Geographical History and Flora of the Gariwerd and Burrunj Landscapes

Rod Bird & Diane Luhrs

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Cover photo:

Pultenaea subalpina (Rosy Bush-pea) on the Major Mitchell Plateau.
This is one of many endemic species for Gariwerd and the only purple-flowered member of the bush-pea family.

Photo below:

Dillwynia oreodoxa (Grampians Parrot-pea) at Bundaleer.
This is also an endemic species in Gariwerd.

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Introduction

The Gariwerd/Grampians National Park, with its westerly sandstone outlier Burrunj/Black Range, is truly one of the scenic and botanic wonders of Victoria and the nation. Some of its visual splendours have been presented by Pouliot & Wettenhall (2006) and by Mitchell & Hannan in their forthcoming book of art works from the area. Douglas & O'Brien (1971), Cochrane *et al*. (1973), Elliot (1975), Heuston (1979), McCann (1994), Calder (1987), Costermans (2006), Wilkie (2020) and others have introduced us to the flora and environmental history. Bechervaise & Hay (1971), Thomas (1986), M & P Coleman (2021) and Luhrs (2020) have provided guides for exploring various parts of the ranges. Information from Cayley & Taylor (1997) and other geologists concerning the geology and formation of the Gariwerd and Burrunj ranges has been presented by Costermans & VandenBerg (2022).

The Gariwerd and Burrunj ranges and plains are home to about 970 species of flowering native plants, almost a third of the native flora of Victoria. That total includes about 105 species of orchids (from Backhouse 2023). If we add the floras of Grimgundidj (Dundas Range) and Mt Arapiles – both of similar geological origin – then the total number of native species/subspecies in the Grampians Bioregion is at least 1100. At least 46 species, subspecies (subsp.) or varieties (var.) are 'endemics' to Gariwerd and Burrunj (Western Black Ra) – i.e. they do not occur naturally anywhere else.

The following discussion concerns the origins of this wonderland of floral species, with reference to Christophel (1993), Conn (1993), Costermans & VandenBerg (2022) and White (1986), with some indication of the species you might see now on various forays into the Gariwerd & Burrunj areas.

Origin of the native flora

The flora has adapted over a very long time to the infertile siliceous soils eroded and weathered from shales, sandstone, mudstone, siltstone and minor areas of granite. The impoverished soils and skeletal sandstone ranges are the principle reasons why the major part of this landscape was not alienated for agriculture. The Gariwerd National Park was gazetted in 1984 and is a magnificent treasure of flora, fauna and Aborigine culture that we have by accident, despite colonial and more recent exploitation.

The sediments that were later to become the sandstones and mudstones of the Grampians Group were laid down in braided rivers and shallow seas of the Gondwana Supercontinent in the south polar region during the Silurian-Devonian period, about 440–410 million years ago (Ma).

A little later, around 410–400 Ma, the uplifted Gariwerd rocks were extended and rotated along major horizontal faults that developed between the rocks and the underlying Cambrian-aged bedrock. Parts of the bedrock at great depth melted and the magma intruded the upper bedrock and, in places, deformed the Grampians Group sediments. Where the magma cooled within the bedrock and Grampians Group it formed granite masses and thin sheets of porphyry.

For nearly 200 million years, between the Devonian and the Jurassic periods (360-145 Ma), most of the Gariwerd succession was eroded to almost a flat plain, exposing granite in the Victoria Valley, Mafeking and Zumsteins. On the Mt William Range there is a remnant of this ancient plain, the Major Mitchell Plateau.

The original conifer, cycad fern and ginkgo flora established in the warm and wet Jurassic period (208-144 Ma) and flourished through the Cretaceous period (146-65 Ma). In what is now Victoria, the Angiosperms (flowering plants) first appeared in the mid-Cretaceous period when Gondwana began to break up. The gradual rift-separation of Australia from Antarctica was marked by an uplift of the rift flanks and the eroded Gariwerd rocks were reborn as mountains. Since then, erosion of the softer, tilted mudstone and siltstone layers has incised the flanks of the uplifted mountains to form deep valleys, with the tilted sandstone layers left to form the main ranges.

After Australia separated from Antarctica about 45 Ma and drifted north, there was a period of 30 million years when the sclerophyllous eucalyptus, acacia, casuarina, banksia, grass tree and hummock grasses

developed in isolation and by the Pleistocene (2.6-0.012 Ma) largely replaced the Antarctic Beech and Gymnosperms, except in some wet coastal areas of eastern Australia.

The other major factor influencing the flora of the Gariwerd ranges and plains is its long period of isolation after the sea rise in about 8 Ma that left the Gariwerd and Burrunj ranges as a promontory in a shallow sea that extended into NSW. Islands at that time were nearby Grimgundidj and the more distant Mt Arapiles. The granite Pyrenees to the NE (e.g. Mt Langi Ghiran, Buangor, Ben Nevis and Mt Cole) were part of the north eastern land mass not flooded, to which the Gariwerd ranges were probably connected.

At about 5 Ma there was a rise in the land mass (or a drop in sea level) causing a retreat of the sea from the plains in Western Victoria. Considering the Gariwerd landscape, apart from minor outcrops at nearby Mt Arapiles, Burrunj and Grimgundidj, there is no similar sandstone landscape/rock. With the exception of Mt Cavendish, a large rhyolyte hill (405 Ma) a few km south-west of the Billawin (Victoria) Range, there were no volcanic 'islands' to the south, east or west near enough to contribute flora to the Gariwerd ranges in the period after the retreat of the sea. Conversely, the Gariwerd ranges were a repository of plants that might spread across landscapes where plants had been lost to the sea. The oldest volcanic basalt peaks in the region to the south and east were formed from 2-4 Ma, long after the retreat of the sea. Basalt lava of that age flowed into the Victoria Valley and edges of southern parts of the ranges, diverting streams. Nearby volcanoes, such as Kolor (Mt Rouse) (0.35 Ma) and Tapoc (Mt Napier) (0.03 Ma) appeared much later on the volcanic plain.

Aborigine burning practices from perhaps as long ago as 65,000 years may have induced some long-term changes to the vegetation of the Grampians, although there is little historical evidence that fire was routinely applied in the ranges. The fire-practices of the white settlers and modern managers may have had a greater overall impact. Dense shrubberies of a few flammable species in what were once more open woodlands may be the result of frequent large fires lit to produce 'green pick' for sheep or, ironically, with the objective of reducing the risk to lives and commercial and personal assets in and adjacent to Gariwerd. The logging of the forests and establishment of large pine plantations from 1926 at Mt Difficult and 1964 at the Billywing (Heuston 1979; Land Conservation Council 1980), and grazing by sheep, cattle and feral herbivores (goats, deer and rabbits), has certainly had an impact.

The Gariwerd-Burrunj landscape is a series of steep-sided ranges of hard, gently-dipping sandstone alternating with valleys cut in softer red-brown shales. Some of the broader valleys are in granites that underlie the sandstones. Sheets of alluvial sand have washed out from the hills onto the plains. The plant communities that have developed on this varied landscape include sub-alpine herb-fields, tall forests on the eastern flanks of the high ranges, woodlands, heaths, fern gullies and marshes.

Based on Costermans and VandenBerg (2022), there are 6 major environments for flora in Gariwerd:

1. Exposed sandstone rises above 1000 m asl
2. Colluvium slopes from the rocky summits
3. Deep sheltered gullies and streams
4. Granite outcrops
5. Outwash fans of sand and silt
6. Poorly drained flats and swamps between/away from the ranges

The plant communities that developed in those Gariwerd environments can be briefly indicated as follows, based on the presentation by Conn (1993):

1. **Sub-alpine low open-woodlands/shrublands** – the highest peaks have patches of sub-alpine heaths, stunted *Eucalyptus baxteri*, *E. serraensis*, *E. pauciflora*, *E. goniocalyx* and *Callitris rhomboidea*. *Banksia saxicola* and *Prostanthera lasianthos* var. *subcoriacea* are small trees that also occur here, the latter with isolated appearances on exposed summits and upper slopes.
2. **Rocky outcrop woodland** – upper rocky slopes, often with large areas of bare rock, may have *Eucalyptus alaticaulis*, *E. baxteri*, *E. goniocalyx* and *Callitris rhomboidea*. Shrubs include *Dodonaea viscosa* subsp. *cuneata*, *Leptospermum turbinatum*, *Melaleuca decussata* and *Calytrix tetragona*. *Prostanthera lasianthos* var. *lasianthos* is found in the moist gullies.
3. **Dry forests** – medium-sized trees (e.g. *Eucalyptus baxteri*, *E. obliqua*, *E. alaticaulis*, *E. goniocalyx*, *E. aromaphloia* or *E. melliodora* occur on middle and lower slopes of the ranges and

the outwash slopes. *Hakea* species dominate drier areas. The lower slopes generally have a heath understorey with a great many species present.

4. **Wet sclerophyll forest** – tall open forest dominated by *Eucalyptus obliqua* and *E. alaticaulis* on high rainfall areas on the eastern slopes of Billawin and Serra Ranges, Lake Wartook, Delleys Dell at Dairy Ck and near the Major Mitchell Plateau. Smaller trees are *A. melanoxylon*, *Pomaderris apetala* subsp. *apetala*, *Prostanthera lasianthos* var. *lasianthos* and *Dicksonia antarctica*. The 'mixed species', *Eucalyptus obliqua, E. baxteri*, *E. alaticaulis* and *E. viminalis*, were the species logged from about 1930 to 1990 and few large, old trees were left in the logged areas (Land Conservation Council Victoria 1980).
5. **Heath woodland/sclerophyll woodland** – nutrient-poor outwash slopes with *Eucalyptus baxteri, E. obliqua, E. goniocalyx, E. aromaphloia,* or *E. falciformis* with some *Callitris rhomboidea*, *Banksia marginata* and a dense understorey of shrubs (including bush-peas of *Pultenaea, Dillwynia* and other genera) and heath plants such as *Styphelia adscendens, S. humifusa Stenanthera pinifolia, S. conostephioides*, *Brachyloma daphnoides* and *Styphelia ericoides*. *Banksia ornata* occurs on some areas of sand. *Eucalyptus ovata, Leptospermum scoparium, Melaleuca squamea* and *Pomaderris* sp. are found on moist areas.
6. **Swamplands and wet heathlands** – areas around water storages and natural low-lying clay areas with impeded drainage (e.g. Wannon and Glenelg River headwater flats). The main tree species are *Eucalyptus camaldulensis, E. aromaphloia, E. falciformis* with *Banksia marginata*. The shrubs include *Allocasuarina palludosa*, *Gahnia sieberiana, Hakea rostrata, Leptospermum continentale, L. lanigerum, L. scoparium, Melaleuca decussata, M. squarrosa* and *Sprengelia incarnata*. *Callistemon rugulosis* occurs on wet sandy flats on some northern and western areas.
7. **Grassy woodland –** *Eucalyptus camaldulensis* and sometimes other eucalypts such as *E. melliodora, E. leucoxylon* and *E. ovata* grow on clay flats between or on the edges of the ranges. The 'durable species' (*E. camaldulensis* and *E. leucoxylon*) were logged from about 1880 to provide sleepers and posts (Land Conservation Council Victoria 1980). Other trees that can occur include *Allocasuarina verticillata*, *Allocas. luehmannii* and *Callitris rhomboidea.* The shrub layer often has *Acacia verniciflua* and *Brachyloma daphnoides* present and the ground layer is predominantly herbaceous, dominated by grasses and low shrubs/groundcover species such as *Hibbertia* spp., *Stenanthera conostephioides* and *Styphelia humifusa*.

The large number of species that may be found in Gariwerd has been greatly influenced by the N-S orientation over about 70 km, with average rainfall varying from 500 to 700 mm from N to S. High altitude areas receive perhaps 1000 or more mm annually; periodically Duwul (Mt William) and the Major Mitchell Plateau also receives snow. The elevated area of the Mt William Range contains several endemics, including *Grevillea confertifolia*, *Pultenaea subalpina* and *Eucalyptus pauciflora* subsp. *parvifructa*. *Celmisia pugioniformis* (Snow Daisy), a species from the eastern Alps, is also found there.

The variation in altitude may alter peak flowering times. A drive up the road to the Duwul parking area in November-early December – and the 2-km walk to the 1167 m asl summit – will reveal a magnificent display of plants in flower long after most at lower levels have finished flowering.

Significant flora in Gariwerd and Burrunj

VicFlora (Royal Botanic Gardens Victoria) is regarded here as the authority on flora in Victoria. We have used the most recent accepted botanical and common plant names. However, many species do not have an official common name and those given by others (such as Ian McCann) have been used.

While extensive, the lists of plants that are given here are not exhaustive and favour those with restricted distribution and visual prominence. Attractive plants that are well known and widespread in Victoria may not have been given prominence.

The flora of Gariwerd/Burrunj includes at least 46 endemic species/sub species/varieties:

- *Allocasuarina grampiana* Grampians Sheoak
- *Allocasuarina mackliniana* subsp. *hirtilinea* Western Sheoak (Mt Zero & Billawin Range)
- *Bauera sessiliflora* Grampians Bauera (on stream margins)
- *Bertya grampiana* Grampians Bertya (riparian areas of the Billywing)
- *Boronia latipinna* Grampians Boronia
- *Borya mirabilis* Grampians Pincushion Lily (v. rare, Wonderland Range)

- *Bossiaea rosmarinifolia* Grampians Bossiaea (also in Burrunj)
- *Caladenia grampiana* Grampians Spider Orchid
- *Caleana disjuncta* Grampians Duck-orchid (v. rare)
- *Dillwynia oreodoxa* Grampians Parrot-pea
- *Epacris impressa* var. *grandiflora* Grampians Heath
- *Eucalyptus alaticaulis* Grampians Grey Gum
- *Eucalyptus pauciflora* subsp. *parvifructa* Mt William Snow Gum (Mt William Range)
- *Eucalyptus serraensis* Grampians Stringybark (northern Serra Range & Wonderland Range)
- *Eucalyptus verrucata* Mt Abrupt Stringybark (Mirranatwa Gap, Mud-dadjug in Serra Range)
- *Eucalyptus victoriana* Victoria Range Stringybark (Billawin Range)
- *Grevillea confertifolia* Grampians Grevillea (Major Mitchell Plateau)
- *Grevillea dimorpha* Flame Grevillea (Serra Range, Mt William Range)
- *Grevillea gariwerdensis* Gariwerd Grevillea (in low, moist heath on sandy soils)
- *Grevillea microstegia* Mt Cassell Grevillea (Mt William Range)
- *Hibbertia cistiflora* subsp. *rostrata* Rock Rose Guinea-flower (on summits in Gariwerd)
- *Hovea corrickiae* Glossy Hovea (Billawin & Mt. William Range; also in Burrunj)
- *Hovea rosmarinifolia* Rosemary Hovea (dry, rocky woodland at Mt. Difficult)
- *Leionema bilobum* subsp. *bilobum* Notched Bilobum (heathy woodland, northern Gariwerd)
- *Leionema bilobum* subsp. *thackerayense* Mt Thackeray Bilobum
- *Lepyrodia flexuosa* Twisting Scale-rush (also in Burrunj and an outlier east of Gariwerd)
- *Leucopogon thymifolius* Thyme Beard-heath (Gariwerd ranges and at Pomonal)
- *Monotoca billawinica* Grampians Broom-heath (high on Billawin & Mt Difficult Ranges)
- *Pimelea pagophila* Grampians Rice-flower
- *Platylobium alternifolium* Victorian Flat-pea (east-facing slopes)
- *Pomaderris apetala* subsp. *apetala* Grampians Pomaderris
- *Prostanthera lasianthos* var. *subcoriacea* Christmas Bush
- *Pterostylis macilenta* Grampians Greenhood
- *Pultenaea costata* Ribbed Bush-pea
- *Pultenaea luehmannii* Thready Bush-pea
- *Pultenaea maidenii* Maiden's Bush-pea (from SW side of Billawin in 1906 extinct?)
- *Pultenaea patellifolia* Mount Byron Bush-pea (only in Burrunj)
- *Pultenaea subalpina* Rosy Bush-pea (Mt William Range)
- *Pultenaea victoriensis* Billawin Bush-pea (Billawin Range)
- *Pultenaea williamsoniana* Williamson's Bush-pea
- *Sphaerolobium acanthos* Grampians Globe-pea (rare; Halls Gap, Duwul, Victoria Valley)
- *Stylidium soboliferum* Bristly Triggerplant (also in Burrunj)
- *Spyridium daltonii* Grampians Spyridium (woodlands and moist forests in central Gariwerd)
- *Spyridium x ramosissimum* Branched Spyridium (hybrid of *S. daltoni* & *S. parvifolium*)
- *Thryptomene calycina* Grampians Thryptomene (also in Burrunj)
- *Zieria oreocena* Grampians Zieria (a rare shrub in northern Gariwerd)

The bush peas (*Fabaceae* family) contribute 13 endemic species, about 28% of the endemic taxons in the park. The *Proteaceae* family has 4 endemic *Grevillea* species, so that about 37% of the endemic species are found from these two families.

Twelve other interesting plants either have been or might be described as endemic to Gariwerd-Burrunj but they do have outlier populations in western Victoria that are not far distant:

- *Asperula minima* Mossy Woodruff – also at Ararat, French Island & Mt Buffalo
- *Callistemon wimmerensis* Wimmera Bottlebrush – Wannon River fan in SE corner of Gariwerd at Brady Swamp, along McKenzie Ck & Glenelg River west of Balmoral
- *Correa lawrenceana* var. *grampiana* Grampians Mountain Correa – high, exposed sites (e.g. Duwul & Mt Langi Ghiran)
- *Correa reflexa var. angustifolia* Grampians Correa – found also in the Stawell area
- *Daviesia laevis* Grampians Bitter-pea – also at Mt Cole in montane gullies
- *Eucalyptus goniocalyx* subsp. *viridissima* Rock Bundy – Gariwerd, Burrunj & Mt Arapiles

- *Leptospermum turbinatum* Shiny Tea-tree – common on sandstone and granite outcrops in Gariwerd, Mt Langi Ghiran, Buangor & Ben Nevis
- *Leucopogon neurophyllus* Veined Beard-heath – also in Mt Langi Ghiran & Ben Nevis
- *Philotheca angustifolia* subsp. *montana* Narrow-leaf Wax-flower (Mt Zero, Flat Rock, Golton Gorge, Burrunj & Lawloit Range (Western Highway west of Nhill)
- *Prasophyllum maccannii* McCann's Leek Orchid – northern Gariwerd, Deep Lead, Stawell
- *Pterostylis planulata* Grampians Rustyhood – also sparse records in Big & Little Deserts
- *Pultenaea daltonii* Hoary Bush-pea – also Burrunj, Little Desert & Portland forest areas

At least 35 flora species/subsp./var. in Gariwerd have disjunct distributions at other distant places, so perhaps their presence in Victoria was much greater before the period of oceanic isolation.

- *Allocasuarina misera* Slender Sheoak – also in the Anglesea & Sale areas
- *Allocasuarina paradoxa* Green Sheoak – also at Westernport & Wilsons Promontory
- *Asterolasia phebalioides* Downy Star Bush – also Little Desert & in SA
- *Banksia saxicola* Rock Banksia – on sheltered slopes and gullies in Gariwerd and on coastal granites at Wilsons Promontory
- *Caladenia alpina* Mountain Caladenia – mountains in eastern Victoria
- *Callitris rhomboidea* Oyster Bay Pine – Grampians Bioregion, Mallee sandhills, far east Vic, SA, NSW, Qld, Tas
- *Conospermum mitchellii* Victorian Smoke-bush – also Burrunj, Dundas Ra, Lower Glenelg NP, far SW heaths and at Anglesea
- *Celmisia pugioniformis* Snow Daisy – on Major Mitchell Plateau & alpine/sub-alpine herbfields, heaths, bogs and woodlands in the snowfields of Vic & NSW
- *Chaetospora turbinata* a Bog-rush – Anglesea, Cape Liptrap, Howe Range, Qld, NSW, Tas
- *Cyphanthera anthocercidea* Large-leaf Ray-flower – also Burrunj, Mt Arapiles, Gippsland
- *Davallia solida var. pyxidata* Hare's Foot Fern – Burrunj cliffs; also NSW & Qld
- *Epacris lanuginosa* Woolly-style Heath – Wartook Res. area; coastal Vic, NSW, Tas
- *Eucalyptus falciformis* Western Peppermint – also coast west from Anglesea to SA border
- *Gahnia ancistrophylla* Donkey Saw-sedge – Asses Ears in Gariewerd; also WA & SA
- *Gonocarpus mezianus* Hairy Raspwort – Gariwerd area; also in SA
- *Goodenia lineata* Grampians Goodenia – also Mt Clay and Lower Glenelg National Park
- *Hakea teretifolia* subsp. *hirsuta* Dagger Hakea – also west of Melbourne to far east coast
- *Hibbertia humifusa* subsp. *humifusa* Rising Star Guinea-flower – northern Gariwerd, Deep Lead & Mt Ida (Heathcote)
- *Howittia trilocularis* Blue Howittia – Billawin, Burrunj, Mt Arapiles & eastern Victoria
- *Lasiopetalum macrophyllum* Shrubby Velvet-bush – also in Tas, NSW, eastern Victoria
- *Lepidosperma forsythii* Large-flowered Rapier-sedge –also Otway, Gippsland, NSW, Tas
- *Lycopodiella serpentina* Bog Clubmoss – also Otway, French is. Gippsland & all States
- *Olearia suffruticosa* Clustered Daisy-bush – swampy heaths at Glenisla, Casterton-Dergholm
- *Phlegmariuris varius* Long Clubmosss – also Otways, Wilson's Prom., Gippsland, Qld, NSW, Tas, NZ
- *Prostanthera hirtula* Hairy Mint-bush – Ballarat, N of Melbourne, Alps & Gippsland
- *Prostanthera saxicola* var. *bracteolata* Slender Mint-bush – Bendigo, Melbourne & Bairnsdale areas
- *Prostanthera spinosa* Spiny Mintbush – sandy rocky areas northern Gariwerd, SA, NSW
- *Pultenaea benthamii* Bentham's Bush-pea – also Mt Kaye & Howe Ra. in east Gippsland
- *Pultenaea graveolens* Scented Bush-pea – also SA, Brisbane Ra., Ngambie, Castlemaine
- *Psilotum nudum* Skeleton Fork Fern – in rock crevices at Mura Mura/Mt Zero, Mt Arapiles and parts of East Gippsland. The ancestor of this primitive plant developed 410 Ma.
- *Senecio hypoleucus* Pale Fireweed – at Burrunj, Mt Arapiles & SA
- *Spyridium cinereum* Tiny Spyridium – NE Gariwerd; coast west of Mallacoota; also NSW
- *Swainsona brachycarpa* Slender Swainson-pea – in Vic only in Gariwerd; NSW & Qld
- *Tetrarrhena turfosa* Smooth Rice-grass – eastern Vic & NSW
- *Westringia glabra* Violet Westringia – northern Gariwerd, Lerderderg Gorge, East Gippsland

Scenic drives in Gariwerd and Burrunj

To conclude, six suggested drives into and through the Gariwerd National Park (and one visit to the Burrunj State Park) will provide an opportunity to see much of the flora in these parks.

Dunkeld to Halls Gap, with a diversion to Duwul/Mt William

The tourist road from Dunkeld to Halls Gap provides a visitor with multiple experiences of landscape and flora. First, Wurgarri/Mt Sturgeon and then the looming mass of Mud-dadjug/Mt Abrupt. Both offer excellent, stiff walks to their summit and a wealth of flowers along the way. After a fire the flowering stems of *Xanthorrhoea australis* may be seen in their thousands on the hill side. The trees here are *Eucalyptus obliqua, E. baxteri* and *Callitris rhomboidea*. Further north are wet heaths and, in winter-spring, the flowers of *Epacris impressa*, *Stenanthera conostephioides*, *Leptospermum myrsinoides*, *Calytrix tetragona*, *Banksia marginata* and a host of other species. At Jimmys Creek camp area the *Eucalyptus baxteri* gives way to tall *E. viminalis*.

Approaching the turn-off to Duwul/Mt. William are many wattles: *Acacia mucronata, A. myrtifolia, A. oxycedrus, A. mearnsii, A. melanoxylon* and *A. verticillata*. On the road to the Duwul car park, look for *Kunzea parvifolia, Melaleuca decussata, Grevillea alpina, G. aquifolium, Leptospermum turbinatum, Boronia latipinna, Conospermum mitchellii, Pimelea linifolia, Patersonia occidentalis, Utricularia dichotoma, Euphrasia collina* and many other colourful species.

Walking to the summit of Duwul, look for *Calytrix alpestris, Pultenaea subalpina, P. benthamii, P. laxiflora, P. mollis, Leptospermum turbinatum, Pimelea pagophila, Dillwynia oreodoxa, D. sericea, Tasmannia lanceolata, Leucopogon neurophyllus, Banksia saxicola* and *Caladenia alpina*.

At Lake Bellfield *Eucalyptus rubida* makes an appearance; this is a tall tree with a smooth, white trunk.

Wulbuwa/Woohlpooer to Harrops Tk and Jardwadjali/Buandik Camp Ground

Another scenic approach to Gariwerd is from the SW off the Henty Highway in the River Red Gum woodland at Wulbuwa. These trees in the State Forest adjoining the park dominate the landscape. In spring the open understorey is a carpet of gold and purple from flowering *Bulbine bulbosa* and *Arthropodium strictum*, with many orchid species also present.

The Glenelg River Rd leads east to Harrops Tk and thence to the Jardwadjali Picnic area. Billawin Range is on the right and one travels through many kilometres of woodland and heath, crossing several streams. Look for *Calectasia intermedia, Daviesia brevifolia, Pultenaea scabra, Dillwynia sericea, Pigea floribunda, Hovea linearis, Comesperma volubile, Acacia myrtifolia, Glossodia major, Thelymitra benthamiana* and other orchids in the heaths. At the streams, look for *Bauera sessiliflora* and *Marianthus bignoniaceus. Banksia ornata* and *Thryptomene calycina* are seen on the walk to Manja rock art shelter.

On the walk to the Jardwadjali Falls and Billimina Shelter, when crossing the Billimina Ck look for the endemic *Ziera oreocina*. Further along, in spring, *Pterostylis curta* orchids may be flowering beside the track. If leaving via the road to the Henty Highway, the wet heath on the Glenisla Flats are renowned for a range of orchids. There is also a fine stand of *Banksia ornata* on a sandy rise by the highway, about 2 km south from the Billywing Rd.

Brimpaen to northern Gariwerd Troopers Ck area in northern Gariwerd

The northern Gariwerd ranges provide views of wildflowers in bloom earlier than seen to the south. Access from the Henty Highway at Brimpaen to Roses Gap Rd leads to Troopers Ck and the Gar Falls and Beehive Falls walks. Plants there include *Acacia gunnii, A. mitchellii (*a shrub with bipinnate leaves), *A. ulicifolia, A. genistifolia, A. longifolia, Hakea teretifolia, Brachyloma ericoides, Correa aemula, Stylidium soboliferum, Acianthus exsertus* and many more. Further along Roses Gap Rd the Mt Zero-Halls Gap Rd takes one north to Mura Mura/Mt Zero, Gunigalg/Mt Stapleton and Wudjub-guyun/Hollow Mountain.

Halls Gap to Mura Mura, Gunigalg and Wudjub-guyun in northern Gariwerd

The Mt Zero-Halls Gap Rd takes one north to Mura Mura/Mt Zero, Gunigalg/Mt Stapleton and Wudjub-guyun/Hollow Mountain. These sites are near the northern extremity of Gariwerd, in a lower rainfall area and that is reflected in the flora. The main starting point for walks in the hills are the Hollow Mountain car park (walks to Summerday Valley and Taipan Wall) and Mt Zero picnic ground (walks to Flat Rock, Wudjub-guyun and Gunigalg). The display of flowers in the heathlands here in spring is spectacular.

Banksia ornata, *Euromyrtus ramosissima* subsp. *ramosissima*, *Grevillea alpina*, *Micromyrtus ciliata*, *Philotheca angustifolia* subsp. *montana*, *Pultenaea scabra*, *Stenanthera pinifolia*, *Thryptomene calycina* and *Triodia scariosa* may be seen. On the rocky areas the uncommon *Cyphanthera anthocercidea* can be found, along with *Goodenia ovata*, *Correa glabra* var. *glabra*, *Acacia ulicifolia*, *Calytrix alpestris*, *Eucalyptus alaticaulis* and *E. goniocalyx* subsp. *viridissima*.

Glenelg River Rd to Strachans Hut and Victoria Range Rd

The Glenelg River Rd takes one through the heart of Gariwerd, where River Red Gums grow on flats near the headwaters of the Glenelg River. One giant near the old Forest Lodge on Lodge Rd was 51 m tall, perhaps the tallest in Australia, but fires in 2006 and 2013 have burned the accumulated branches/litter around its base and badly damaged it by hollowing out the butt and burning the canopy.

Stop at Strachans Hut on Sawmill Tk, an old forestry camp. Sawmill Tk leads to the Victoria Range Rd, first passing through the high rainfall zone of regrowth forest of *Eucalyptus obliqua* and *E. alaticaulis* on the eastern flank of Billawin. The trees there were logged from about 1930 to 1990. The tall regrowth forest 30 years later has some trees of diameter at breast height of more than 80 cm. No older trees survived the forestry management practices of those times. *Dicksonia antarctica*, *Pomaderris apetala* subsp. *apetala* and *Hovea corrickiae* remain in the understorey.

The 4WD Victoria Range Rd passes along the spine of Billawin, past The Fortress and Mt Thackeray (978 m asl) to the Goat Tk, where one can turn left to the Jardwadjali/Buandik Picnic area or right to get back to the Glenelg River Rd. Some interesting species on the Victoria Range Rd and/or near Mt Thackeray are *Howittia trilocularis*, *Baeckea crassifolia*, *Bauera sessiliflora*, *Boronia latipinna*, *Dillwynia oreodoxa*, *Grevillea aquifolium*, *Melaleuca squamea*, *Chiloglottis valida*, *Caladenia alpina* and *Prasophyllum odoratum*. Some very tall stringybark eucalypts (possibly *Eucalyptus victoriana*) near Mt Thackeray were too difficult to exploit in the forestry era.

Halls Gap to Stony Peak and Tower Hill at Bundaleer

A drive from Halls Gap up Mt Victory Rd to the Glenelg River Rd and then the Stony Ck Tk will take you to the Mt Rosea Tk, Stony Peak and Bundaleer. That drive goes across the high country with many species of bush-peas, including *Pultenaea mollis*, *P. scabra*, *P. costata*, *Dillwynia oreodoxa* and *D. sericea* seen along the way. A walk along the 4WD Mt Rosea Tk brings one to the Tower Hill trail. *Melaleuca squarrosa*, *Cyanothamnus nanus*, *Pimelea flava* subsp. *flava*, *Gompholobium ecostatum*, *Bauera sessiliflora*, *Marianthus bignoniaceus*, *Conospermum mitchellii and Calectasia intermedia* are some of the plants seen along the way.

Ascending the trail to Tower Hill are *Dodonaea viscosa* subsp. *cuneata*, *Hakea repullulans*, *Billardiera scandens*, *Goodenia blackiana*, *G. ovata*, *Calytrix alpestris*, *Thryptomene calycina*, *Allocasuarina grampiana*, *Coronidium scorpioides*, *Chrysocephalum baxteri*, *C. apiculatum* and many other wildflowers. Orchids include *Caladenia cucullata*, *C. iridescens* and *C. moschata*. A fine view is also had of the great Western Wall, looking west across the valley.

Djarabul/Cherry Pool to Burrunj/Black Range State Park

From Djarabul/Cherrypool on the Henty Highway, at the crossing of the Bugara/Glenelg River, the drive to HGH corner traverses areas of open *Eucalyptus leucoxylon* and *E. melliodora* woodland, with some *Allocasuarina luemannii*, *Eucalyptus goniocalyx* subsp. *goniocalyx* and *Callitris rhomboidea*. *E. microcarpa* can be found Sth from the road. The major shrub is *Acacia verniciflua*, flowering at its best in August. Groundcover plants include *Acacia aculeatissima*, *Stylidium gramminifolium*, *Pelargonium rodneyanum*, *Pultenaea pedunculata*, *Stenanthera conostephioides* and *Chrysocephalum semipapposum*.
At HGH corner the choice is to turn right through heathland to Mudadgadjiin Picnic Ground or left on the Rocklands Cherrypool Rd to the Muirfoot Track, 6 km distant. The first option takes you through patches of spectacular heathland with *Banksia ornata*, *Grevillea alpina*, *G. lavandulacea*, *Prostanthera denticulata*, *P. spinosa*, *Thryptomene calycina* and a mass of other species, ending at the picnic ground near the range. The orchids *Leporella fimbriata* and *Pterostylis parviflora* are usually in flower in winter-early spring beyond the Mugadgadjin Shelter on the walk to the range. At the foot of the range *Calytrix tetragona*, *Cyphanthera anthocercidea*, *Goodenia ovata*, *Howittia trilocularis*, *Micromyrtus ciliata* and several bush-peas may be found among the dense border of shrubs or on the mossy lower ledges. Rock art – mainly hand stencils – may be seen on several rock overhangs along the eastern face of the range.

The second option from HGH corner takes one 5.6 km south to the Muirfoot Tk, or further to the edge of the Rocklands Reservoir and ultimately to Balmoral. Either destination will, in spring, enable you to see many orchids, such as *Caladenia carnea, C. clavigera, C. moschata, C. parva, C pusilla, C. tentaculata, Diuris orientis, Thelymitra antennifera, T. ixioides, T. pauciflora* and *T. rubra.*

If one takes the 4WD Muirfoot Tk 4.8 km west one arrives at the sign for the Mt Byron Walk. The track further west can be deeply rutted and impassable in winter. The walk up to Mt Byron begins by crossing the Muirfoot Ck, which is lined with *Gleichenia microphylla, Leptospermum lanigerum, L. scoparium* and *Gahnia sieberiana*. The beautiful endemic Mt Byron Bush Pea – *Pultenaea patellifolia* – can be found among rocks from the mid-slope, flowering in late spring. The trees there include *Banksia marginata, Callitris rhomboidea, Eucalyptus baxteri* and *E. goniocalyx* var. *goniocalyx*, with groves of *Banksia ornata* on the lower slope. Interesting small shrubs include *Acacia genistifolia, A. verticillata, A. ulicifolia, Allocasuarina muelleriana, Brachyloma ericoides, Correa glabra, Hakea decurrens, Ixodia achillaeoides, Leptomeria aphylla, Persoonia chamaepeuce* and *Spyridium parvifolium.* A walk of 1-2 km west on Muirfoot Tk will also show *Micromyrtus ciliata, Thryptomene calycina* and *Pultenaea patellifolia,* a splendid flowering spectacle in spring.

Back at the Henty Highway, the Yellow Box woodland just south of Djarabul has several *Eucalyptus microcarpa* among the *E. melliodora*. Grey Box have fine grey bark.

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Appendix 1: Botanical and Common names

- *Acacia aculeatissima* Thin-leaf Wattle
- *Acacia genistifolia* Spreading Wattle
- *Acacia gunnii* Ploughshare Wattle
- *Acacia longifolia* Sallow Wattle
- *Acacia mearnsii* Black Wattle
- *Acacia melanoxylon* Blackwood
- *Acacia mitchellii* Mitchell's Wattle
- *Acacia mucronata* Narrow-leaf Wattle
- *Acacia myrtifolia* Myrtle Wattle
- *Acacia oxycedrus* Spike Wattle
- *Acacia ulicifolia* Juniper Wattle
- *Acacia verniciflua* Varnish Wattle
- *Acacia verticillata* Prickly Moses
- *Acianthus exsertus* Mosquito Orchid
- *Allocasuarina grampiana* Grampians Sheoak
- *Allocasuarina luehmannii* Buloke
- *Allocasuarina mackliniana* subsp. *hirtilinea* Western Sheoak
- *Allocasuarina misera* Slender Sheoak
- *Allocasuarina muelleriana* Slaty Sheoak
- *Allocasuarina paludosa* Scrub Sheoak
- *Allocasuarina paradoxa* Green Sheoak
- *Allocasuarina verticillata* Drooping Sheoak
- *Arthropodium strictum* Chocolate Lily
- *Asperula minima* Mossy Woodruff
- *Asterolasia phebalioides* Downy Star Bush
- *Baeckea crassifolia* Desert Baeckea
- *Banksia marginata* Silver Banksia
- *Banksia ornata* Desert Banksia
- *Banksia saxicola* Rock Banksia
- *Bauera sessiliflora* Grampians Bauera
- *Bertya grampiana* Grampians Bertya
- *Billardiera scandens* Common Apple-berry
- *Boronia latipinna* Grampians Boronia
- *Borya mirabilis* Grampians Pincushion Lily
- *Bossiaea rosmarinifolia* Grampians Bossiaea
- *Brachyloma daphnoides* Daphne Heath
- *Brachyloma ericoides* subsp. *ericoides* Brush Heath
- *Bulbine bulbosa* Bulbine Lily
- *Caladenia alpina* Mountain Caladenia.
- *Caladenia carnea* Pink Fingers
- *Caladenia clavigera* Plain-lip Spider Orchid
- *Caladenia cucullata* Hooded Caladenia
- *Caladenia grampiana* Grampians Spider Orchid
- *Caladenia iridescens* Bronze Caladenia
- *Caladenia moschata* Musky Caladenia
- *Caladenia parva* Green-comb Spider-orchid
- *Caladenia pusilla* Pygmy Caladenia
- *Caladenia tentaculata* Large Green-comb
- *Caleana disjuncta* Grampians Duck-orchid

- *Calectasia intermedia* Blue Tinsel-lily
- *Callistemon rugulosis* Scarlet Bottlebrush
- *Callistemon wimmerensis* Wimmera Bottlebrush
- *Callitris rhomboidea* Oyster Bay Pine
- *Calytrix alpestris* Snow-myrtle
- *Calytrix tetragona* Common Fringe-myrtle
- *Celmisia pugioniformis* Snow Daisy
- *Chaetospora turbinata* – a Bog-rush
- *Chiloglottis valida* Common Bird-orchid
- *Chrysocephalum apiculatum* Common Everlasting
- *Chrysocephalum baxteri* Fringed Everlasting
- *Chrysocephalum semipapposum* Clustered Everlasting
- *Comesperma volubile* Love Creeper
- *Conospermum mitchellii* Victorian Smoke-bush
- *Coronidium scorpioides* Button Everlasting
- *Correa aemula* Hairy Correa
- *Correa glabra* var. *glabra* Rock Correa
- *Correa lawrenceana* var. *grampiana* Grampians Mountain Correa
- *Correa reflexa var. angustifolia* Grampians Correa
- *Cyanothamnus nanus* Dwarf Boronia
- *Cyphanthera anthocercidea* Large-leaf Ray-flower
- *Davallia solida* var. *pyxidata* Hare's Foot Fern
- *Daviesia brevifolia* Leafless Bitter-pea
- *Daviesia laevis* Grampians Bitter-pea
- *Dicksonia antarctica* Soft Tree-fern
- *Dillwynia oreodoxa* Grampians Parrot-pea
- *Dillwynia sericea* Showy Parrot-pea
- *Diuris orientis* Wall-flower Orchid
- *Dodonaea viscosa* subsp. *cuneata* Wedge-leaf Hop-bush
- *Epacris impressa* var. *grandiflora* Grampians Heath
- *Epacris lanuginosa* Woolly-style Heath
- *Eucalyptus alaticaulis* Grampians Grey Gum
- *Eucalyptus aromaphloia* Scent-bark
- *Eucalyptus baxteri* Brown Stringybark
- *Eucalyptus camaldulensis* River Red-gum
- *Eucalyptus falciformis* Western Peppermint
- *Eucalyptus goniocalyx subsp. viridissima* Rock Bundy (Gariwerd)
- *Eucalyptus goniocalyx subsp. goniocalyx* Bundy (Burrunj)
- *Eucalyptus leucoxylon* Yellow Gum
- *Eucalyptus melliodora* Yellow Box
- *Eucalyptus microcarpa* Grey Box
- *Eucalyptus obliqua* Messmate Stringybark
- *Eucalyptus ovata* Swamp Gum
- *Eucalyptus pauciflora* subsp. *parvifructa* Mt William Snow Gum
- *Eucalyptus rubida* Candlebark
- *Eucalyptus serraensis* Grampians Stringybark
- *Eucalyptus verrucata* Mt Abrupt Stringybark
- *Eucalyptus victoriana* Victoria Range Stringybark
- *Eucalyptus viminalis* Manna Gum.
- *Euphrasia collina* Purple Eyebright
- *Euryomyrtus ramosissima* subsp. *ramosissima* Rosy Euryomyrtus
- *Gahnia ancistrophylla* Donkey Saw-sedge
- *Gahnia sieberiana* Red-fruit Saw-sedge
- *Gleichenia microphylla* Scrambling Coral-fern
- *Glossodia major* Wax-lip Orchid
- *Gompholobium ecostatum* Dwarf Wedge-pea

- *Gonocarpus mezianus* Hairy Raspwort
- *Goodenia blackiana* Black's Goodenia
- *Goodenia lineata* Grampians Goodenia
- *Goodenia ovata* Hop Goodenia
- *Grevillea alpina* Mountain Grevillea
- *Grevillea aquifolium* Holly Grevillea
- *Grevillea confertifolia* Grampians Grevillea
- *Grevillea dimorpha* Flame Grevillea
- *Grevillea gariwerdensis* Gariwerd Grevillea
- *Grevillea lavandulacea* Lavender Grevillea
- *Grevillea microstegia* Mt Cassell Grevillea
- *Hakea decurrens* subsp. *physocarpa* Bushy Needlewood
- *Hakea repullulans* Furze Hakea
- *Hakea rostrata* Beaked Hakea
- *Hakea teretifolia* subsp. *hirsuta* Dagger Hakea
- *Hibbertia cistiflora* subsp. *rostrata* Rock Rose Guinea-flower
- *Hibbertia humifusa* subsp. *humifusa* Rising Star Guinea-flower
- *Hovea corrickiae* Glossy Hovea
- *Hovea rosmarinifolia* Rosemary Hovea
- *Hovea heterophylla* Common Hovea
- *Howittia trilocularis* Blue Howittia
- *Ixodia achillaeoides* subsp. *alata* Ixodia
- *Kunzea parvifolia* Violet Kunzea
- *Lasiopetalum macrophyllum* Shrubby Velvet-bush
- *Leionema bilobum* subsp. *bilobum* Notched Bilobum
- *Leionema bilobum* subsp. *thackerayense* Mt Thackeray Bilobum
- *Lepidosperma forsythii* Large-flowered Rapier-sedge
- *Leporella fimbriata* Fringed Hare-orchid
- *Leptomeria aphylla* Leafless Currant-bush
- *Leptospermum continentale* Prickly Teatree
- *Leptospermum lanigerum* Woolly Teatree
- *Leptospermum myrsinoides* Heath Teatree
- *Leptospermum scoparium* Manuka
- *Leptospermum turbinatum* Shiny Tea-tree
- *Lepyrodia flexuosa* Twisting Scale-rush
- *Leucopogon neurophyllus* Veined Beard-heath
- *Leucopogon thymifolius* Thyme Beard-heath
- *Lycopodiella serpentina* Bog Clubmoss
- *Marianthus bignoniaceus* Orange Bell-climber
- *Melaleuca decussata* Totem-poles
- *Melaleuca squamea* Swamp Honey-myrtle
- *Melaleuca squarrosa* Scented Paperbark
- *Micromyrtus ciliata* Heath-myrtle
- *Monotoca billawinica* Grampians Broom-heath
- *Olearia suffruticosa* Clustered Daisy-bush
- *Patersonia occidentalis* Long Purple-flag
- *Pelargonium rodneyanum* Magenta Stork's-bill
- *Persoonia chamaepeuce* Dwarf Geebung
- *Philotheca angustifolia* subsp. *montana* Narrow-leaf Wax-flower
- *Phlegmariurus varius* Long Clubmoss
- *Pigea floribunda* Shrub Violet
- *Pimelea flava* subsp. *flava* Yellow Rice-flower
- *Pimelea linifolia* subsp. *linifolia* Slender Rice-flower
- *Pimelea pagophila* Grampians Rice-flower
- *Platylobium alternifolium* Victorian Flat-pea
- *Pomaderris apetala* subsp. *apetala* Grampians Pomaderris

- *Prasophyllum maccannii* McCann's Leek-orchid
- *Prasophyllum odoratum* Fragrant Leek-orchid
- *Prostanthera denticulata* Rough Mint-bush
- *Prostanthera hirtula* Hairy Mint-bush
- *Prostanthera lasianthos* var. *lasianthos* Christmas Bush
- *Prostanthera lasianthos* var. *subcoriacea* Victorian Christmas Bush
- *Prostanthera saxicola* var. *bracteolata* Slender Mint-bush
- *Prostanthera spinosa* Spiny Mint-bush
- *Psilotum nudum* Skeleton Fork Fern
- *Pterostylis curta* Blunt Greenhood
- *Pterostylis macilenta* Grampians Greenhood
- *Pterostylis parviflora* Tiny Greenhood
- *Pterostylis planulata* Grampians Rustyhood
- *Pultenaea benthamii* Bentham's Bush-pea
- *Pultenaea costata* Ribbed Bush-pea
- *Pultenaea daltonii* Hoary Bush-pea
- *Pultenaea graveolens* Scented Bush-pea
- *Pultenaea laxiflora* Loose-flower Bush-pea
- *Pultenaea luehmannii* Thready Bush-pea
- *Pultenaea maidenii* Maiden's Bush-pea
- *Pultenaea mollis* Soft Bush-pea
- *Pultenaea patellifolia* Mt Byron Bush-pea
- *Pultenaea pedunculata* Matted Bush-pea
- *Pultenaea scabra* Rough Bush-pea
- *Pultenaea subalpina* Rosy Bush-pea
- *Pultenaea victoriensis* Billawin Bush-pea
- *Pultenaea williamsoniana* Williamson's Bush-pea
- *Senecio hypoleucus* Pale Fireweed
- *Sphaerolobium acanthos* Grampians Globe-pea
- *Sprengelia incarnata* Pink Swamp-heath
- *Spyridium cinereum* Tiny Spyridium
- *Spyridium daltonii* Grampians Spyridium
- *Spyridium parvifolium* Dusty Miller
- *Spyridium x ramosissimum* Branched Spyridium
- *Stenanthera conostephioides* Flame Heath
- *Stenanthera pinifolia* Pine Heath
- *Stylidium graminifolium* Grass Triggerplant
- *Stylidium soboliferum* Bristly Triggerplant
- *Styphelia adscendens* Golden Heath
- *Styphelia ericoides* Pink Beard-heath
- *Styphelia humifusa* Cranberry Heath
- *Swainsona brachycarpa* Slender Swainson-pea
- *Tasmannia lanceolata* Mountain Pepper
- *Thelymitra antennifera* Rabbit-ears
- *Thelymitra benthamiana* Blotched Sun-orchid
- *Thelymitra ixioides* Dotted Sun-orchid
- *Thelymitra pauciflora* Blue Sun-orchid
- *Thelymitra rubra* Salmon Sun-orchid
- *Thryptomene calycina* Grampians Thryptomene
- *Triodia scariosa* Porcupine Grass
- *Utricularia dichotoma* Fairies' Aprons
- *Westringia glabra* Violet Westringia
- *Xanthorrhoea australis* Austral Grass-tree
- *Zieria oreocena* Grampians Zieria

Appendix 2. Some significant species and landscapes in Gariwerd and/or Burrunj

Dillwynia oreodoxa

Pultenaea subalpina on Major Mitchell Plateau

Thryptomene calycina

Prostanthera sp. from Burrunj

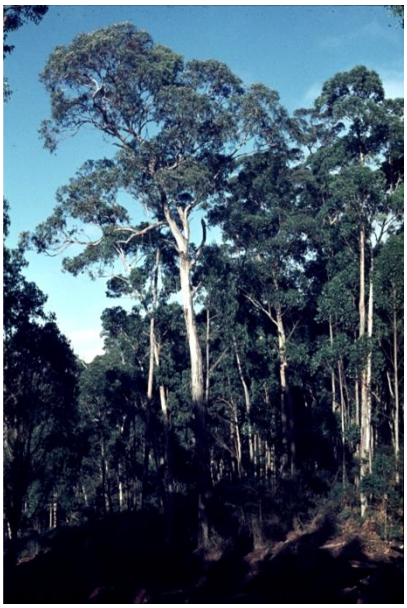
Bauera sessiliflora

Pultenaea costata

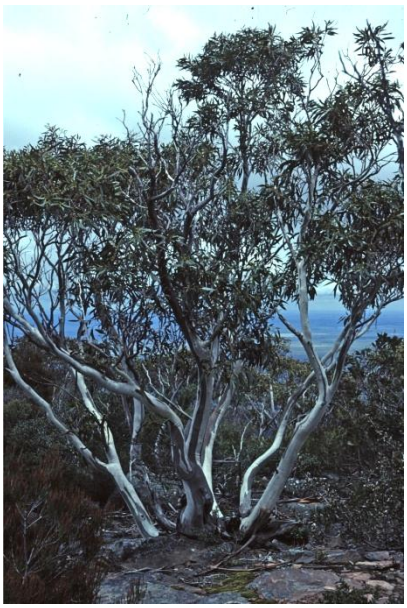
Pimelea pagophila

Boronia latipinna

Eucalyptus goniocalyx

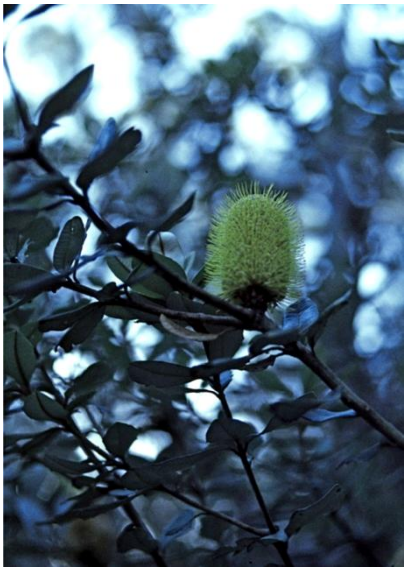


Eucalyptus alaticaulis



Eucalyptus pauciflora

Banksia marginata



Banksia saxicola

Banksia ornata

Eucalyptus camaldulensis

Tasmannia lanceolata

Leptospermum turbinatum

Grevillea dimorpha

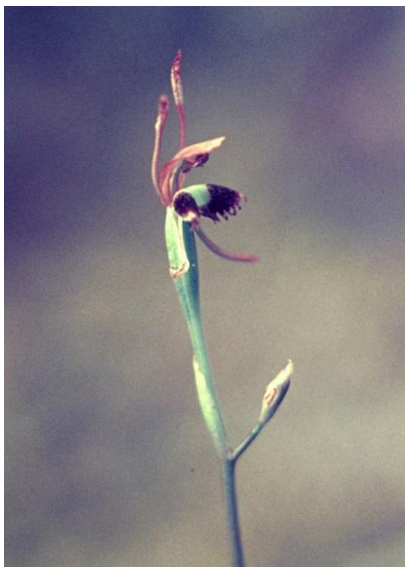
Grevillea lavandulacea

Grevillea confertifolia on Major Mitchell Plateau

Grevillea alpina

Gariwerd Red Rock, Billawin Range

Acacia verniciflua & *E. camaldulensis*, Burrunj



Leporella fimbriata

Pterostylis parviflora

Thelymitra benthamiana

Xanthorrhoea australis after fire in Jan. 2006

Calytrix at Burrunj cliffs

Epacris impressa var. *grandiflora*

Celmisia pugioniformis

Diuris orientis

Eucalyptus melliodora in Burrunj

Eucalyptus leucoxylon in Burrunj

Triodia scariosa, Serra Rd, Gariwerd

Eucalyptus serraensis at Mud-dadjug