail.com

Almost an island – the remarkable flora and habitats of Banks Peninsula, a talk by Melissa Hutchison, 14th July 2021

Alex Wearing

The Banks Peninsula (henceforth BP) is an area with fascinating natural and human histories. The physical geography of the BP is rugged and dramatic, and the biota is diverse with many distinctive features. The human geography is a palimpsest that reflects past and present attempts, both successful and unsuccessful, to shape the land to meet human needs and desires. Melissa Hutchison gave a very interesting and well-illustrated talk on the fascinating and diverse plants and vegetation of the BP.

Most of the BP is the result of volcanic eruptions between 12 and 6 million years ago, although land was present millions of years before then. Subsequent fluvial erosion produced many deeply incised valleys, partially filled, at times of higher sea levels, by bays. During the Pleistocene epoch (beginning about 2 million years ago), sea levels at times of maximum glaciation were as much as 150 m below present sea level. The BP was an island at times of higher sea levels. In the current interglacial period, aggradation of glacial and fluvial outwash debris led to coastal progradation that joined the BP to the South Island. The BP was a significant plant refuge during glacial periods (e.g., for species such as red beech (*Fuscospora fusca*), rimu (*Dacrydium cupressinum*), and fuchsia (*Fuchsia excorticata*)). But most of the BP experienced harsh conditions during glacial periods, as evidenced by incised gullies filled with loess. Many warm-temperate species were temporarily eliminated from the BP (e.g., nikau palm, *Rhopalostylis sapida*). The present coastline was established about 12,000 years ago.

The BP comprises the Banks Ecological Region (about 100,000 hectares), which is divided into three ecological districts: Port Hills, Herbert, and

Akaroa. Altitude, proximity to the coast, topographic heterogeneity (e.g., aspect, terrain complexity), and climate produces strong environmental gradients. The highest point is Mt Herbert/Te Ahu Patiki at 920 m and there are 25 summits higher than 700 m. Soils are generally fertile and base rich. These soil conditions facilitate, for example, the presence of kahikatea (*Dacrycarpus dacrydioides*) at higher altitudes. Rainfall ranges from about 750 to 2000 mm/yr. In the past, snow frequently occurred at low levels, but there are some areas that are frost free. The BP sometimes experiences severe droughts.

The BP, apart from limited areas of steep rock, coastal cliffs, dunes and wetlands, was a completely forested landscape at the time of Māori settlement. Māori impacts led to the loss of about one-third of forest cover as a result of intentional and accidental fires (Wilson, 1998). Tussock grasses, bracken (*Pteridium esculentum*), shield fern (*Polystichum vestitum*), kānuka (*Kunzea robusta*), and scrub spread to cleared land. Few, if any, plant species became extinct but there were extensive faunal changes (extinctions and depletions), which affected browsing impacts and plant dispersal.

European impacts on the BP vegetation have been pervasive and transformational (leading to a shift from predominantly woody to predominantly grassy landscapes). Some forest was removed for timber. Intentional and accidental forest fires and the drainage of wetlands facilitated the creation of a pastoral landscape. There were at least 20 plant extinctions and about 30 species have been reduced to low numbers and rendered vulnerable to local extirpation (Wilson, 1998). Vegetation communities and plant populations have become fragmented, and the distribution of many plant species now reflects where they have been able to survive and persist, and not necessarily their preferred habitats.

Maps of the BP showing the reduction since human settlement from a near continuous forest

cover to a plethora of small fragments constitute some of the most striking images of New Zealand's environmental history (e.g., see Wilson, 1998). The nadir of BP forest cover was in the 1920s. Most of the surviving native vegetation remnants were located at high altitude and/or rocky sites. Today, these sites are where most of the conservation reserves are located. The survival of fragments reflected topographic protection, relatively increased soil moisture, and sometimes management decisions by landowners not to actively remove native vegetation. Some species, such as mountain cedar (*Libocedrus bidwillii*) (one adult and one juvenile) are now very rare on the Banks Peninsula.

There has been some forest recovery in the last 100 years, mostly under kānuka, or under canopies of mixed species (e.g., fuchsia, mahoe (*Melicactus ramiflorus*), fivefinger (*Pseudopanax arboreus* and *P. colensoi*), and lemonwood/tarata (*Pittosporum eugenioides*)). Podocarp regrowth is occurring but mostly of browse- and herbicide resistant tōtara (*Podocarpus totara*), which also regenerates in the open. In open areas, recovery is preferentially of unpalatable species, but where there is topographic buffering and/or human intervention (e.g., fences and pest control), regeneration of palatable species does occur. Currently, primary growth forest, secondary growth forest, and shrubland cover about 15% of the BP. Nearly all habitats of the BP have woody propensities.

It seems likely that some plant species have always been few in numbers, due to the restricted area of their preferred environmental conditions (e.g., rock outcrops, coastal cliffs). Other species, such as blue tussock (*Festuca actae*), were restricted in range before the arrival of people, but were able to expand their ranges following the reduction of forest cover.

Currently, the vascular flora comprises more than 550 species and includes 10 endemics. BP endemics include the Banks Peninsula scurvy

grass (*Lepidium aegrum*) which occurs at coastal sites on well manured soils, the Lyttelton forget-me-not (*Myosotis lytteltonensis*) which has 150 plants on damp cliff faces, and the Banks Peninsula hebe (*Veronica lavaudiana*), which is widespread on rock outcrops but very palatable and prone to drought. New species continue to be identified. Seven species were discovered or rediscovered between 2008 and 2021 (including *Isolepis distigmata* at Okuti Valley, *Pittosporum obcordatum* at Okains Bay, *Chionochloa rubra* on the south side of Mt Herbert, and *Bulbinella hookeri* at the Hinewai Reserve). The BP is the southern limit of nine plant species, including tītoki (*Alectryon excelsus*), akeake (*Dodonaea viscosa*), kawakawa (*Macropiper excelsum*), native passion vine (*Passiflora tetrandra*), and shining spleenwort (*Asplenium oblongifolium*). To date, more than 230 native mosses (one endemic), more than 200 native liverworts, and more than 250 native lichens have been identified.

Melissa Hutchison identified and described the diverse range of indigenous vegetation types occurring on the BP:

- Lowland-podocarp hardwood forest. Now remnants, mostly on rocky sites and/or along waterways. Some species are now uncommon (e.g., miro (*Prumnopitys ferruginea*)).
- Montane podocarp-hardwood forest. This is present as a fragmented mosaic in grazed lands, and on rocky outcrops, especially on colder and wetter (south-facing aspects). Species include mountain cedar and Hall's tōtara (*Podocarpus laetus*).
- Beech forest. Scattered stands on the eastern Banks Peninsula (e.g., Armstrong Scenic Reserve (red beech, *Fuscospora fusca*), and Hinewai Reserve (red beech and black beech, *Fuscospora solandri*)).
- Second growth kānuka low forest and scrub. This is common on the Port Hills. Habitats are often very weedy.

- Small-leaved shrubland. This is seen by many farmers as a weed when occurring in pasture lands. Recovers when given the opportunity.
- Coastal forest (e.g., nikau palm at Dan Rogers Gully)/shrubland and grassland. Woody plant expansion into grasslands is very slow.
- Subalpine shrubland (shrubby wineberry (*Aristotelia fructicosa*), inaka (*Dracophyllum longifolium*), and mountain holly (*Olearia ilicifolia*)) and grassland (*Chionochloa* spp.). This often occurs on farmed land. It will recover if given an opportunity (e.g., a regime of light grazing).
- Silver tussock (*Poa cita*) grassland. This is probably largely induced. It is the native vegetation type most favoured by farmers. In many areas there is a good potential for a transition to kānuka.
- Rock outcrops. These are hotspots of local diversity and benefit from their low accessibility to grazing animals. They are botanically interesting, with several endemic plant species. Rock outcrops possess rich lichen floras.
- Freshwater wetlands. They are few and small. Rare plants are present.
- Saline wetlands. Rare plants are present.
- Coastal sand dunes. Pikao (*Ficinia spiralis*) is present at a few sites (e.g., Tumbledown Bay).

Notwithstanding the diverse types of native vegetation, most of the BP comprises exotic pasture, with species such as cocksfoot (*Dactylis glomerata*), sweet vernal (*Anthoxanthum odoratum*), and clover (*Trifolium* spp.) and gorse (*Ulex europaeus*), as well as a plethora of other introduced grasses, herbaceous and woody species. There are many stands of exotic forest.

There are currently 17 threatened and 42 at risk native plant species on the BP. In the future, some species could become less common on, or disappear from the BP as a result of climate and/or habitat changes.

Threats to BP native plants include fire, myriad weeds, pest animals (possums, deer, goats, and rabbits), livestock (grazing and trampling impacts), and land-use changes (agricultural intensification, land modification, clearance of spontaneous regeneration (e.g., kānuka), aerial herbicides, and plantation forestry), and land subdivision. Different weeds target different habitat types.

It is not possible to talk and write the botany and ecology of the BP without reference to the work of Hugh Wilson. His Protected Natural Area Programme Survey (botanical surveys 1983-1988; report published 1992), many subsequent publications (including the Pīpipi newsletter), and his efforts in setting up and then creating (with the vision of protecting landscapes comprising a sequence of habitats from beach to ridgeline) and managing Hinewai Reserve (1250 hectares), have literally put the BP on the botanical conservation map. Hugh Wilson's advocacy of minimum interference management (i.e., no planting), sustained attack on pest plants and animals, and the use of gorse as a nurse crop to promote the spontaneous regeneration of native plants, whilst initially controversial, have since been applied in many areas in New Zealand.

The botanical and ecological present and future of the BP has also been shaped by the Banks Peninsula Conservation Trust (BPCT) (c. 80 covenants), the Queen Elizabeth II Trust (QEII) (c. 60 covenants), Department of Conservation, the Christchurch City Council (three reserves), four private reserves (including Hinewai Reserve), and private landowners. The BPCT and QEII covenants together comprise about 3000 hectares.

Melissa Hutchison's talk covered the diversity, significance of, and threats to BP native plants and vegetation, as well as identifying the wide range of practices used in protection and management. Her enthusiasm ably

communicated to the audience that the BP is a botanical wonderland, to be treasured.

Note

The work of Hugh Wilson and the story of Hinewai Reserve are presented in the film *Fools and Dreamers: Regenerating a Native Forest* (2019), 30 minutes. Available on YouTube.

Reference

Wilson, H. D. 1998. Living in Raoul country. The changing flora and vegetation of the Banks Peninsula. P. 101-121 in, Burrows, C.J. (Ed.), *Étienne Raoul and Canterbury Botany 1840-1996*. A Canterbury Botanical Society Special Publication. Manuka Press, Christchurch.

Field trip to Mt Kettle and Mt Cutten, 24th July 2021

Lydia Turley

This trip ended up being more of a walk than a botanizing trip, which suited me quite nicely. Twelve people turned up and were rewarded with perfect weather – lovely sunshine and as warm as you could ask for in the middle of July.

We set off up a gravel track with abundant ferns growing on the side. Eventually we stopped to wait for the slower members of our group. Kate picked two *Acaenas*, *A. novae-zelandiae* and *A. anserinifolia*, which can look very alike so it was good to see the two together. David found *Chionochloa conspicua*, which Gretchen and I had dismissed as toitoi.

Eventually we realized that we had gone too far and passed the track to Mt Kettle, so had to backtrack. Everyone felt a bit silly when we found the track, since the entrance was a large clearing and should have been fairly obvious despite the sign being set back behind vegetation. Nevertheless, we eventually ended up on the right track, which wound through pine forest in what

felt like a magical adventure of a forest. The pine gave way to native vegetation (yay!) and the track turned uphill, with lots of scrambling over boulders. A few *Libocedrus bidwillii* seedlings were spotted along the path and there was *Dracophyllum*.

Morning tea was held atop Mt Kettle, David scolding me for sitting on *Chionochloa rigida* - a more convincing *Chionochloa* than the last one he'd pointed out. The view over the trees and reservoir was lovely. We discovered that we had already lost our first participant; James had turned back and gone to the reservoir to look for spiders.



Halocarpus biformis (Photo: Lydia Turley)

The next stage was down the other side of Mt Kettle, through lush green bush with a thick fern understory. David pointed out *Halocarpus biformis*, a conifer which I would have dismissed as two separate plants if he hadn't commented on it since the two forms are so distinct. *H. biformis* can be distinguished from its cousin the bog pine due to a "keel" on the adult leaf – yes, that's a keel like on a yacht which sticks out of the blade, not some obscure technical term. Gretchen and Robyn spent considerable time debating the identity of a large tree, then David turned up and immediately declared it pokaka.

A short detour was made to look at some huge rimu. They were suitably large, but of greater interest to me were these neat pale orange jelly-like fungi growing on a nearby kānuka.

The next leg of the trip was up Mt Cutten. This took us again through pine forest, and the track was quite steep toward the summit but we were

rewarded by stunning views over and along the harbour. Robyn treated us to the story of how she was responsible for the pines that had once been on the top of the hill having been cut down. A trio of conifer seedlings were found all growing within half a metre – tōtara, rimu and *Libocedrus*. It looked like the tōtara was winning that battle.



Jelly-like fungus growing on kānuka (Photo: Lydia Turley)

From Mt Cutten we legged it out past the reservoir and to the car park, ending the trip around 3pm. Overall, it was a great day with a really pleasant walk and gorgeous vegetation. Enthusiasm was high to run a trip next winter to the neighboring peak Mihiwaka.



Golden jelly fungus, *Tremella mesenterica*, (witches butter, yellow brain) surrounded by a red-fruited crustose lichen *Haematomma babingtonii* (Photo: Robyn Bridges)

Field trip to Racemans Track, Silverstream, 7th August 2021

Stella Fish

The final trip of winter was to Racemans Track, where ten Bot Soc members braved a chilly morning for a botanical adventure. The plan was to practise with the Dunedin fern key and become acquainted with mosses, liverworts, hornworts and lichens. As we moved from pasture to forest there were changes in fern species but some regulars stayed with us.

The track started off with pasture and a narrow band of bush to separate us from the river. Enthusiasm was high as we encountered the first ferns of the trip, *Polystichum vestitum* and *Zealandia pustulata*. *P. vestitum* grew along the edges of the path and demonstrated the importance of stipe scales for identification. These allowed us to distinguish it from the related *P. neozelandicum* we encountered later. The scales of the former are light brown with an obvious darker centre whereas in *P. neozelandicum* they are uniformly black to dark brown.

Z. pustulata was found epiphytic and on the ground, with its scaly rhizomes peeking out from below the lobed fronds. The round sori were sunk

into the lamina, forming the characteristic dimpled appearance of the fertile fronds.



Sori of Z. pustulata (Photo: Stella Fish)

Meanwhile, James' enthusiasm for spiders was rewarded with the appearance of *Neoramia otagoa*, *Cambridgea obscura*, and *Cycloctenus fugax*, with the last being well behaved for its photoshoot.

New ferns were found in the forest. There was the first appearance of the dark scaled *P. neozelandicum* and, hanging from above, the epiphytic and ornamental *Asplenium flaccidum*. One stump had an impressive assortment of



Scales of Polystichum vestitum (left) and P. neozelandicum (right) (Photos: Stella Fish)

different ferns; *Asplenium gracillimum*, *Pellaea rotundifolia*, *Cranfillia fluviatilis*, and *Austroblechnum lanceolatum*, all vying for our attention.

Here John demonstrated how sori can differ among species of ferns. In *A. gracillimum* they are elongated along the vein with the protective indusium opening away from the midrib, whereas in *P. rotundifolia* they line the lamina margin in a coenosorus.



Fern assemblage on stump (Photo: Stella Fish)

One *A. gracillimum* had a single bulbil growing on the frond; a type of asexual reproduction where the genetically identical bulbil forms from the cells on the lamina.



Asplenium gracillimum bulbil (Photo: Stella Fish)

Alongside the ferns, several mosses, liverworts and lichens were common. There was my personal favourite, the dendroid moss *Canalohypopterygium tamariscinum* with sporophytes, the appropriately named teddy bear liverwort *Leiomitra lanata*, and the filamentous lichen *Coenogonium implexum* with its orange apothecia. Despite our success with ferns and nonvascular plants, a sudden downpour put a halt to botanising for some of us and a tea break was decided. The track from here was treacherous, but patience prevailed and the group made it across unscathed.

The next section of the track was reached via steep, broken stairs, but as with the previous section we made it safely down. At the bottom was a damp gully with the additions of *Leptopteris hymenophylloides* and *Lomaria discolor*. These demonstrated different attachment styles of pinnae to the rachis - adnate in *L. discolor* and attached via a short stalk in *L. hymenophylloides* - as well as degree of lamina division - 1-pinnate in *L. discolor* and 3-pinnate in *L. hymenophylloides*.



Sori of *Asplenium gracillimum* (left) and *Pellaea rotundifolia* coenosorus (right) (Photos: Stella Fish)



Fronde of *Lomaria discolor* (left) and *Leptopteris hymenophylloides* (right) (Photos: Stella Fish)

The rocks and soil banks were clothed in several mosses and liverworts but one rock supported a small, green, hornless hornwort! A success for the trip and motivation to make it up the next stretch of hill.

The other side of the river revealed a dramatically different environment. Open spaces interspersed with *Pteridium esculentum* and disturbed ground that showed evidence of wild pig damage. The native forested margins hosted old faithful, *Z. pustulata*, and the leafless, exotic trees were eye-catching in their *Usnea* and *Ramalina* drapery. Despite the uprooted ground there was a mosaic of mosses, liverworts and lichens providing an informative example of growth

forms for Allison to spread her infectious enthusiasm. The trip highlight was found here, a liverwort with capsules. This liverwort, a species of *Heteroscyphus* or *Lamellocolea*, had a mass of sprawling sporophytes with capsules borne on translucent, 4cm long setae. While admiring this find some group members watched as a capsule sprang open to reveal the spore mass inside.

With the excitement of the liverwort to spur us on, we wandered towards the end of the track lined with huge *Parablechnum novaezelandiae* displaying their auriculate stipes for us to compare with the bare stipes of *P. montanum* and *P. procerum*. The final challenge of the track, the Silverstream weir loomed and an amusing dance

followed as the group tried varied footwork to avoid wet feet - some failing miserably.

Many thanks to John Steel for organising this fun and informative trip.

Participants: Allison Knight, Daniella Damm, James Crofts-Bennett, Jasmin Mosimann, Jessica Paull, John Steel, Lucy Parsons, Lydia Turley, Robyn Bridges, Stella Fish.



Liverwort (left) and capsules (right) (Photos: Stella Fish)

For a copy of the species list contact john.steel@otago.ac.nz.



Fern covered bank of Silverstream weir (Photo: Stella Fish)

Seaweeds at the doorstep: the diversity of coastal habitats and the species that are found in the Otago region, a talk by Wendy Nelson, 11th August 2021

Tony Aldridge

Speaker: Professor Wendy Nelson, Biological Sciences at the University of Auckland and Principal Scientist – Marine Biology at the National Institute of Water and Atmospheric Research.

Upon reflection, Wendy’s presentation has to be one of the most memorable botanical meetings for me this year. Here’s why. Wendy began defining the Otago region from Curio Bay to Karitane with types of coast, and key seaweed species. We then saw Otago examples of the main seaweed groups: green, brown and red. New Zealand has around 1,150 macro algae species, of which many are ‘data deficient’, meaning there are few records. Red algae comprise around half these species!

While groups of seaweed and key species are instantly recognised, taxonomic detail still seems a ‘work in progress’. For example, our common green ‘sea lettuce’ *Ulva* has around 25 species, of which half are invasive. Genetic sequencing is necessary! Later questions were mostly

taxonomic for which Wendy took offline by suggesting people email her directly. Taxonomy aside, Wendy’s presentation answered the question “*why study seaweeds?*”

Surprising seaweed facts emerged that are worth pondering. Herbivores only eat 10% (mass) of seaweeds; the rest of the algae end up as particles of food for bacteria and filter feeders. Otago harbour biomass peaks in Autumn (as opposed to Spring for Whangarei Harbour), perhaps a link with when lamp shells spawn. There are even intertidal turfs of seaweed. Also, crusts of red coralline seaweed that are ‘tasted’ by paua larvae before they settle. Wendy had stunning images of the growing tips of the kelp *Marginariella*. These tips had a spiral shape reminiscent of an unfolding fern frond. Another surprise was a low tide photo with three species of common bull kelp, including the new species *Durvillaea poha*. These kelps were aligned in zones that reminded me of beech species up a mountain side.

Seaweeds can be vulnerable. After the Kaikoura earthquakes, a moratorium was imposed on collecting seaweed to protect the newly uplifted seabed. The common Neptune’s necklace, *Hormosira banksii*, can die when walked upon. Wendy did not shy away from practical uses. New Zealand recipe books of the 1920’s and 30’s included how to select and cook seaweed. No seaweed is poisonous, but beware of a species with pH 1, or seaweed with attached diatoms.

After Wendy’s presentation I’m convinced that any Society trip near a coast should include a low tide walk around a headland or bay. Guides by Wendy or Nancy Adams are ‘must have’ references. Thank you, Wendy, for such an informative and thought provoking introduction to seaweeds near us.

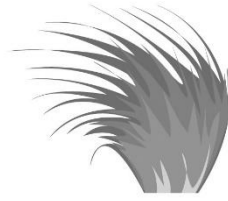
Adams N. (1997) Common Seaweeds of New Zealand. Canterbury University Press.

Nelson W. (2020) New Zealand Seaweeds: An Illustrated Guide Te Papa Press.

Botanical Society of Otago

Patron: Audrey Eagle

Website: <http://www.bso.org.nz>Email: bsso@otago.ac.nz**Committee 2021**Chair: **Gretchen Brownstein**Vice Chair: **John Barkla**Secretary: **Angela Brandt**Treasurer: **Mary Anne Miller**Newsletter and Website Editor: **Lydia Turley**Publications (Native plants of Dunedin): **David Lyttle**Publications (Lichens): **Allison Knight**University Liaison: **Matt Larcombe**Botanical art: **Sharon Jones**Committee: **David Orlovich**Committee: **Taylor Davies-Colley**Committee: **Aidan Braid**BrownsteinG@landcareresearch.co.nzmjbarkla@xtra.co.nzBrandtA@landcareresearch.co.nzmaryanne.miller53@gmail.comlydiamturley@gmail.comdjllyttle@gmail.comallison.knight.nz@gmail.commatt.larcombe@otago.ac.nzsharon.jones388@gmail.comdavid.orlovich@otago.ac.nztaylordaviescolley@gmail.comaidanbraid@gmail.comPlease submit copy for next newsletter to Lydia Turley by 10th January 2022**This Newsletter was published on 1 October 2021.****ISSN 0113-0854 (Print) ISSN 1179-9250 (Online)***Buttons for botanical pundits – still available at BSO meetings*



BOTANICAL SOCIETY
OF OTAGO

Membership Form
2021

Title: Name:

Postal address (work or home):
.....

E-mail address:

Phone: work: () home: ()

 BOTANICAL SOCIETY <small>OF OTAGO</small>	Please tick one box			
	Emailed <i>Newsletter</i>		Hardcopy <i>Newsletter</i>	
Student	\$10		\$20	
General	\$20		\$30	

Subscription Rate (one of the above): \$

Donations welcome: \$

Total: \$

Cash: Lodge the correct amount with a completed form at a BSO meeting.

Internet Banking: Account No: 03 0905 0029158 00 (Westpac)

Code: 2021 sub

Reference: *your name*

If a new subscription or details have changed from last year, please send a completed form to the Treasurer at the address below or to bso@otago.ac.nz

BSO Treasurer,
% Department of Botany
University of Otago
P O Box 56
Dunedin

BOTANY DEPARTMENT
UNIVERSITY OF OTAGO



Botanical Society of Otago,
c/o Department of Botany, University of Otago,
PO Box 56, North Dunedin 9059, NEW ZEALAND

Right: Corokia cotoneaster branch (Artist: Sharon Jones)



BOTANICAL SOCIETY

OF OTAGO