

Southern Alps Bush Blitz

National Herbarium of NSW team

31st January – 10th February 2023

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Nomenclature and taxonomy used in this report is consistent with:

The Australian Plant Name Index (APNI)

<http://www.anbg.gov.au/databases/apni-about/index.html>

The Australian Plant Census (APC)

<http://www.anbg.gov.au/chah/apc/about-APC.html>

AusMoss

<http://data.rbg.vic.gov.au/cat/mosscatalogue>

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List of contributors

List of contributors to this report.			
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Guy Lowe	National Herbarium of NSW, Botanic Gardens of Sydney	Herbarium curator	Survey participant
Daniel Ohlsen	National Herbarium of Victoria	Identification botanist; taxonomy and identification of NSW flora	Survey participant; Identification
Andrew Orme	National Herbarium of NSW, Botanic Gardens of Sydney	Identification botanist; taxonomy and identification of NSW flora	Survey participant; Identification
Stephen Skinner	National Herbarium of NSW, Botanic Gardens of Sydney	Honorary Research Associate; taxonomy and identification of NSW flora (algae)	Identification
Kayte Wilkie	Royal Botanic Gardens, Sydney. Botanic Gardens of Sydney	Horticulturalist; Seed and living material collector	Survey participant
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Trevor Wilson	National Herbarium of NSW, Botanic Gardens of Sydney	Systematic Botanist; systematics of Australian Flora	Identification

Abstract

Between the 31st January and 10th February 2023, the NSW flora team visited the Pilot Wilderness Area. A total of 485 specimens representing 241 species (207 angiosperms, 1 gymnosperm, 4 pteridophytes and allies, 5 mosses, and 24 algae) were collected. These specimens shall be housed in the National Herbarium of NSW with duplicates to both the National Herbarium of Victoria (MEL) and the Australian National Herbarium (CANB). Two *Hypericum* native species collected currently have misapplied names and once current research is completed, will represent three species; a further species – *Prunella vulgaris* (long spike form) may represent a new native species. Three range extensions (*Dianella caerulea* var. *caerulea*, *Leionema lamprophyllum* subsp. *lamprophyllum* and *Viola hederacea*), including a new addition to the NSW flora census were made, and one threatened species (*Calotis pubescens*) was located. No Weeds of National Significance (WONS) were observed, but 18 weed species were collected; none appeared to be seriously impacting either threatened species or community health. Feral animals (horses and pigs) were observed to be having an impact on swampy heaths and frost-hollow herbfields and continued management of these animals is suggested. A cursory visit to The Pilot, the highest point in the Wilderness Area did not locate any narrow endemics typically found in the higher elevation areas within Kosciuszko National Park.

1. Introduction

The Pilot Wilderness Area comprises of over 350,000 ha and is managed by the NSW National Parks and Wildlife Service. Much of the survey area is within the Australian Alps bioregion (IBRA – AUA) (Thackway and Cresswell 2005). The Pilot Wilderness Area ranges in altitude from 800 m along the banks of the Murray River to 1830m at the summit of The Pilot. The range of habitats include wet sclerophyll forests, montane and alpine grassy woodlands, alpine heaths, bogs, and swamps (Keith 2004).

Prior to the BushBlitz survey, general collecting and surveys had been limited. The highest concentration of herbarium collections had been made in three field trips – March 1970 (Coveny and Pickard – NSW Herbarium); December 1998 (Whalen, Chandler and Fethers – Canberra Herbarium), and December 2016 (Wright and Miles – Canberra Herbarium). The chief survey in the area was the Canopy Survey of 1999.

The higher peaks along the Main Range within the Kosciuszko National Park contain a high number of narrow endemics due to the elevation and communities present. While the elevation within the Pilot Wilderness is not as high as the Main Range, it was hoped that by sampling as many of the vegetation habitats known or assumed to be present, that range extensions of threatened taxa, and new records for NSW (particularly of Victorian species) would be made.

2. Methods

2.1 Site selection

Fourteen sites were nominated by the NSW Flora team that ranged across the Pilot Wilderness Area. Previous survey and herbarium collection points were plotted to give a visual representation of the areas with the highest concentration of previous observation/ collections. Overlaying these points onto the satellite maps supplied by the NSW Department of Land and Property Information, it was possible to then select sites that provided habitat, elevation, and geological diversity in areas that lacked any floristic data. A plot within one of the rainforest gully communities recorded by Doherty et al. (2011) was considered but was ultimately

rejected due to the time required to access any of these sites and to the lower number of species recorded for this vegetation.

2.2 Survey techniques

Plant collecting during helicopter drop-offs and road access were opportunistic. The immediate habitat types observed from the helicopter or from the vehicle, and a traverse was made to investigate what species may be present. Priority was given to fertile material (buds, flowers, fruits), but occasionally sterile material would be collected if the taxon suspected was either a listed threatened species, a potential new species or species of interest (range extension or unusual form). Progressively, with respect to road access collecting, sites were selected either for species not previously observed or collected, or were habitats either not previously explored or contained good to high diversity due to condition.

Vascular plant collection involved sampling by secateurs for shrubs and lower branches of trees, trowel for herbs, and extending pole pruners for higher branches of trees. These samples were pressed within a day press between sheets of newspaper and transferred to a standard press back at base camp. These were dried in sunny positions at base camp, with final drying within the drying cabinets at the National Herbarium of NSW at a set temperature of 30°C for up to 7 days.

Plants with delicate floral parts such as orchids or bladderworts (*Utricularia*), and freshwater algae samples were collected in fresh water in the field in plastic sample bottles but were transferred and stored in glass sample bottles containing 70% Ethanol: 30% distilled water.

Bryophyte samples were contained within envelopes made from newspaper or in brown paper bags. These were dried in the drying cabinets in identical conditions to the vascular flora specimens.

2.2.1 Methods used at standard survey sites

The NSW flora team visited Standard Survey Sites 1 and 2 based the centroid coordinates supplied by the BushBlitz team. SSS 1 coordinates were representative of the habitat (a mixed swampy heath and herbfield), but the SSS 2 coordinates supplied were in a habitat (swampy heath) that had been heavily damaged by feral animals and it was necessary to move the plot approximately 30 m further south-east. Unfortunately, the entire area has been degraded by feral animals (horses and pigs) causing erosion, damage to drainage lines, and destruction of canopy of the upper shrub layer.

For both sites, a systematic parallel field transverse was conducted to ensure a complete floristics list. Collection methods were as per Section 2.2. Non-fertile samples were collected to verify identification back at the herbarium.

2.3 Identifying the collections

All vascular flora and bryophyte specimens were examined under a dissecting microscope to either identify to species, or to confirm a field identification made on the day of collection. For the algae, a subsample was mounted onto a slide. Using a compound microscope, the slide was examined and the various entities were identified. Below is the list of contributors who identified the survey specimens, and the literature used.

Contributor (all NSW unless specified)	Plant group/ specialty
Russell Barrett	Cyperaceae; Asparagaceae
Peter Jobson	Ferns; Gymnosperms; all angiosperm families not already listed
Richard Jobson	Lentibulariaceae; Hypericaceae
Daniel Ohlsen (MEL)	Bryophytes
Andrew Orme	Myrtaceae; Orchidaceae
Stephen Skinner	Algae
Karen Wilson	Cyperaceae
Trevor Wilson	Lamiaceae

The following literature was used to identify the collections during the survey:

Angiosperms:

PlantNET: eFlora of New South Wales Version 2.0

VicFlora: Flora of Victoria

Ausgrass2: Grasses of Australia

EUCLID: eucalypts of Australia 4th Edition

WATTLE: acacias of Australia Version 3

Collins et al (2022): *Xerochrysum* (Asteraceae)

Nicolle (2022): Native eucalypts of Victoria and Tasmania – South-eastern Australia

Thompson (2006): *Senecio* (Asteraceae)

Wang & Bean (2019): *Lagenophora* (Asteraceae)

Pteridophytes and Gymnosperms:

PlantNET: Flora of New South Wales Version 2.0

VicFlora: Flora of Victoria

Bryophytes:

Vicflora: Flora of Victoria

Algae:

Entwisle, Sonnerman & Lewis (1997): Freshwater algae in Australia

Algae of Australia: Batrachospermales, Thoreaales, Oedogoniales & Zygonemaceae

Ling & Tyler (2000) Australian Freshwater Algae

3. Results and Discussion

Appendix 1 lists all flora (vascular and non-vascular) recorded during the Bush Blitz survey. Collections made during this Bush Blitz resulted in 485 specimens representing 239 species (207 angiosperms, 1 gymnosperm, 4 ferns and allies, 5 mosses, and 24 algae) being added to the National Herbarium of NSW (NSW), with any duplicates to be distributed initially to both the National Herbarium of Victoria (MEL) and the Australian National Herbarium (CANB).

3.1 Un-named or not formalised taxa

Richard Jobson (NSW) is currently conducting research into the taxonomy and systematics of *Hypericum* (Hypericaceae) in Australia. He examined and identified the material collected on the survey and for the nature of this report supplied the currently used names, which he knows to be misapplied to Australian material. He has tentatively applied the following names to the survey material as: *Hypericum gramineum* = *H. involutum* (Labill.) Choisy [to be newly applied] and *Hypericum japonicum* = *H. pusillum* Choisy [to be newly applied] or *H. rubicundulum* Heenan [to be newly applied].

Trevor Wilson (NSW) had previously noted the occurrence of a strange alpine form of *Prunella vulgaris*. *Prunella vulgaris* is currently considered to be an introduction from Europe and is common in disturbed areas throughout moister and elevated areas of eastern Australia. This alpine form is different in a number of characters, particularly in its inflorescence shape, and has been recorded in areas that are not considered disturbed. Further study is required to determine the status of this entity.

Taxon	Comment
<i>Hypericum gramineum</i>	Misapplication of this name
<i>Hypericum japonicum</i>	Misapplication of this name
<i>Prunella vulgaris</i> (long spike form)	

3.2 Putative new species (new to science)

No new putative species of vascular plants were encountered and collected on the survey. The aquatic samples of algae were frequently not identified to species. This was either due to the nature of the material collected, or to the absence of any literature. Therefore, for this report, these identifications (including those with a diagnostic identifier) are not treated as putative new species.

3.3 Exotic and pest species

Within the Pilot Wilderness Area, those areas that had been heavily impacted by previous human activities such as habitation (shepherd huts) and areas where stock and horses had been corralled, and trail maintenance to mitigate erosion or slippage, were the areas that had the highest density of weed species. These included the areas immediately around Cascade and Tin Mine Huts, and along the route of Cascade Trail. The species recorded were either well known species associated with pasture improvement, or have been used for erosion mitigation. Away from human disturbance weed species were regularly not observed, or with

few individuals such as the ubiquitous *Hypochaeris radicata* which is a common understory herb and which does not appear to impact threatened taxa where they co-occur.

Of interest was the recording of weed species in a clearing near Pinch River that had occurred as a direct result of the 2019/20 bushfires. Most of the dominant trees had been killed by the fire and had fallen in the subsequent months. These fallen trees had created small clearings throughout the community. It was in one such clearing that two weed species (*Cerastrium vulgare* and *Rumex acetosella*) were recorded. *Rumex acetosella* is commonly encountered in erosion and trail remediation, and in areas of former human activities, but not in understories away from such areas. The presence of *R. acetosella* at the remote site of Pinch River suggests this species is commonly in the seedbank throughout the entire Pilot Wilderness Area but can only become established in extreme environmental events. Fortunately, *R. acetosella* does not appear to impact areas where species of significance co-occur.

At Standard Study Site 2, feral animals had impacted the entire community of the swamp heathland. Here, the shrub canopy had been interrupted, erosion was obvious, and drainage lines had formed as the heavy loam (peat) soil layer degraded. While the species list for SSS 2 is comparable to SSS 1, there is a potential for biodiversity to decrease with further degradation of the site.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
<i>Foeniculum vulgare</i> (Apiaceae)	6.3 km NW of Jindabyne along Alpine way, just W of entrance to property 'The Overflow'. -36.426406; 148.565118	Small patches in roadside that had been extensively cleared	Area already degraded
<i>Hypochaeris radicata</i> (Asteraceae)	Cascade Trail, c. 3 km SSW of Cascade Hut -36.6025; 148.251111 Camp ground around Cascade Hut, c. 10 km S along Cascade Trail from Dead Horse Gap. -36.5829908; 148.2579489	Very common in grassy woodland Very common in grassy herbfield	Apparently not affecting native species
<i>Onopodium acanthium</i> subsp. <i>acanthium</i> (Asteraceae)	Barry Way, 2.6 km S of Jindabyne -36.426751; 148.608925	Small patch on roadside in heavily disturbed eucalypt woodland	Area already degraded
<i>Echium vulgare</i> (Boraginaceae)	6.3 km NW of Jindabyne along Alpine way, just W of entrance to property 'The Overflow'. -36.426406; 148.565118	Small patches in roadside that had been extensively cleared	Area already degraded

<i>Cerastrum vulgare</i> (Caryophyllaceae)	A small clearing, c. 100 m N of Pinch River, c. 3.5 km E of Cascade Trail and 1.1 km N of Tin Mine Trail. -36.633816; 148.289732	Widely scattered in clearing	Only present where canopy is open due to tree fall
<i>Dianthus armeria</i> (Caryophyllaceae)	c. 400 m E of Murray River and McCarthys Trail. -36.777632; 1 48.112056	Scattered individuals in limestone outcropping	Not spreading beyond the narrow talus
<i>Saponaria officinalis</i> (Caryophyllaceae)	Jindabyne Aerodrome -36.426944; 148.599444	Single self-contained clump	Regular mowing restricts spread
<i>Lotus corniculatus</i> (Fabaceae)	Tin Mine Creek, c. 1.1 km E of Cowombat Trail. c. 3.5 km SW of Tin Mine Huts. -36.7271541; 148.2308785	Scattered around the site	Apparently not affecting native species
<i>Lotus subbiflorus</i> (Fabaceae)	Tin Mine Hut - 36.700278; 148.251944	Uncommon near old buildings	
<i>Trifolium dubium</i> (Fabaceae)	Tin Mine Hut - 36.700278; 148.251944 Tin Mine Creek, c. 1.1 km E of Cowombat Trail. c. 3.5 km SW of Tin Mine Huts. -36.7271541; 148.2308785	Scattered in cleared area Scattered around the site	Apparently not affecting native species
<i>Trifolium repens</i> (Fabaceae)	saddle SE of The Pilot summit -36.755; 148.206667	Small patch	Apparently not affecting native species
<i>Hypericum perfoliatum</i> (Hypericaceae)	6.3 km NW of Jindabyne along Alpine way, just W of entrance to property 'The Overflow'. -36.426406; 148.565118	Scattered patches in roadside that had been extensively cleared	Area already degraded
<i>Callitriche stagnalis</i>	Ingeegoodbee River, c. 200 m E of Tin Mine Huts, c. 3.6 Km S along Cascade Trail from intersection with Tin Mine Trail. 36.623368; 148.250798	Occurring in pools adjacent to river bank	Likely to be spreading during flood periods. Not present in fast flowing water

<i>Anoxantherum odoratum</i> (Poaceae)	Camp ground around Cascade Hut, c. 10 km S along Cascade Trail from Dead Horse Gap. -36.5829908; 148.2579489	Scattered on edges of cleared area, but dense around the hut	Apparently not affecting native species
<i>Rumex acetosella</i> (Polygonaceae)	SE of Bob's Ridge off Cascade Trail, near horse enclosure. -36.5576428; 148.267448	Common	Spreads when ground is disturbed
	start of Cascade Trail at Dead Horse Gap -36.523056; 148.264444	Very common on slope	
	saddle SE of The Pilot summit -36.755; 148.206667	Patches in sheltered areas	
	Camp ground around Cascade Hut, c. 10 km S along Cascade Trail from Dead Horse Gap. -36.5829908; 148.2579489	Widely scattered throughout community	Only present where canopy is open due to tree fall
	A small clearing, c. 100 m N of Pinch River, c. 3.5 km E of Cascade Trail and 1.1 km N of Tin Mine Trail. -36.633816; 148.289732	Widely scattered in clearing	
<i>Potentilla recta</i> (Rosaceae)	Jindabyne Aerodrome -36.426944; 148.599444	Scattered	Spread to adjacent woodland
	Camp ground around Cascade Hut, c. 10 km S along Cascade Trail from Dead Horse Gap. -36.5829908; 148.2579489	Uncommon	Not spreading into adjacent communities
<i>Verbascum thapsus</i> subsp. <i>thapsus</i> (Scrophulariaceae)	6.3 km NW of Jindabyne along Alpine way, just W of entrance to property 'The Overflow'. -36.426406; 148.565118	Small patches in roadside that had been extensively cleared	Area already degraded
<i>Verbascum virgatum</i> (Scrophulariaceae)	In clearing up hill from the Murray River. -36.7775; 148.1125	Scattered	Not aggressively expanding

3.4 Threatened species

Only one threatened listed species was encountered during the survey period. In NSW, *Calotis pubescens* is currently known from approximately 5 localities all within Kosciuszko

National Park, including two from within the Pilot Wilderness Area. The Cascade Hut population was first recorded in 2014. The main population covers an area c. 200 m², with scattered individuals in low numbers present in a buffer zone of a further 100 m. Many individuals were fruiting and there were no obvious signs of threatening processes. Weed species such as *Hypocharis radicata*, *Anoxantherum odoratum* and *Potentilla recta* were present, but they did not appear to be affecting the viability of *C. pubescens*. Active searching for *C. pubescens* was conducted in similar frost-hollow herbfields such as around the Tin Mine Hut area but was unsuccessful.

Table 4. Threatened species

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
<i>Calotis pubescens</i> (Asteraceae)	Endangered (NSW)	100m East of Cascade Hut, Cascade Trail -36.582773; 148.2585717	Extensive population covering c 200 m ² Many individuals flowering and fruiting

3.5 Range extensions

One of the chief aims for the NSW Flora team was to search and find species known to occur in alpine Victoria but were absent from the NSW flora census. One taxon was added to the NSW flora census - *Leionema lamprophyllum* subsp. *lamprophyllum*. This subspecies is currently known in Victoria in neighbouring sub-alpine regions.

Two species had range extensions. *Dianella caerulea* currently comprises 8 varieties across eastern Australia and is known to be a species complex requiring further study. *Dianella caerulea* var. *caerulea* is also quite polymorphic and may have undescribed taxa within its current circumscription. While the known distribution is unreliable due to the complexity, it has been observed in montane regions of East Gippsland, Victoria. *Viola hederacea* in its current circumscription (Thiele and Prober 2003) in NSW occurs along the eastern fall of the Great Dividing Range to the Sydney Basin, with a single disjunct occurrence in the Brindabella Ranges near Canberra. This not only is a range extension, it is also an interesting disjunction into higher elevations.

Table 5. Range extensions or significant infill in distribution records for species

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Dianella caerulea</i> var. <i>caerulea</i> (Hemerocallidaceae)	Between water crossing and Bobs Ridge along Cascade Trail, Pilot Wilderness -36.5624278; 148.2594801	Near Mitta Mitta (Vic), 74 km (direct) E	
<i>Leionema lamprophyllum</i> subsp. <i>lamprophyllum</i> (Rutaceae)	Dead Horse Gap, beginning of Cascade Trail -36.5238185; 148.2638356	39 km (direct) SSE from Mt Cobberas (Vic)	1 st record for NSW; known in alpine Victoria

<i>Viola hederacea</i> (Violaceae)	Cascade trail, c. 15 km S of Dead Horse Gap on Cascade Trail.	39 km (direct) SSE from Rams Horn (Vic)	1 st record for the greater Kosciuszko National Park
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3.6 Genetic information

Whenever possible, DNA samples were collected concurrently when herbarium specimens were made. This resulted in 121 samples collected, primarily ferns and angiosperms. Upon returning to the NSW herbarium, these samples were freeze dried at -80°C and then housed in air-tight containers in a humidity and temperature-controlled room. These samples will form part of the NSW Plant Tree of Life Flagship project. The aim of this project is to sample every native vascular plant species of NSW and construct an inferred phylogeny.

4. Information on species lists

There were no difficulties in identifying the vascular specimens made during the survey – the flora is well resourced with identification tools, and the descriptions made it possible to align the material with described or known putative new species. There is currently no flora for the bryophytes of NSW and the NSW team relied on the skills of Daniel Ohlsen at MEL and the moss flora of Victoria.

The freshwater algae were identified by Stephen Skinner (NSW) who is a specialist with decades of experience. The identification literature available is very limited and has many cosmopolitan species recorded as occurring in Australia. Future research using molecular data has the potential to reveal a redefining of current species circumscriptions and distributions, and the description of Australian endemic species.

5. Information for land managers

The Pilot Wilderness Area is an important extension to the Kosciuszko National Park due to the minimal disturbance when compared with the high impact areas along the Main Range. It forms part of the northern headwater catchment for the Murray and Snowy Rivers. The presence of intact swampy heaths and frost-hollow herbfields containing weedy species with low threatening impacts means the floral diversity is high and stable; the presence of weed species in low numbers in forests that are recovering from the 2019/20 fires shows these communities are recovering naturally.

However, the evidence of feral animals, particularly horses and pigs, show that they are impacting the communities on the plateau, particularly swampy heaths and communities around waterways. The degradation observed will have flow-on effects with diminished water quality in the catchments, erosion, and threats to species diversity. *Almaleea capitata* is poorly known, and with a limited distribution based on herbarium and observation records. Currently the highest number of populations (3 from 5 known populations) in NSW are all within the Pilot Wilderness Area, and all are restricted to swampy heaths. While this species is not currently legislated, it probably warrants listing. Continued degradation of these communities by feral animals will ultimately have an impact on it.

6. Other significant findings

Two horticulturalists from the Sydney and Mt Annan sites of Botanic Gardens of Sydney attended the survey and were able to collect propagation material. Twenty-four cuttings from 21 species have been successfully propagated. These species shall be used for planting out

in one of the three gardens within the Botanic Gardens of Sydney, and for future propagation within the Gardens nurseries.

The Pilot at 1830 m is the only high point within the Wilderness Area that had potentially narrow endemics like those occurring on the Main Range. Previously only Rex Filson (MEL) had visited the mountain to collect lichens. 58 species were collected on the Pilot (2 mosses; 3 ferns and allies; 1 gymnosperm; 52 angiosperms); 2 species were weeds, but no observed or collected species were listed as threatened. Horses were observed on the saddle and near the summit, but there appeared to be no evidence of erosion or habitat destruction; any human disturbance was historical and minimal (old wire, rusted drums, and horse shoes).

7. Conclusions

Over the two-week period of the Southern Alps BushBlitz survey, 485 specimens, representing 241 species (207 angiosperms, 1 gymnosperm, 4 ferns, 5 mosses, and 24 algae) were added to the National Herbarium of NSW. All but three species are known to occur within the Kosciuszko National Park and neighbouring Wilderness Areas. While it is still not conclusive, it does appear that the narrow endemics seen on the Main Range and associated peaks are absent from the Pilot Wilderness Area. Our cursory visit to The Pilot, the only significant peak within the region, did not locate any such narrow endemics, although the scree area and the southern steep slope were not explored due to time limitations.

Our survey searches were not exhaustive, so the potential for new populations of threatened species, new range extensions and new additions to the NSW flora census are still possible. Locating new records during the survey period suggests that further discoveries are likely.

The Wilderness Area, possibly as a result of limited access for a lengthy period, is remarkably weed free. No Weeds of National Significance (WONS) were observed despite *Pilosella* (*Hieracium*) (Hawkweed) being known to occur within Kosciuszko National Park and the seeds are easily moved by prevailing winds. However, the visual effect of feral animals in frost-hollow herbfields and swampy heaths does require continued land management particularly as these communities were observed to contain threatened listed or potentially threatened species.

Acknowledgements

The NSW flora team wish to thank BushBlitz for the opportunity to explore an under-collected region of NSW and to improve our understanding of its flora, for their dedication to organising to a very high standard in particular helicopter schedules and safety, and for their tireless efforts to ensure our experience is as successful and enjoyable as can be possible. The interactions and networking made possible between other institutions and organism groups is always invaluable in sharing new ideas and concepts. The open day with the people of Jindabyne and engaging with the teachers under the BHP program allowed us to interact with a variety of people and students, to introduce them to the wonder of botany, and to ultimately hopefully inspire a future generation of biologists.

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Appendix 1. List of NSW Flora recorded during the Southern Alps Bush Blitz					
Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Algae					
<u>CYANOBACTERIA</u>					
Scytonemataceae	<i>Scytonema</i> sp.				
Stigonemataceae	<i>Stigonema ocellatum</i>				
<u>DIATOMS</u>					
Fragilariaceae	<i>Tabellaria</i> sp.				
<u>EUGLENIOIDEA</u>					
Euglenaceae	<i>Euglena</i> sp.				
<u>OCHROPHYTA</u>					
Tribonemataceae	<i>Tribonema</i> sp.				
<u>CHLOROPHYTA</u>					
Characeae	<i>Chara</i> sp.				
Netriaceae	<i>Netrium</i> sp.				
Oedogoniaceae	<i>Oedogonium</i> sp.				
Zygnemataceae	<i>Zygnema</i> sp.				
<u>DESMIDIALES</u>					
Closteriaceae	<i>Closterium</i> sp. "small crescent"				
Closteriaceae	<i>Closterium kuetzingii</i>				
Closteriaceae	<i>Closterium intermedium</i> complex				
Desmidiaceae	<i>Cosmarium</i> sp.				
Desmidiaceae	<i>Euastrum cf longicolle</i>				
Desmidiaceae	<i>Euastrum turneri</i> complex				
Desmidiaceae	<i>Micrasterias jenneri</i>				
Desmidiaceae	<i>Micrasterias truncata</i> - blunt form				
Desmidiaceae	<i>Micrasterias truncata</i> - spiny form				
Desmidiaceae	<i>Micrasterias</i> sp.				
Desmidiaceae	<i>Onychonema</i> sp.				
Desmidiaceae	<i>Pleurotaenium</i> sp.				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Desmidiaceae	<i>Staurodesmus sp</i> - classic three-corner hat				
Desmidiaceae	<i>Staurodesmus sp.</i> - decorated arms				
Desmidiaceae	<i>Tetmemorus sp.</i>				
Bryophytes					
Polytrichaceae	<i>Dawsonia longiseta</i>				
Polytrichaceae	<i>Polytrichum commune</i>				
Sphagnaceae	<i>Sphagnum cristatum</i>				
Bartramiaceae	<i>Bartramia robusta</i>				
Meesiaceae	<i>Meesia muelleri</i>				
Ferns and allies					
Blechnaceae	<i>Blechnum penna-marina</i> subsp. <i>alpina</i>				
Aspleniaceae	<i>Asplenium trichomanes</i>				
Dryopteridaceae	<i>Polytrichum proliferum</i>				
Lycopodiaceae	<i>Lycopodium fastigatum</i>				
Gymnosperms					
Podocarpaceae	<i>Podocarpus lawrencei</i>				
Angiosperms					
Apiaceae	<i>Aciphylla glacialis</i>				
Apiaceae	<i>Aciphylla simplicifolia</i>				
Apiaceae	<i>Foeniculum vulgare</i>				Yes
Apiaceae	<i>Gingidia harveyanum</i>				
Apiaceae	<i>Oreomyrrhis brevipes</i>				
Apiaceae	<i>Oreomyrrhis ciliata</i>				
Apiaceae	<i>Oreomyrrhis eriopoda</i>				
Apiaceae	<i>Oschatzia cuneifolia</i>				
Araliaceae	<i>Hydrocotyle algida</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Araliaceae	<i>Hydrocotyle laxiflora</i>				
Araliaceae	<i>Hydrocotyle sibthorpioides</i>				
Araliaceae	<i>Polyscias sambucifolia</i> subsp. Short leaflets (V.Stajsic 196) Vic. Herbarium				
Araliaceae	<i>Trachymene humilis</i> subsp. <i>humilis</i>				
Asparagaceae	<i>Arthropodium milleflorum</i>				
Asphodelaceae	<i>Dianella caerulea</i> var. <i>caerulea</i>				
Asteraceae	<i>Brachyscome aculeata</i>				
Asteraceae	<i>Brachyscome decipiens</i>				
Asteraceae	<i>Brachyscome nivalis</i>				
Asteraceae	<i>Brachyscome spathulata</i>				
Asteraceae	<i>Brachyscome tadgellii</i>				
Asteraceae	<i>Calotis pubescens</i>			Yes (Endangered)	
Asteraceae	<i>Cassinia aculeata</i> subsp. <i>aculeata</i>				
Asteraceae	<i>Celmisia tomentella</i>				
Asteraceae	<i>Chrysocephalum semipapposum</i> subsp. <i>semipapposum</i>				
Asteraceae	<i>Coronidium monticola</i>				
Asteraceae	<i>Craspedia aurantia</i>				
Asteraceae	<i>Craspedia canens</i>				
Asteraceae	<i>Craspedia crocata</i>				
Asteraceae	<i>Cymbonotus preissianus</i>				
Asteraceae	<i>Euchiton involucratus</i>				
Asteraceae	<i>Euchiton japonicus</i>				
Asteraceae	<i>Hypochaeris radicata</i>				Yes
Asteraceae	<i>Lagenifera montana</i>				
Asteraceae	<i>Leptinella filicula</i>				
Asteraceae	<i>Leptorhynchos squamatus</i> subsp. <i>alpinus</i>				
Asteraceae	<i>Microseris lanceolata</i>				
Asteraceae	<i>Olearia algida</i>				
Asteraceae	<i>Olearia myrsinoides</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Asteraceae	<i>Olearia phlogopappa</i> subsp. <i>flavescens</i>				
Asteraceae	<i>Olearia phlogopappa</i> subsp. <i>serrata</i>				
Asteraceae	<i>Onopordum acanthium</i> subsp. <i>acanthium</i>				Yes
Asteraceae	<i>Ozothamnus alpinus</i>				
Asteraceae	<i>Ozothamnus cupressoides</i>				
Asteraceae	<i>Ozothamnus secundiflorus</i>				
Asteraceae	<i>Picris angustifolia</i> subsp. <i>merxmulleri</i>				
Asteraceae	<i>Podolepis lacinatus</i>				
Asteraceae	<i>Rhodanthe anthemoides</i>				
Asteraceae	<i>Senecio gunnii</i>				
Asteraceae	<i>Senecio linearifolius</i> var. <i>latifolius</i>				
Asteraceae	<i>Senecio pinnatifolius</i> var. <i>alpinus</i>				
Asteraceae	<i>Solenogyne gunnii</i>				
Asteraceae	<i>Xerochrysum andrewiae</i>				
Boraginaceae	<i>Echium vulgare</i>				Yes
Brassicaceae	<i>Barbarea grayi</i>				
Brassicaceae	<i>Cardamine robusta</i>				
Campanulaceae	<i>Lobelia pedunculata</i>				
Campanulaceae	<i>Lobelia surrepens</i>				
Campanulaceae	<i>Wahlenbergia ceracea</i>				
Campanulaceae	<i>Wahlenbergia gloriosa</i>				
Campanulaceae	<i>Wahlenbergia stricta</i> subsp. <i>stricta</i>				
Caryophyllaceae	<i>Cerastium vulgare</i>				Yes
Caryophyllaceae	<i>Dianthus armeria</i>				Yes
Caryophyllaceae	<i>Saponaria officinalis</i>				Yes
Caryophyllaceae	<i>Scleranthus biflorus</i>				
Caryophyllaceae	<i>Stellaria pungens</i>				
Celastraceae	<i>Stackhousia monogyna</i>				
Crassulaceae	<i>Crassula sieberiana</i>				
Cyperaceae	<i>Carex appressa</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Cyperaceae	<i>Carex echinata</i>				
Cyperaceae	<i>Carex hypandra</i>				
Cyperaceae	<i>Carex inomitata</i>				
Cyperaceae	<i>Carpha nivicola</i>				
Cyperaceae	<i>Eleocharis gracilis</i>				
Cyperaceae	<i>Isolepis aucklandica</i>				
Cyperaceae	<i>Isolepis fluitans</i>				
Cyperaceae	<i>Isolepis habra</i>				
Cyperaceae	<i>Isolepis montivaga</i>				
Cyperaceae	<i>Lepidosperma curtisiae</i>				
Dilleniaceae	<i>Hibbertia obtusifolia</i> complex				
Droseraceae	<i>Drosera peltata</i>				
Ericaceae	<i>Acrothamnus hookeri</i>				
Ericaceae	<i>Acrothamnus macraei</i>				
Ericaceae	<i>Epacris celata</i>				
Ericaceae	<i>Epacris gunnii</i>				
Ericaceae	<i>Epacris paludosa</i>				
Ericaceae	<i>Richea continentis</i>				
Fabaceae	<i>Acacia mearnsii</i>				
Fabaceae	<i>Acacia penninervis</i> subsp. <i>penninervis</i>				
Fabaceae	<i>Almaleea capitata</i>				
Fabaceae	<i>Bossiaea distichoclada</i>				
Fabaceae	<i>Bossiaea foliosa</i>				
Fabaceae	<i>Cullen microcephalum</i>				
Fabaceae	<i>Daviesia latifolia</i>				
Fabaceae	<i>Glycine clandestina</i>				
Fabaceae	<i>Hovea montana</i>				
Fabaceae	<i>Lotus corniculatus</i>				Yes
Fabaceae	<i>Lotus subbiflorus</i>				Yes
Fabaceae	<i>Oxylobium ellipticum</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Fabaceae	<i>Pultenaea fascicularis</i>				
Fabaceae	<i>Trifolium dubium</i>				Yes
Fabaceae	<i>Trifolium repens</i>				Yes
Gentianaceae	<i>Centaurium erythraea</i>				
Geraniaceae	<i>Geranium antrorsum</i>				
Geraniaceae	<i>Geranium homeanum</i>				
Geraniaceae	<i>Geranium potentilloides</i> var. <i>abditum</i>				
Geraniaceae	<i>Geranium potentilloides</i> var. <i>potentilloides</i>				
Goodeniaceae	<i>Goodenia hederacea</i> subsp. <i>alpestris</i>				
Goodeniaceae	<i>Velleia montana</i>				
Haloragaceae	<i>Gonocarpus micranthus</i> subsp. <i>micranthus</i>				
Haloragaceae	<i>Gonocarpus montanus</i>				
Haloragaceae	<i>Gonocarpus tetragynus</i>				
Hypericaceae	<i>Hypericum gramineum</i>				
Hypericaceae	<i>Hypericum japonicum</i>				
Hypericaceae	<i>Hypericum perforatum</i>				Yes
Hypoxidaceae	<i>Hypoxis hygrometrica</i> var. <i>splendida</i>				
Juncaceae	<i>Juncus phaeanthus</i>				
Juncaceae	<i>Juncus phaeanthus</i> x <i>vaginatus</i>				
Juncaceae	<i>Juncus vaginatus</i>				
Juncaceae	<i>Luzula densiflora</i>				
Juncaceae	<i>Luzula modesta</i>				
Juncaceae	<i>Luzula novae-cambriae</i>				
Lamiaceae	<i>Ajuga australis</i>				
Lamiaceae	<i>Prostanthera cuneata</i>				
Lamiaceae	<i>Prostanthera lasianthos</i>				
Lamiaceae	<i>Prunella vulgaris</i> (long spike alpine form)				
Lentibulariaceae	<i>Utricularia dichotoma</i> subsp. <i>dichotoma</i>				
Lentibulariaceae	<i>Utricularia dichotoma</i> subsp. <i>monanthus</i>				
Linaceae	<i>Linum marginale</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Montiaceae	<i>Montia australasica</i>				
Myrtaceae	<i>Baeckea gunniana</i>				
Myrtaceae	<i>Baeckea latifolia</i>				
Myrtaceae	<i>Baeckea utilis</i>				
Myrtaceae	<i>Callistemon ptyoides</i>				
Myrtaceae	<i>Eucalyptus niphophila</i>				
Myrtaceae	<i>Eucalyptus perriniana</i>				
Myrtaceae	<i>Eucalyptus stellulata</i>				
Myrtaceae	<i>Kunzea muelleri</i>				
Myrtaceae	<i>Leptospermum grandifolium</i>				
Myrtaceae	<i>Leptospermum lanigerum</i>				
Onagraceae	<i>Epilobium billardioreanum</i> subsp. <i>cinereum</i>				
Onagraceae	<i>Epilobium billardioreanum</i> subsp. <i>hydrophilum</i>				
Orchidaceae	<i>Chiloglottis valida</i>				
Orchidaceae	<i>Eriochilus magenteus</i>				
Orchidaceae	<i>Genoplesium nudum</i>				
Orchidaceae	<i>Prasophyllum alpestre</i>				
Orchidaceae	<i>Prasophyllum sphacelatum</i>				
Orchidaceae	<i>Prasophyllum tadgellianum</i>				
Orchidaceae	<i>Pterostylis decurva</i>				
Orchidaceae	<i>Pterostylis monticola</i>				
Orchidaceae	<i>Pterostylis squamata</i>				
Orchidaceae	<i>Thelymitra cyanea</i>				
Orobanchaceae	<i>Euphrasia caudata</i>				
Phyllanthaceae	<i>Poranthera oreophila</i>				
Pittosporaceae	<i>Bursaria spinosa</i> subsp. <i>lasiophylla</i>				
Plantaginaceae	<i>Callitriche stagnalis</i>				Yes
Plantaginaceae	<i>Plantago alpestris</i>				
Plantaginaceae	<i>Plantago euryphylla</i>				
Plantaginaceae	<i>Veronica derwentiana</i> subsp. <i>maideniana</i>				

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Plantaginaceae	<i>Veronica perfoliata</i>				
Plantaginaceae	<i>Veronica subtilis</i>				
Poaceae	<i>Agrostis muelleriana</i>				
Poaceae	<i>Agrostis parviflora</i>				
Poaceae	<i>Agrostis venusta</i>				
Poaceae	<i>Anoxantherum odoratum</i>				Yes
Poaceae	<i>Austrostipa nivicola</i>				
Poaceae	<i>Deyeuxia brachyathera</i>				
Poaceae	<i>Deyeuxia carinata</i>				
Poaceae	<i>Lachnagrostis meioncetes</i>				
Poaceae	<i>Poa clivicola</i>				
Poaceae	<i>Poa fawcettiae</i>				
Poaceae	<i>Poa labillardieri</i>				
Poaceae	<i>Rytidosperma pilosum</i>				
Poaceae	<i>Rytidosperma racemosum</i> subsp. <i>racemosum</i>				
Poaceae	<i>Themeda triandra</i>				
Polygalaceae	<i>Comesperma retusum</i>				
Polygonaceae	<i>Rumex acetosella</i>				Yes
Proteaceae	<i>Grevillea australis</i>				
Proteaceae	<i>Grevillea lanigera</i>				
Proteaceae	<i>Grevillea victoriae</i> subsp. <i>nivalis</i>				
Proteaceae	<i>Hakea microcarpa</i>				
Proteaceae	<i>Persoonia chamaepeuce</i>				
Ranunculaceae	<i>Ranunculus amphitrichus</i>				
Ranunculaceae	<i>Ranunculus graniticola</i>				
Ranunculaceae	<i>Ranunculus producta</i>				
Ranunculaceae	<i>Ranunculus scapiger</i>				
Restionaceae	<i>Baloskion australe</i>				
Rosaceae	<i>Acaena novae-zelandiae</i>				
Rosaceae	<i>Potentilla recta</i>				Yes

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State Act)	Exotic/ pest
Rosaceae	<i>Rubus parviflorus</i>				
Rubiaceae	<i>Asperula gunnii</i> (glabrous form)				
Rubiaceae	<i>Asperula gunnii</i> (type form)				
Rubiaceae	<i>Asperula pusilla</i>				
Rubiaceae	<i>Coprosma hirtella</i>				
Rutaceae	<i>Boronia nana</i> var. <i>hyssopifolia</i>				
Rutaceae	<i>Leionema lamprophyllum</i> subsp. <i>lamprophyllum</i>				
Rutaceae	<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>				
Santalaceae	<i>Exocarpos strictus</i>				
Scrophulariaceae	<i>Verbascum thapsus</i> subsp. <i>thapsus</i>				Yes
Scrophulariaceae	<i>Verbascum virgatum</i>				Yes
Stylidiaceae	<i>Stylidium montanum</i>				
Thymelaeaceae	<i>Pimelea glauca</i>				
Thymelaeaceae	<i>Pimelea ligustrina</i> subsp. <i>ciliata</i>				
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>caesia</i>				
Violaceae	<i>Viola betonicifolia</i>				
Violaceae	<i>Viola fuscoviolacea</i>				
Violaceae	<i>Viola hederacea</i> subsp. <i>hederacea</i>				
Winteraceae	<i>Tasmannia xerophila</i> subsp. <i>xerophila</i>				