Vascular Flora of the Peterswald Hill area, Great Victoria Desert.

Report for the Department of the Environment

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Contents

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Cover photo: *Calotis erinacea* on one of the many dunes found on the PETERSWALD sheet.

Abstract

A flora survey was conducted over the PETERSWALD map sheet from the 25th August – 9th September 2014. This survey which included some wetland sites just outside the map sheet and increased the known flora for the area to 382 taxa. One of the species collected previously (1896) was not relocated. A total of 454 collections were made of 334 taxa representing 87.7% of taxa encountered. Of the 381 taxa recorded in the current survey 70 (18.4%) were new records for the Great Victoria Desert based on FloraBase records. Seven taxa on the Department of Parks and Wildlife's Priority Flora List were encountered, one of these (*Brachyscome* sp. Wanna Munna Flats (S. van Leeuwen 4662)) has recently been re-circumscribed (now *Roebuckiella similis* P.S Short) and its current listing needs review. Only two introduced taxa were recorded *Sonchus oleracea* and *Cyperus hamulosus*. Five taxa were collected that could not be assigned to currently described species, two of these appear to have been collected for the first time (*Sclerolaena* sp. (NG & EMS 7530), *Sida* sp. (NG & EMS 7618)). A number of significant range extensions were recorded the largest was over 500 km (*Aenictophyton anomalum*). Given the access limitations and the diversity recorded in other areas where detailed floristic studies have been undertaken in the Great Victoria Desert the results of this survey should be considered preliminary. Camels appear to be having a significant negative impact on the vegetation which had not been noted in other recent surveys in the arid zone.

Introduction

Collection of information on the distribution of flora and fauna across Australia is patchy due to size of the continent, variability in climatic condition in both time and space and the general lack of accessibility in the arid zone. The Federal government has provided some assistance to State governments to undertake survey work in areas with the least amount of available biological data. These surveys target those 1:100,000 map sheets with the fewest flora and fauna records in the national biodiversity databases. As part of this program a biological survey was recently undertaken covering the PETERSWALD (3644) 1: 100,000 map sheet. This report outlines the results of the flora survey of this area.

The PETERSWALD sheet covers an area in the north western sector of the Great Victoria Desert bioregion ca. 250 km northwest of Laverton and ca. 390 km east of Wiluna (Figure 1). The map sheet is located just to the north east of Lake Wells station on Unallocated Crown Land which is not currently under Native Title claim. The study area falls entirely within GVD2 subregion and occurs close (7–60 km) to the borders of four other bioregions: the Gascoyne to the northwest, the Murchison to the west, the Little Sandy Desert to the north and the Gibson Desert to the north east (Figure 1).

The earliest European exploration of the area was the final stage of the Elder Scientific Exploring Expedition when Wells and a small team cross the map sheet in two days in March 1892 (Lindsay 1892). Cumming, a member of the expedition, made the first plant collections from the area, these collections are now housed in the Adelaide Herbarium (Figure 2). Wells named many of the geographic features of the area including Peterswald Hill from which the map sheet takes its name (Figure 2). Wells' map and journal indicate the vegetation they passed through largely comprised mulga on the rocky ridges and spinifex with desert gums, acacias, quondongs [sic] and occasional mallees on high sand dunes (Figure 2). Cumming collected a mistletoe (*Amyema preissii*) on the Ernest Giles Range and a Hopbush (*Tribulus suberosus*) on the western boundary of the sheet. In all Cumming made 65 collections comprising 45 taxa during the latter part of the Elder expedition in Western Australia.

Figure 1. Location of the PETERSWALD map sheet in the Great Victoria Desert bioregion. Neighbouring bioregions are also indicated (COO, Coolgardie; MUR, Murchison; GAS, Gascoyne; LSD, Little Sandy Desert; GD, Gibson Desert; CR, Central Ranges. Also shown are locations mentioned in text.

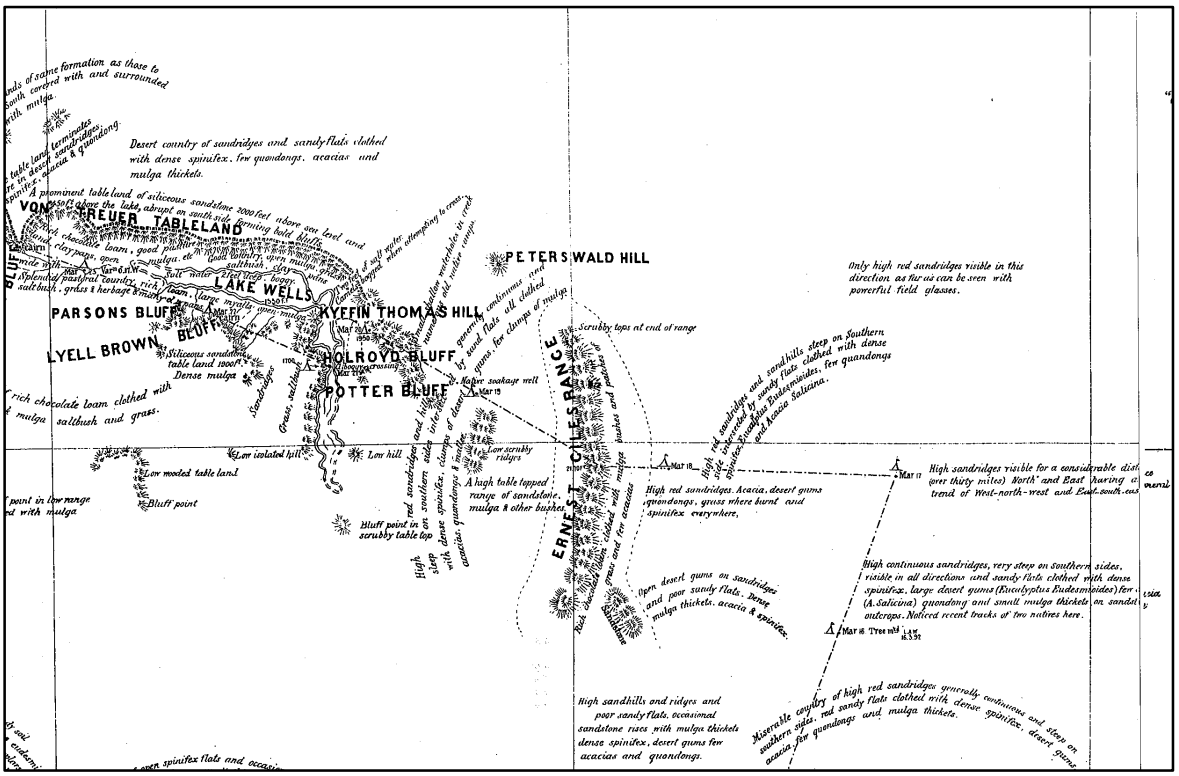

Figure 2. Excerpt from survey map produced by Elder Scientific Exploring Expedition centred on Peterswald Hill showing area covered by Wells between 16th and 23rd March 1892. Wells named many of the geographic features and gave brief descriptions of the vegetation.

Hubbe's party next traversed the area over three days in May 1896. Hubbe and his companions had been tasked with finding a stock route from Oodnadatta in South Australia to the Western Australian goldfields. While no plant collections were made Hubbe produced a very detailed map of the soils and vegetation he traversed (Figure 3) and listed 20 taxa in his journal (Hubbe 1897) from the PETERSWALD sheet, 14 of which came be identified to species level (Appendix 1). A few months later in August 1896 Carnegie crossed the Ernst Giles Range south of the PETERSWALD sheet on his epic journey north to Halls Creek and then traversed to the north and west of the area on his return journey in June 1897 (Carnegie 1898).

Frank Hann and his aboriginal companion Talbot also explored the region in February 1908 (Donaldson & Elliot 1998). Hann named the Calanchini Hills at the northern end of the Ernest Giles Range which he considered separate as well as Calanchini Creek and with Talbot established a trig on Welstead Hill near Peterswald Hill (Figure 4). While his diaries give detailed information of his routes, the naming of geographical features and the location of water, information on the flora and vegetation is meagre.

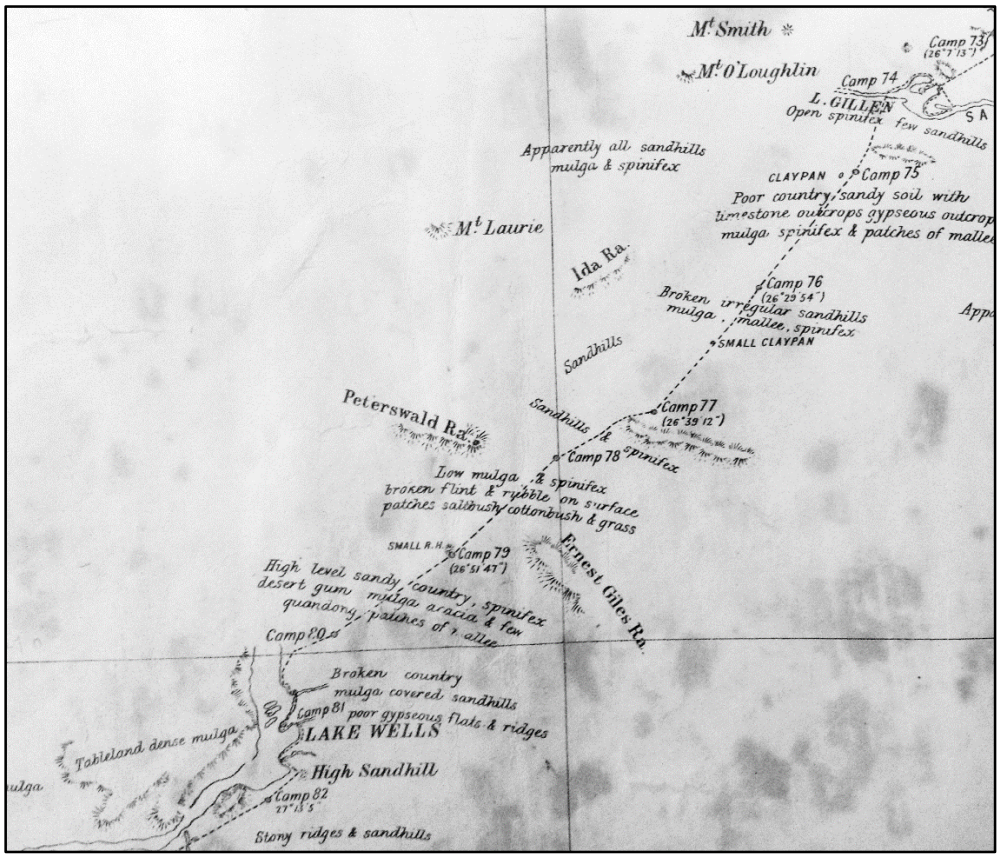

Figure 3. Excerpt from survey map produced by the Stock Route Expedition from South Australia to Western Australia centred on Peterswald Hill showing area covered by Hubbe between 6th and 14th May 1896. Hubbe's journal gave detailed descriptions of the soil and vegetation traversed.

Little further information was available until broad scale vegetation and geological mapping were undertaken some 70 years later. Geological mapping of the area was produced in the late 1970's as part of the 1: 250,000 series (Jackson 1978). Four major physiographic units were recognised on the PETERSWALD sheet; rocky uplands, sand dunes and sand plains, lateritic plain overlain in part by aeolian sand or valley fill and depressions representing relictual drainage systems.

Figure 4. Track of early exploration on the PETERSWALD sheet (red border). Tracks of Wells and Hubbe from georeferenced expedition maps, Hann's route plotted from diary entries (Donaldson & Elliot 1998). Carnegie passed just to the south east of map sheet in August 1896. Green dots indicate locations of Cumming collections (1892) and orange dot Latz collection (2010). Track traversed on current survey shown as solid line.

The rocky uplands comprise the mesas, breakaways, low hills and adjacent colluvial deposits and include the Ernest Giles Range and Peterswald and Welstead Hills. The sand dunes and sand plains cover most of the map sheet. The dunes tend to be northeast trending and generally several kilometres long. The lateritic plains are relatively uncommon being largely covered the sand dune systems. Depressions are a small component on this map sheet and were not visited during the current survey.

Beard (1974) had mapped the area some years earlier at 1: 1,000,000 scale from aerial photo interpretation and limited ground traverses of surrounding areas (Figure 5). This area falls within his Helms Botanical District (now generally referred to as the Great Victoria Desert bioregion). His broad scale map shows mulga (*Acacia aneura* sens. lat.) scrub occupying most of the upland areas (Figure 6), while the central and south eastern areas of dune swales and plains are dominated by *Eucalyptus gongylocarpa* over *Triodia basedowii* (Figure 7). The swales in similar dune systems to the northwest are dominated by mulga (Figure 8a). Beard attributes this difference to a thinner sand cover over the

Precambrian bedrock. Smaller areas of sand plain without a tree overstorey occur in the southwest. While these four formations occupy most of the map sheet, there are small additional areas of salt lake vegetation and mulga low woodland on an arm of Lake Wells in the southwest corner of the map and a band of mallee in the northeast (Figure 8b).

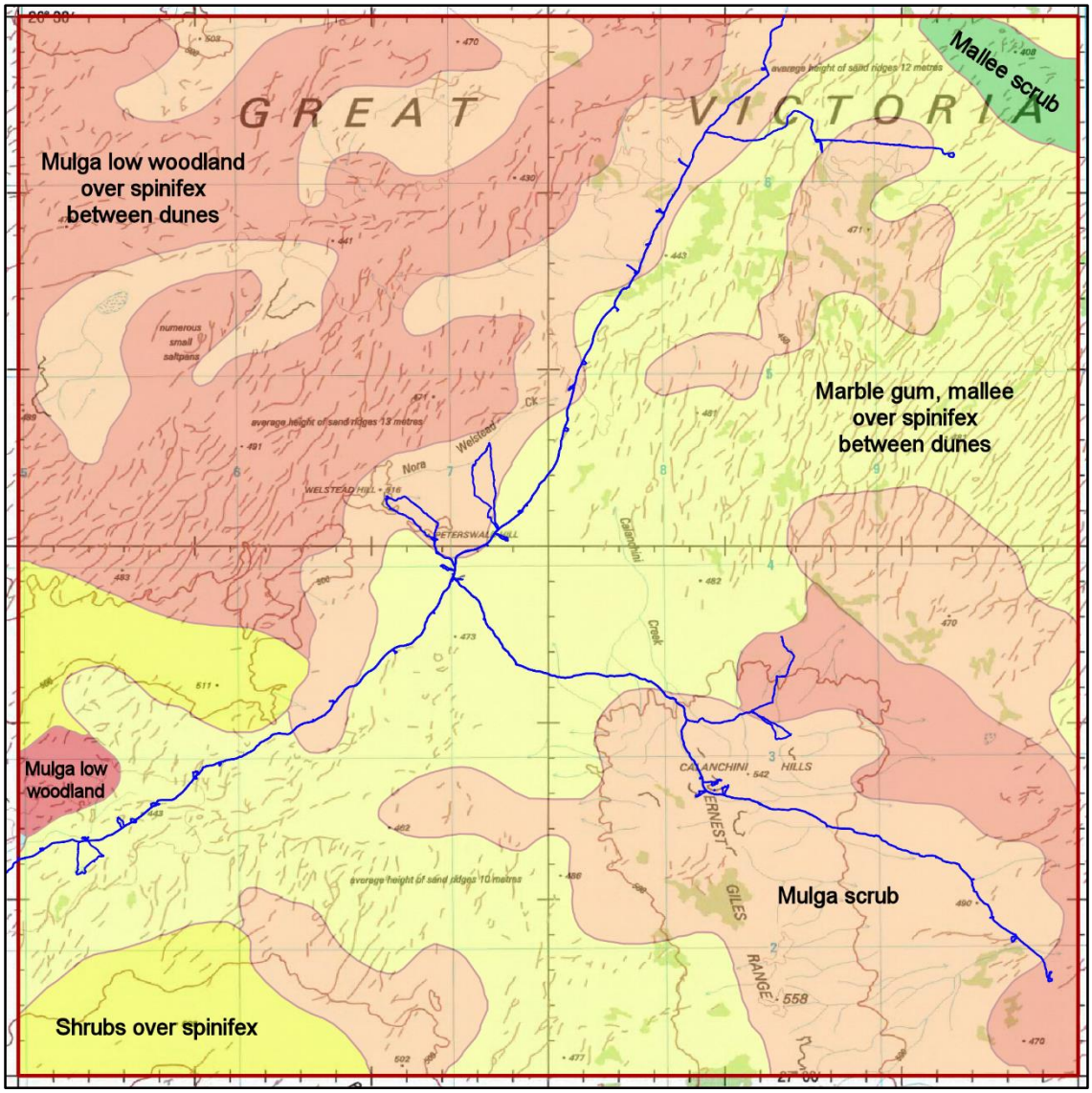

Figure 5. Beard's 1:1,000,000 vegetation mapping covering the PETERSWALD sheet. A small sliver of salt lake vegetation is also mapped in the southwest of this map sheet adjacent to the Mulga low woodland. Tracks traversed in this survey shown in as solid line.

Largely however the Great Victoria Desert has remained little studied primarily due to the difficulty of access. What studies that have been undertaken have generally been broad scale regional surveys (fauna - Burbidge *et al*. 1976, McKenzie & Burbidge 1979; flora - Newbey *et al*. 1984). The flora and vegetation of Queen Victoria Spring Nature Reserve (some 400 km to the south) is an exception and has been studied in detail (Pearson 1994). More recently there has been other detailed survey work in the southern Great Victoria Desert for the Tropicana mining development (ecologia 2009). The flora and vegetation of the PETERSWALD sheet have remained unexplored with only one recent plant collection. This collection by Peter Latz of *Eremophila platythamnos* subsp. *exotrachys* was made in 2010 from the southwest corner of the sheet (Figure 4).

Figure 6. a) Peterswald Hill lateritic sandstone mesa, remnants of Tertiary duricrust with low open mulga scrub occurring on upper slopes where soil permitted. b) Weathered kalonite exposed below breakaways carrying open mallee (here *Eucalyptus carnei*) community with scattered chenopods (*Tecticornia, Maireana*) dominating outwash plains.

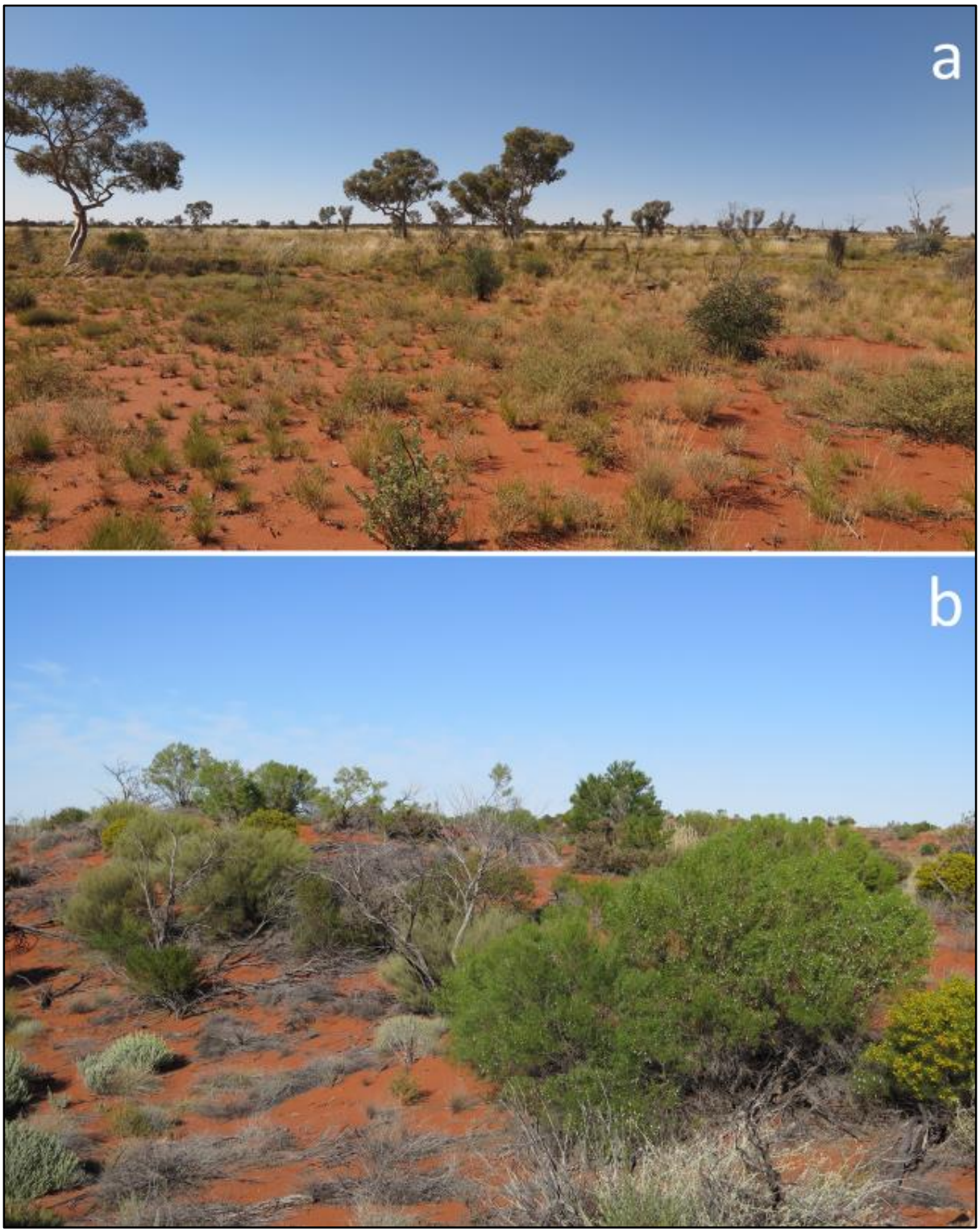

Figure 7. Large proportions of the PETERSWALD sheet are coved by sand dunes and swales. a) Swales are commonly dominated by *Eucalyptus gongylocarpa* over *Triodia basedowii*. Foreground recently burnt, sand dune forming skyline ridge. b) Dune vegetation typically included species of *Callitris, Grevillea, Eremophila,* and *Aluta* with both *Triodia basedowii* and *T. schinzii*.

Figure 8. a) In the northwest the swale vegetation was dominated by mulga over *Triodia basedowii.* b) Occasionally the swales are mallees dominated as pictured here where *Eucalyptus youngiana* forms the canopy layer over the ubiquitous *Triodia basedowii*.

Methods

Twenty five relevés ca. 0.25 ha were established and scored exhaustively for vascular flora. At 15 of these sites fauna surveys were also carried out. Collections were made at an additional 98 site within the PETERSWALD map sheet and at five sites to the west and south west of the map sheet (Figure 9). The five sites outside the primary study area represented small wetlands on the main access track where good material of uncollected species were available. All five sites were within the Great Victoria Desert bioregion. Sampling was carried out over 16 days from the 25th August – 9th September 2014. The survey used a single base camp located near the cross roads south south east of Peterswald Hill (Figure 9).

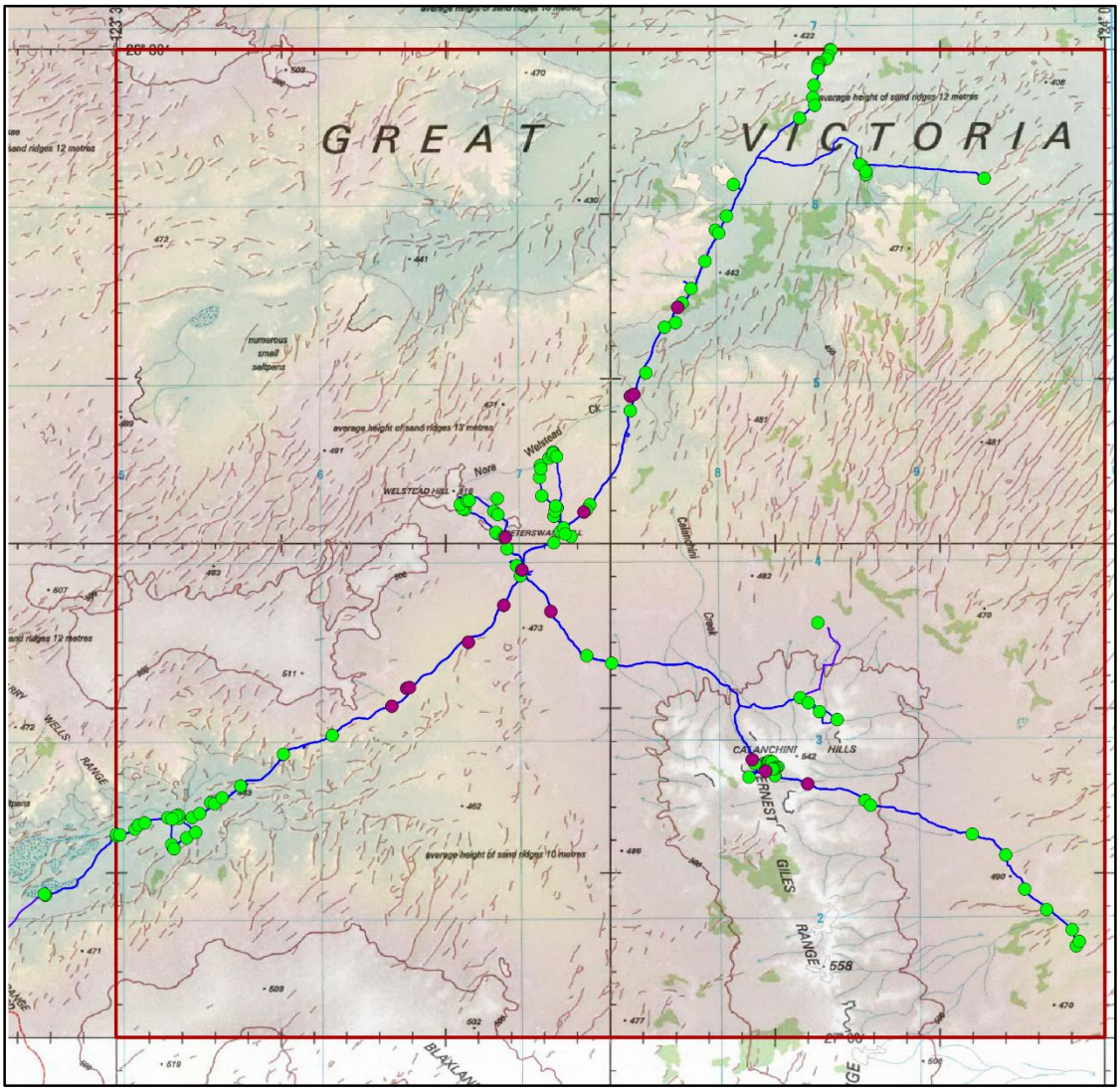

Figure 9. PETERSWALD map sheet (red borders) showing major topographic features, track traversed during survey, fauna sites (red dots) and flora collection sites (green dots). Several wetlands to the southwest of the sheet were also sampled.

As expected the landforms and vegetation patterns were found to be much more complex than suggested by Jackson (1978) and Beard (1974). On rocky uplands distinct vegetation types were found on the mesa tops, the breakaways and outwash plains (Figure 6 & 10) while the lateritic plains only outcropped in places and vegetation varied from almost bare to open shrublands dependent on soil depth (Figure 10b). The dunes were relatively consistent in species composition of the understorey although the dominant tree cover varied (Figure 7). The swale vegetation could either

be dominated by *E. gongylocarpa* or *Acacia* spp. in the mulga group or occasionally by mallee eucalypts (Figure 7 & 8). Drainage lines often comprised thicker *Acacia* woodlands with a rich herbaceous layer and small ephemeral claypans and salt lakes were locally common although highly variable in species composition (Figure 11). All of these habitats were sampled during the survey. Lack of access track precluded sampling of the large depressions mapped by Jackson (1978) in the west and northwest. Vegetation patterning was much finer than that mapped by Beard and all of his vegetation types were visited during the survey.

Wherever possible collections were made of all species of vascular flora encountered from at least two different locations, while Priority flora was collected wherever it was encountered. Collecting followed standard methods with flowering and fruiting material being pressed after each days collecting, brief description were compiled for all sites and locations determined by handheld GPS. At the 15 unbounded relevés generally 30-40 minutes was spent sampling the area. At the completion of the surveys the plant presses were dried and frozen before processing. Nomenclature follows current usage at the Western Australian Herbarium.

Once the collections had been identified the geographical range of the species was determined from distribution maps available on FloraBase (WA Herbarium (1998–); accessed May 2015). Although no taxa were found to be restricted to the Great Victoria Desert many new records for this region were documented and range extensions of > 400 km were noted.

Results

During the survey 381 taxa including varieties and hybrids were recorded and 454 collections were made of 334 (87.7%) of these taxa (Appendix 2). The most common families were Asteraceae (47 taxa), Fabaceae (47), Poaceae (39), Chenopodiaceae (39), Scrophulariaceae (21), Goodeniaceae (19), Myrtaceae (14) Malvaceae (14) and Amaranthaceae (13).

Of the 381 taxa recorded 70 (18.4%) were new records for the Great Victoria Desert in Western Australia (Appendix 2). These figures include the 26 taxa recorded from the five sites just outside the PETERSWALD sheet. These taxa are predominately wetland species (Appendix 3). The 70 taxa not previously recorded from the Great Victoria Desert were predominantly from the Asteraceae (11 taxa), Poaceae (8 taxa), Scrophulariaceae (6 taxa), Fabaceae (4 taxa).

No threatened taxa were recorded during the survey, while seven taxa on the Department of Parks and Wildlife's Priority Flora List were encountered (Table 1). The Priority Flora List is a State based list of taxa under consideration for listing as Threatened Flora. Taxa that have not yet been adequately surveyed may be added to the Priority Flora List under Priorities 1, 2 or 3 (Jones 2014). Five of these taxa had not been previously been recorded from the Great Victoria Desert bioregion, while three did not occur on the PETERSWALD sheet but were recorded from small wetlands just to the west and south west of the sheet.

Only two introduced taxa were recorded *Sonchus oleracea* and *Cyperus hamulosus*. The record of *C. hamulosus* came from a wetland southwest of the PETERSWALD sheet.

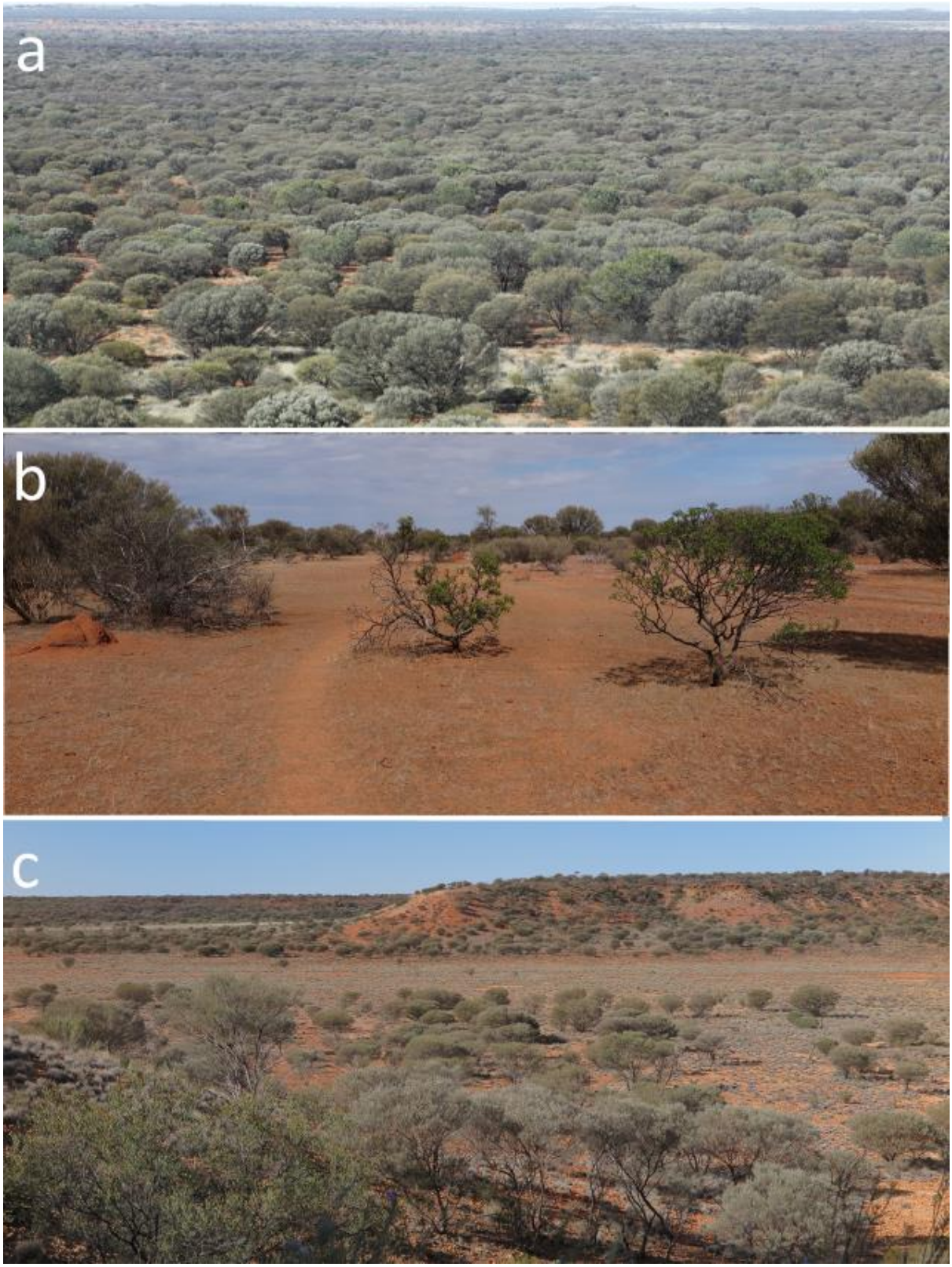

Figure 10. a) Rocky plain in the north of the PETERSWALD sheet dominated by mulga. b) On the shallowest soil low open *Acacia* – *Eremophila* shrubland is encountered. c) Extensive *Atriplex* shrublands can develop below the larger breakaway systems (Calachini Hills).

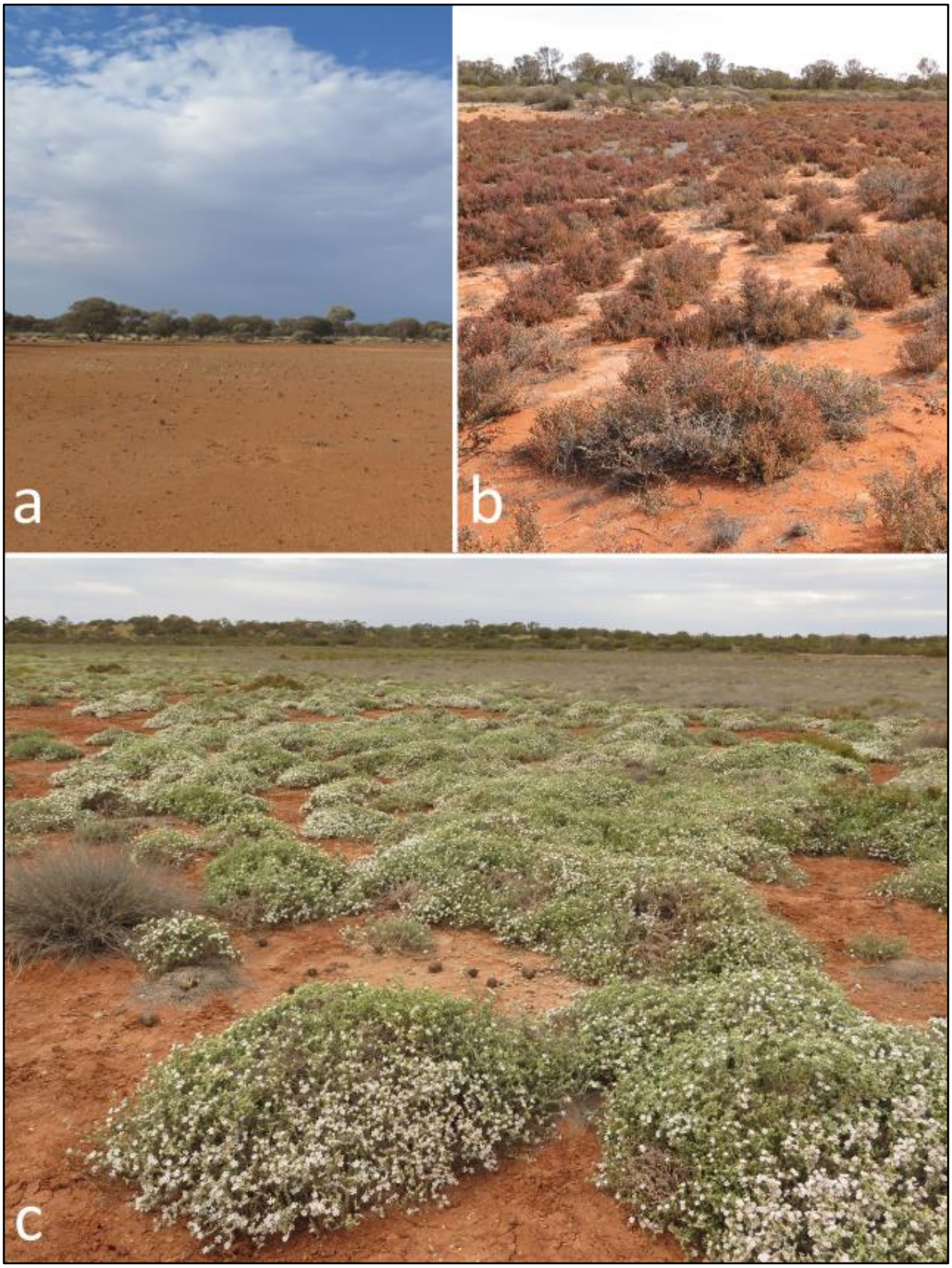

Figure 11. A number of different wetland types were encountered on the PETERSWALD sheet. a) Small ephemeral clay based wetlands in low lying areas of the mulga shrublands up to several hectares in size, often dominated by small herbs such as *Calandrinia* spp., *Goodenia* spp. and Asteraceae. b) More saline soils in paleodrainage lines were dominated by *Tecticornia* spp. c) Larger wetland showed zonal vegetation patterns such as here where *Frankenia cinerea* dominated the outer edge of the wetland.

Table 1. Priority flora recorded during current survey. New records for Great Victoria Desert bioregion indicated. Three taxa were recorded from wetlands to the west and southwest of the PETERSWALD sheet.

Family	Taxon	Priority Code	New record GVD	On PETERSWALD sheet	Appendix 4 Photo number
Asteraceae	*Brachyscome* sp. Wanna Munna Flats (S. van Leeuwen 4662)	1	Yes		13
Cyperaceae	*Eleocharis papillosa*	3	Yes	No	102
Elatinaceae	*Elatine macrocalyx*	3	Yes	No	-
Frankeniaceae	*Frankenia glomerata*	3			-
Goodeniaceae	*Goodenia lyrata*	3	Yes		38
Myrtaceae	*Melaleuca apostiba*	3		No	-
Scrophulariaceae	*Eremophila shonae* subsp. *diffusa*	3	Yes		-

Phrase names are used on FloraBase (WA Herbarium 1998–) to identify species that are likely to represent "good" taxa though not yet formally described. Nine taxa with phrase names were recorded in the current survey (Table 2). Two of these taxa (*Brachyscome* sp. = *Roebuckiella similis* P.S Short; *Podolepis* sp. = *Podolepis eremaea* Jeanes) have recently been described but are not yet listed on FloraBase (Appendix 4, photos 13).

Table 2. Phrase named taxa recorded during current survey.

Family	Taxon
Asteraceae	*Brachyscome* sp. Wanna Munna Flats (S. van Leeuwen 4662)
Asteraceae	*Podolepis* sp. Great Victoria Desert (A.S. George 8219)
Chenopodiaceae	*Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)
Fabaceae	*Senna* sp. Meekatharra (E. Bailey 1-26)
Malvaceae	*Sida* sp. Golden calyces pubescent (G.J. Leach 1966)
Malvaceae	*Sida* sp. tiny glabrous fruit (A.A. Mitchell PRP1152)
Malvaceae	*Sida* sp. verrucose glands (F.H. Mollemans 2423)
Rubiaceae	*Pomax* sp. desert (A.S. George 11968)
Scrophulariaceae	*Eremophila* sp. Plumridge Lakes (S.G.M. Carr 534)

Four further taxa were collected that could not be assigned to currently described species:

- *Thysanotus* aff. *patersonii* (NG & EMS 7786) is a climbing fringe lily that was collected on a dune and in run-on area dominated by mulga. This taxa is part of a species complex currently under review (Appendix 4, photo 74).
- *Sclerolaena* sp. (NG & EMS 7530) was collected at a single wetland dominated by *Frankenia cinerea* in the south of the map sheet (Figure 11c). Its leaves are densely covered in long branched hairs which are also apparent on the fruits. Branched hairs are unusual in *Sclerolaena* and this collection could not be matched to any previous collection in the WA Herbarium.
- *Velleia* sp. (NG & EMS 7638) was collected from two mulga sites. It has a very hairy scape and a long spur on the flower. It keys to *Velleia glabrata* but is clearly not that taxon. There appears to be numerous previous collections of this taxa in the WA Herbarium.
- *Sida* sp. (NG & EMS 7618) is a small creeping taxon that was collected from two dunes. It could not be matched to any of the currently recognised taxa. This group is taxonomically complex and is currently being revised.

The *Sclerolaena* sp. (NG & EMS 7530) and *Sida* sp. (NG & EMS 7618) may represent local endemic taxa. No other taxa appear to be endemic to the study area, indeed none of the 381 taxa recorded are endemic to the Great Victoria Desert, although *Melaleuca apostiba* and *Eremophila* sp. Plumridge Lakes (S.G.M. Carr 534) are largely restricted to this bioregion.

The 70 taxa that were new records for the Great Victoria Desert all represent range extension of several 10s to 100s of kilometres. The largest range extensions recorded were for:

- *Aenictophyton anomalum* has previously been recorded from the south west of the NT and just over the border into WA and SA and from northern NSW and across the border into Qld. This taxon was common on red dunes but only collected once in flower. It represents a range extension of over 500 km (Appendix 4, photo 49).
- *Brachyscome* sp. Wanna Munna Flats (S. van Leeuwen 4662) [syn. *Roebuckiella similis* P.S Short] has previously been recorded in the southern Pilbara and just across the biogeographical boundary into the Gascoyne. It is now known to be a widespread arid zone taxa occurring in WA, south western Qld and north western NSW. As now circumscribed the closest collection is AS George 5502, "14 miles E of Carnegie Homestead" which is ca. 170 km to the north west from the our collections. This taxa is currently listed as Priority 1 (Jones 2014), this listing needs to be reassessed (Appendix 4, photo 13).
- *Solanum gilesii* the closest contemporary collection shown on FloraBase is east of the Gibson Desert Nature Reserve some 400 km to the northwest. A search of the Australian Virtual Herbarium database showed however that Helms, as part of the Elder expedition, collected this species twice in the Great Victoria Desert in September 1891 (15th and 28th). His collections were made several hundred kilometres to the southeast and south of the PETERSWALD sheet.

Discussion

Remarkably little botanical survey work has been undertaken on the PETERSWALD sheet despite a promising start. The collection of information on the flora and vegetation of this area commenced early with the collections by Cumming on the Elder expedition and detailed maps and journals of Wells (Lindsey 1893) and in particular Hubbe (1897). Hubbe noted at least 20 taxa from the PETERSWALD although none appear to have been collected; 14 can be identified to species level. All were recollected during the current survey except for *Eremophila deserti* [syn. *Myoporum deserti*]. Hubbe was particularly looking for this species as it was known to be toxic to camels. Both Wells and Hubbe map significant areas of mulga (*Acacia aneura* sens. lat.) across the map sheet as did Beard's (1978) more recent 1: 1,000,000 scale mapping.

Vegetation patterning on the ground was found to occur at a much finer scale than proposed by Beard's map. In addition the taxonomy of mulga (*Acacia aneura* sens. lat.) which is one of the dominant species mapped by Beard has recently been revised and is now known to comprise at least 12 taxa and a number of variants and hybrids. Co-occurrence of species in this group is common and we recorded seven of these taxa and a further eight mulga hybrids and variants (Appendix 2).

Almost 20% of the taxa recorded in this survey have not previously been recorded in the Great Victoria Desert (WA Herbarium 1998–). The large proportion of new records is at least partially accounted for by the position of the PETERSWALD sheet close to the boundary of four other bioregions (Figure 1). In addition there is a general lack of access in the Great Victoria Desert away from a few major roads and tracks were collection efforts have been concentrated (Figure 12).

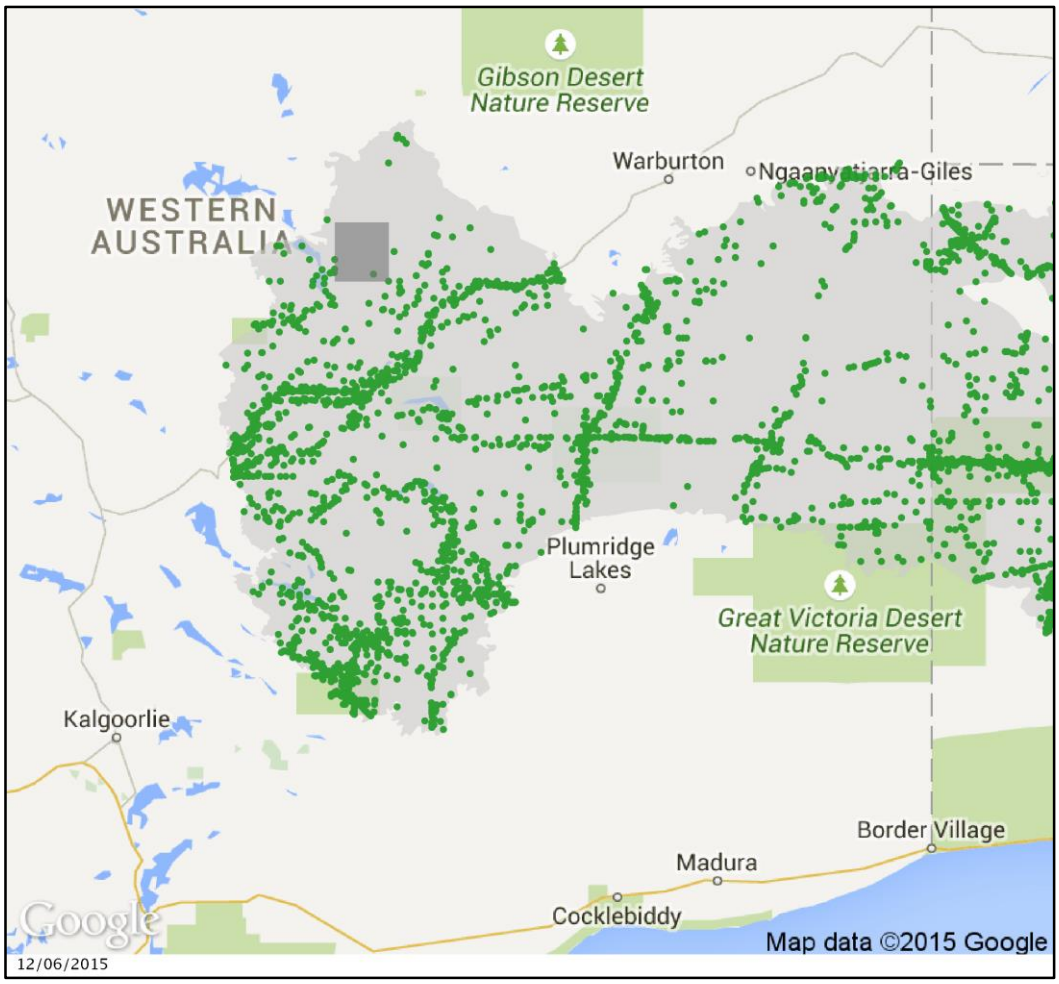

Figure 12. Atlas of Living Australia map of plant collections in Great Victoria Desert (light grey shading) also showing PETERSWALD map sheet (dark grey square) in north west of Great Victoria Desert. Data accessed 12 June 2015. Concentration of collection effort along major roads and tracks is clearly evident.

The spatial bias in collecting effort across the Great Victoria Desert is also evident from both the relocation of *Solanum gilesii* which Helms had collected in 1891 and had only subsequently been collected 500 km to the north, and the identification of several taxa (*Sclerolaena* sp. (NG & EMS 7530), *Sida* sp. (NG & EMS 7618)) apparently not previously collected. Likewise the survey results from the PETERSWALD sheet should be considered preliminary as vehicle access is quite restricted and most collection effort was focused on these tracks.

Two detailed area based surveys have been carried out in the Great Victoria Desert. A survey of Queen Victoria Springs Nature Reserve which straddles the boundary of the Great Victoria Desert and the Murchison bioregion. This reserve also lies just to the north of the Coolgardie bioregion (Figure 1). The other area was surveyed for the Tropicana mine which lies to the north east of Queen Victoria Springs Nature Reserve and wholly within Great Victoria Desert but near the southern boundary (Figure 1). All three areas have rich floras, differences in total number of species reflect in part different sampling efforts (Table 3).

Table 3. Comparison of PETERSWALD survey with those undertaken for the Tropicana development (ecologia 2009) and a flora and vegetation survey of the Queen Victoria Desert Nature Reserve (Pearson 1994). The survey parameters, number of taxa encountered and the 12 most common families and the five most common genera as a percentage of the total flora of the PETERSWALD survey are listed and compared to other surveys where available. Adapted from ecologia (2009), WA Herbarium collection database accessed June 2015.

	Current survey		Tropicana		QVDNR	
SURVEY DETAILS						
Author	Gibson et al. 2015		ecologia 2009		Pearson 1994	
Area included in survey (km^2)	2,754		1,356		2,726	
Survey effort	25 x 0.25 ha relevés		204 x 0.04 ha plots		77 x 0.16 ha plots	
	103 collection sites		-		+ opportunistic sampling	
Number of times sampled	1		2		multiple	
Field sampling (person days)	32		60		n/a	
TAXA RECORDED						
Number of taxa	381		437		552	
Collections lodged	454		104		754	
Number of taxa / km^2	0.14		0.32		0.20	
Number of Families[1]	49		57		65	
Dominant families (% taxa)	Asteraceae	12.6	Asteraceae	7.1	Asteraceae	11.8
	Fabaceae[1]	12.3	Mimosaceae / Papilionaceae	13.7	Mimosaceae / Papilionaceae	10.8
	Poaceae	10.2	Poaceae	10.8	Poaceae	5.8
	Chenopodiaceae	10.2	Chenopodiaceae	10.3	Chenopodiaceae	6.7
	Scrophulariaceae[1]	5.5	Myoporaceae	5.9	Myoporaceae	3.6
	Goodeniaceae	5.0	Goodeniaceae	5.3	Goodeniaceae	6.7
	Myrtaceae	3.7	Myrtaceae	7.6	Myrtaceae	10.7
	Malvaceae	3.7	Malvaceae	3.7	n/a	
	Amaranthaceae	3.4	n/a		n/a	
	Portulacaceae	2.4	n/a		n/a	
	Solanaceae	2.4	n/a		n/a	
	Proteaceae	1.8	Proteaceae	3.4	Proteaceae	3.6
Dominant genera	*Acacia*	7.9	*Acacia*	9.2	*Acacia*	6.5
	Eremophila	5.5	*Eremophila*	5.7	*Eucalyptus*	6.3
	Maireana	3.4	*Eucalyptus*	4.3	*Eremophila*	3.6
	Sclerolaena	2.9	n/a		n/a	
	Eucalyptus	2.4	n/a		n/a	
	Ptilotus	2.4	n/a		n/a	

1) Different family concepts apply in 2015 compared with earlier surveys.

The current survey had the least survey effort and this is reflected by the lowest number of taxa recorded, lowest number of families recorded (noting that some family circumscriptions have changed recently) and lowest density of taxa / km^2 (Table 3). Nonetheless the high numbers of

records and collections from PETERSWALD was a surprise given the short field campaign and only average rainfall leading up to the sampling period. A significant proportion of the richness encountered was from the small saline and semi saline wetland systems.

A strong climatic gradient is apparent in the patterns of dominance of the families and genera, with the more northern (arid) location of the PETERSWALD sheet showing strong representation of Asteraceae, Chenopodiaceae (particularly *Maireana* and *Sclerolaena*) and a decrease in importance in Myrtaceae particularly *Eucalyptus*. The contrasts are most extreme with Queen Victoria Springs Nature Reserve which occurs furthest south.

While the number of introduced taxa found during the current survey was low it was clear that the feral camel population was having a significant impact on the vegetation. Grazing damage on more palatable shrubs was commonly observed as was damage caused by camel camps both on top of dunes and in the mulga woodlands. Groups of camels were often encountered and fresh sign of camel movement along track was encountered on a daily basis. This level of activity has not been observed in other recent surveys in the arid zone.

Acknowledgements

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Appendix 1. List of vascular flora recorded in Hubbe's journal between 10 –12 May 1896 while his party crossed the PETERSWALD sheet from northeast to southwest.

Taxa recorded	Family	Probable identity
purple everlastings	Asteraceae	Brachyscome spp.
yellow everlastings	Asteraceae	Watzia acuminata or Schoenia ayersii
saltbush	Chenopodiaceae	Atriplex spp.
pine	Cupressaceae	Callitris verrucosa
mulga	Fabaceae	Acacia aneura sens. lat.
black wattle	Fabaceae	Acacia pruinocarpa
dwarf wattle	Fabaceae	Acacia sp.
acacia other varieties	Fabaceae	Acacia spp.
native current bush	Goodeniaceae	Scaevola spinescens
poplar	Gyrostemonaceae	Codonocarpus cotinifolius
dwarf tea tree	Myrtaceae	Aluta maisonneuvei subsp. auriculata
desert gum	Myrtaceae	Eucalyptus gongylocarpa
mallee	Myrtaceae	Eucalyptus spp.
bunchgrass	Poaceae	Eragrostis eriopoda
wiregrass	Poaceae	Eriachne helmsii
spinifex	Poaceae	Triodia basedowii
little parakylia [sic]	Portulacaceae	Calandrinia creethiae
corkwood	Proteaceae	Hakea lorea
quondong	Santalaceae	Santalum spicatum
Myoporum deserti [sic]	Scrophulariaceae	Eremophila deserti

Appendix 2. List of vascular flora (including hybrids and variants) occurring within and immediately adjacent to the PETERSWALD 1: 100,000 map sheet. New records for Great Victoria Desert and current conservation codes based on FloraBase (WA Herbarium 1998–) accessed May 2015.

Number of taxa: 381

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Amaranthaceae	Alternanthera		angustifolia				y
Amaranthaceae	Alternanthera		denticulata				
Amaranthaceae	Amaranthus		cuspidifolius				y
Amaranthaceae	Ptilotus		aervoides				
Amaranthaceae	Ptilotus		astrolasius				y
Amaranthaceae	Ptilotus		chamaecladus				
Amaranthaceae	Ptilotus		gaudichaudii	subsp.	gaudichaudii		
Amaranthaceae	Ptilotus		helipteroides				
Amaranthaceae	Ptilotus		nobilis				
Amaranthaceae	Ptilotus		obovatus				
Amaranthaceae	Ptilotus		polystachyus				
Amaranthaceae	Ptilotus		schwartzii				
Amaranthaceae	Surreya		diandra				
Apiaceae	Daucus		glochidiatus				
Apocynaceae	Marsdenia		australis				
Apocynaceae	Rhyncharrhena		linearis				
Apocynaceae	Sarcostemma		viminale				
Araliaceae	Trachymene		glaucifolia				
Asparagaceae	Lomandra		leucocephala	subsp.	robusta		
Asparagaceae	Thysanotus	?	exiliflorus				
Asparagaceae	Thysanotus	aff.	patersonii				
Asteraceae	Angianthus		cyathifer				y
Asteraceae	Brachyscome		ciliaris				
Asteraceae	Brachyscome		iberidifolia				
Asteraceae	Brachyscome		sp. Wanna Munna Flats (S. van Leeuwen 4662) = *Roebuckiella similis* P.S Short			1	y
Asteraceae	Calotis		erinacea				
Asteraceae	Calotis		hispidula				
Asteraceae	Calotis		multicaulis				
Asteraceae	Calotis		plumulifera				
Asteraceae	Centipeda		pleiocephala				
Asteraceae	Centipeda		thespidioides				y

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Asteraceae	Chrysocephalum		eremaeum				
Asteraceae	Erymophyllum		ramosum				
Asteraceae	Gnephosis		arachnoidea				y
Asteraceae	Gnephosis		tenuissima				
Asteraceae	Helichrysum		luteoalbum				
Asteraceae	Lawrencella		davenportii				
Asteraceae	Leiocarpa		semicalva				
Asteraceae	Leucochrysum		stipitatum				
Asteraceae	Myriocephalus		rudallii				y
Asteraceae	Olearia		calcarea				y
Asteraceae	Olearia		eremaea				
Asteraceae	Olearia		stuartii				
Asteraceae	Olearia		subspicata				
Asteraceae	Pluchea		dunlopii				y
Asteraceae	Pluchea		rubelliflora				y
Asteraceae	Podolepis		canescens = *Podolepis aristata* subsp. *affinis* (Sond.)Jeanes				
Asteraceae	Podolepis		capillaris				
Asteraceae	Podolepis		sp. Great Victoria Desert (A.S. George 8219) = *Podolepis eremaea* Jeanes				
Asteraceae	Pogonolepis		stricta				
Asteraceae	Pterocaulon		sphaeranthoides				y
Asteraceae	Rhodanthe		charsleyae				
Asteraceae	Rhodanthe		chlorocephala	subsp.	splendida		y
Asteraceae	Rhodanthe		citrina				
Asteraceae	Rhodanthe		floribunda				
Asteraceae	Rhodanthe		humboldtiana				y
Asteraceae	Rhodanthe		maryonii				
Asteraceae	Rhodanthe		propinqua				
Asteraceae	Rhodanthe		stricta				
Asteraceae	Rutidosis		helichrysoides				
Asteraceae	Schoenia		ayersii				
Asteraceae	Schoenia		cassiniana				
Asteraceae	Senecio		gregorii				
Asteraceae	Senecio		lacustrinus				
Asteraceae	Sonchus		oleraceus				
Asteraceae	Streptoglossa		liatroides				
Asteraceae	Vittadinia		sulcata				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Asteraceae	Waitzia		acuminata				
Boraginaceae	Halgania		erecta				
Boraginaceae	Halgania		glabra				y
Boraginaceae	Heliotropium		cunninghamii				y
Boraginaceae	Heliotropium		curassavicum				
Boraginaceae	Trichodesma		zeylanicum	var.	zeylanicum		
Brassicaceae	Lepidium		oxytrichum				
Brassicaceae	Lepidium		phlebopetalum				
Brassicaceae	Stenopetalum		anfractum				
Brassicaceae	Stenopetalum		lineare	var.	lineare		
Brassicaceae	Stenopetalum		nutans				y
Brassicaceae	Stenopetalum		pedicellare				y
Campanulaceae	Isotoma		petraea				
Campanulaceae	Lobelia		heterophylla	subsp.	centralis		
Campanulaceae	Wahlenbergia		tumidifructa				
Casuarinaceae	Casuarina		obesa				
Casuarinaceae	Casuarina		pauper				
Celastraceae	Macgregoria		racemigera				
Celastraceae	Stackhousia		megaloptera				
Centrolepidaceae	Centrolepis		eremica				
Chenopodiaceae	Atriplex		codonocarpa				
Chenopodiaceae	Atriplex		vesicaria				
Chenopodiaceae	Dissocarpus		paradoxus				
Chenopodiaceae	Dysphania		melanocarpa	forma	melanocarpa		y
Chenopodiaceae	Dysphania		rhadinostachya	subsp.	inflata		y
Chenopodiaceae	Dysphania		rhadinostachya	subsp.	rhadinostachya		
Chenopodiaceae	Dysphania		simulans				
Chenopodiaceae	Enchylaena		tomentosa				
Chenopodiaceae	Maireana		carnosa				
Chenopodiaceae	Maireana		eriosphaera				
Chenopodiaceae	Maireana		georgei				
Chenopodiaceae	Maireana		glomerifolia				
Chenopodiaceae	Maireana		luehmannii				
Chenopodiaceae	Maireana		melanocoma				y
Chenopodiaceae	Maireana		pentatropis				
Chenopodiaceae	Maireana		planifolia				
Chenopodiaceae	Maireana		platycarpa				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Chenopodiaceae	Maireana		pyramidata				
Chenopodiaceae	Maireana		tomentosa	subsp.	tomentosa		
Chenopodiaceae	Maireana		triptera				
Chenopodiaceae	Maireana		villosa				
Chenopodiaceae	Rhagodia		eremaea				
Chenopodiaceae	Salsola		australis				
Chenopodiaceae	Sclerolaena		alata				y
Chenopodiaceae	Sclerolaena		clelandii				
Chenopodiaceae	Sclerolaena		cuneata				
Chenopodiaceae	Sclerolaena		densiflora				
Chenopodiaceae	Sclerolaena		deserticola				
Chenopodiaceae	Sclerolaena		eriacantha				
Chenopodiaceae	Sclerolaena		eurotioides				
Chenopodiaceae	Sclerolaena		fimbriolata				
Chenopodiaceae	Sclerolaena		fusiformis				
Chenopodiaceae	Sclerolaena		lanicuspis				
Chenopodiaceae	Sclerolaena		sp. (NG & EMS 7530)				
Chenopodiaceae	Tecticornia		disarticulata				
Chenopodiaceae	Tecticornia		halocnemoides				
Chenopodiaceae	Tecticornia		indica	subsp.	bidens		
Chenopodiaceae	Tecticornia		pruinosa				
Chenopodiaceae	Tecticornia		sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)				
Convolvulaceae	Bonamia		erecta				
Convolvulaceae	Duperreya		commixta				
Crassulaceae	Crassula		colorata	var.	acuminata		
Cupressaceae	Callitris		verrucosa				
Cyperaceae	Cyperus		hamulosus				y
Cyperaceae	Cyperus		rigidellus				
Cyperaceae	Eleocharis		papillosa			3	y
Cyperaceae	Isolepis		congrua				
Cyperaceae	Schoenoplectus		dissachanthus				
Elatinaceae	Bergia		trimera				y
Elatinaceae	Elatine		macrocalyx			3	y
Euphorbiaceae	Euphorbia		boophthona				
Euphorbiaceae	Euphorbia		porcata				
Euphorbiaceae	Monotaxis		luteiflora				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Fabaceae	Acacia		abrupta				
Fabaceae	Acacia		aneura				
Fabaceae	Acacia	?	aptaneura				
Fabaceae	Acacia		ayersiana				
Fabaceae	Acacia		ayersiana - narrow phyllode variant				
Fabaceae	Acacia		burkittii				
Fabaceae	Acacia		caesaneura - narrow phyllode variant				
Fabaceae	Acacia		craspedocarpa - hybrid				y
Fabaceae	Acacia		dictyophleba				y
Fabaceae	Acacia		donaldsonii				y
Fabaceae	Acacia		doreta				
Fabaceae	Acacia		helmsiana				
Fabaceae	Acacia		incurvaneura				
Fabaceae	Acacia		incurvaneura x mulganeura				
Fabaceae	Acacia	?	kempeana				
Fabaceae	Acacia		ligulata				
Fabaceae	Acacia		melleodora				
Fabaceae	Acacia		minyura				
Fabaceae	Acacia		minyura hybrid				
Fabaceae	Acacia		minyura - translucent resin variant				
Fabaceae	Acacia		mulganeura				
Fabaceae	Acacia		mulganeura - variant 1				
Fabaceae	Acacia		mulganeura - variant 2				
Fabaceae	Acacia		murrayana				
Fabaceae	Acacia		nyssophylla				
Fabaceae	Acacia		pachyacra				
Fabaceae	Acacia		prainii				
Fabaceae	Acacia		pruinocarpa				
Fabaceae	Acacia		pteraneura				
Fabaceae	Acacia		quadrimarginea				
Fabaceae	Acacia		ramulosa	var.	linophylla		
Fabaceae	Acacia		rhodophloia				
Fabaceae	Acacia		sibina				
Fabaceae	Acacia		tetragonophylla				
Fabaceae	Acacia		tysonii				
Fabaceae	Aenictophyton		anomalum				y
Fabaceae	Indigofera		georgei				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Fabaceae	Kennedia		prorepens				
Fabaceae	Leptosema		chambersii				
Fabaceae	Petalostylis		cassioides				
Fabaceae	Senna		artemisioides	subsp.	filifolia		
Fabaceae	Senna		artemisioides	subsp.	helmsii		
Fabaceae	Senna		artemisioides	subsp.	oligophylla		
Fabaceae	Senna		artemisioides	subsp.	oligophylla - hybrid		
Fabaceae	Senna		artemisioides	subsp.	petiolaris		
Fabaceae	Senna		artemisioides	subsp.	x artemisioides		
Fabaceae	Senna		glutinosa	subsp.	chatelainiana		
Fabaceae	Senna		pleurocarpa				
Fabaceae	Senna		sp. Meekatharra (E. Bailey 1-26)				y
Fabaceae	Swainsona		formosa				
Fabaceae	Swainsona		microphylla				
Fabaceae	Swainsona		oliveri				
Fabaceae	Swainsona		oroboides				
Frankeniaceae	Frankenia		cinerea				
Frankeniaceae	Frankenia		glomerata			3	
Frankeniaceae	Frankenia		pauciflora				y
Geraniaceae	Erodium		crinitum				
Geraniaceae	Erodium		cygnorum				
Goodeniaceae	Brunonia		australis				
Goodeniaceae	Dampiera		dentata				
Goodeniaceae	Dampiera		ramosa				
Goodeniaceae	Goodenia		centralis				
Goodeniaceae	Goodenia		gypsicola				
Goodeniaceae	Goodenia		havilandii				
Goodeniaceae	Goodenia		lyrata			3	y
Goodeniaceae	Goodenia		ramelii				
Goodeniaceae	Goodenia		triodiophila				
Goodeniaceae	Goodenia		xanthosperma				
Goodeniaceae	Lechenaultia		striata				
Goodeniaceae	Scaevola		basedowii				
Goodeniaceae	Scaevola		collaris				
Goodeniaceae	Scaevola		parvifolia				
Goodeniaceae	Scaevola		spinescens				
Goodeniaceae	Velleia		connata				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Goodeniaceae	Velleia		glabrata				
Goodeniaceae	Velleia		panduriformis				
Goodeniaceae	Velleia		sp. (NG & EMS 7638)				
Gyrostemonaceae	Codonocarpus		cotinifolius				
Gyrostemonaceae	Gyrostemon		racemiger				
Gyrostemonaceae	Gyrostemon		ramulosus				
Gyrostemonaceae	Gyrostemon		tepperi				
Haloragaceae	Gonocarpus		ephemerus				y
Haloragaceae	Haloragis		gossei	var.	gossei		y
Haloragaceae	Haloragis		odontocarpa	forma	octoforma		y
Haloragaceae	Haloragis		odontocarpa	forma	pterocarpa		
Haloragaceae	Haloragis		uncatipila				y
Hemerocallidaceae	Corynotheca		micrantha	var.	divaricata		
Juncaginaceae	Triglochin		hexagona				y
Juncaginaceae	Triglochin		nana				
Lamiaceae	Dicrastylis		exsuccosa				
Lamiaceae	Dicrastylis		sp. (NG & EMS 7753)				
Lamiaceae	Newcastelia		cephalantha				
Lamiaceae	Newcastelia		hexarrhena				
Lamiaceae	Prostanthera		althoferi	subsp.	althoferi		
Lamiaceae	Prostanthera		wilkieana				
Lamiaceae	Spartothamnella		teucriiflora				
Loranthaceae	Amyema		fitzgeraldii				
Loranthaceae	Amyema		hilliana				y
Loranthaceae	Lysiana		exocarpi	subsp.	exocarpi		
Loranthaceae	Lysiana		murrayi				
Malvaceae	Abutilon		cryptopetalum				
Malvaceae	Abutilon		otocarpum				
Malvaceae	Alyogyne		pinoniana	var.	pinoniana		
Malvaceae	Androcalva		loxophylla				
Malvaceae	Hibiscus		burtonii				y
Malvaceae	Keraudrenia		velutina	subsp.	elliptica		
Malvaceae	Lawrencia		glomerata				
Malvaceae	Sida		calyxhymenia				y
Malvaceae	Sida		ectogama				
Malvaceae	Sida	sens. lat.	fibulifera				
Malvaceae	Sida		sp. creeping tiny fruit (NG & EMS 7618)				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Malvaceae	Sida		sp. Golden calyces pubescent (G.J. Leach 1966)				y
Malvaceae	Sida		sp. tiny glabrous fruit (A.A. Mitchell PRP1152)				y
Malvaceae	Sida		sp. verrucose glands (F.H. Mollemans 2423)				
Marsileaceae	Marsilea		hirsuta				
Myrtaceae	Aluta		maisonneuvei	subsp.	auriculata		
Myrtaceae	Eucalyptus		carnei				
Myrtaceae	Eucalyptus		concinna				
Myrtaceae	Eucalyptus		eremicola				
Myrtaceae	Eucalyptus		gongylocarpa				
Myrtaceae	Eucalyptus		lucasii				
Myrtaceae	Eucalyptus		mannensis	subsp.	mannensis		
Myrtaceae	Eucalyptus		oldfieldii				
Myrtaceae	Eucalyptus		socialis	subsp.	eucentrica		
Myrtaceae	Eucalyptus		youngiana				
Myrtaceae	Homalocalyx		thryptomenoides				
Myrtaceae	Melaleuca		apostiba			3	
Myrtaceae	Melaleuca		interioris				
Myrtaceae	Micromyrtus		flaviflora				
Phrymaceae	Glossostigma		diandrum				y
Phrymaceae	Mimulus		repens				y
Phrymaceae	Peplidium	?	aithocheilum				
Pittosporaceae	Pittosporum		angustifolium				
Poaceae	Amphipogon		caricinus	var.	caricinus		
Poaceae	Aristida	?	capillifolia				
Poaceae	Aristida		contorta				
Poaceae	Aristida		holathera				
Poaceae	Aristida	?	nitidula				
Poaceae	Austrostipa		elegantissima				y
Poaceae	Austrostipa		platychaeta				y
Poaceae	Brachyachne		prostrata				y
Poaceae	Cymbopogon		obtectus				
Poaceae	Elytrophorus		spicatus				y
Poaceae	Enneapogon		caerulescens				
Poaceae	Enneapogon		polyphyllus				
Poaceae	Enteropogon		ramosus				
Poaceae	Eragrostis		dielsii				
Poaceae	Eragrostis		eriopoda				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Poaceae	Eragrostis		pergracilis				
Poaceae	Eragrostis		setifolia				
Poaceae	Eragrostis		xerophila				
Poaceae	Eriachne		aristidea				y
Poaceae	Eriachne		flaccida				
Poaceae	Eriachne		helmsii				
Poaceae	Eriachne	?	mucronata				
Poaceae	Eriachne		pulchella				
Poaceae	Eulalia		aurea				
Poaceae	Monachather		paradoxus				
Poaceae	Neurachne		minor				y
Poaceae	Paractaenum		refractum				
Poaceae	Paspalidium	?	clementii				
Poaceae	Paspalidium		sp. (NG & EMS 7477)				
Poaceae	Themeda		triandra				
Poaceae	Thyridolepis		mitchelliana				
Poaceae	Thyridolepis		multiculmis				y
Poaceae	Thyridolepis		xerophila				
Poaceae	Triodia		basedowii				
Poaceae	Triodia		concinna				
Poaceae	Triodia		longiceps				y
Poaceae	Triodia		melvillei				
Poaceae	Triodia		schinzii				
Poaceae	Triraphis		mollis				
Polygalaceae	Polygala		isingii				
Polygonaceae	Duma		florulenta				y
Portulacaceae	Calandrinia		balonensis				
Portulacaceae	Calandrinia		creethiae				y
Portulacaceae	Calandrinia	?	eremaea				
Portulacaceae	Calandrinia		pleiopetala				y
Portulacaceae	Calandrinia	?	polyandra				
Portulacaceae	Calandrinia		ptychosperma				y
Portulacaceae	Calandrinia		pumila				y
Portulacaceae	Portulaca		oleracea				y
Proteaceae	Grevillea		eriostachya				
Proteaceae	Grevillea		juncifolia				
Proteaceae	Grevillea		pterosperma				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Proteaceae	Grevillea		sarissa	subsp.	bicolor		
Proteaceae	Grevillea		sarissa	subsp.	sarissa		
Proteaceae	Grevillea		stenobotrya				
Proteaceae	Hakea		lorea				
Pteridaceae	Cheilanthes		lasiophylla				y
Pteridaceae	Cheilanthes		sieberi	subsp.	sieberi		
Rhamnaceae	Stenanthemum		petraeum				y
Rubiaceae	Pomax		sp. desert (A.S. George 11968)				
Rubiaceae	Psydrax		latifolia				
Rubiaceae	Psydrax		rigidula				
Rubiaceae	Psydrax		suaveolens				
Rubiaceae	Synaptantha		tillaeacea	var.	tillaeacea		
Santalaceae	Anthobolus		leptomerioides				
Santalaceae	Exocarpos		sparteus				
Santalaceae	Santalum		spicatum				
Sapindaceae	Dodonaea		petiolaris				y
Sapindaceae	Dodonaea		rigida				
Sapindaceae	Dodonaea		viscosa	subsp.	angustissima		
Scrophulariaceae	Eremophila		battii				
Scrophulariaceae	Eremophila		exilifolia				
Scrophulariaceae	Eremophila		forrestii	subsp.	forrestii		
Scrophulariaceae	Eremophila		galeata				y
Scrophulariaceae	Eremophila		gibsonii				
Scrophulariaceae	Eremophila		gilesii	subsp.	gilesii		
Scrophulariaceae	Eremophila		glabra	subsp.	Inland Salt Lakes (B. & B. Backhouse SR 191)		y
Scrophulariaceae	Eremophila		glutinosa				y
Scrophulariaceae	Eremophila		latrobei	subsp.	glabra		
Scrophulariaceae	Eremophila		latrobei	subsp.	latrobei		
Scrophulariaceae	Eremophila		longifolia				
Scrophulariaceae	Eremophila		maculata	subsp.	brevifolia		y
Scrophulariaceae	Eremophila		malacoides				y
Scrophulariaceae	Eremophila		miniata				
Scrophulariaceae	Eremophila		oppositifolia	subsp.	angustifolia		
Scrophulariaceae	Eremophila		pantonii				
Scrophulariaceae	Eremophila		platythamnos	subsp.	exotrachys		
Scrophulariaceae	Eremophila		serrulata				

Family	Genus	qualifier	Species	Rank	Infraspecies	Conservation Code	New record GVD
Scrophulariaceae	Eremophila		shonae	subsp.	diffusa	3	y
Scrophulariaceae	Eremophila		sp. Plumridge Lakes (S.G.M. Carr 534)				
Scrophulariaceae	Eremophila		youngii				
Solanaceae	Anthotroche		pannosa				
Solanaceae	Duboisia		hopwoodii				
Solanaceae	Nicotiana		rosulata				
Solanaceae	Nicotiana		simulans				
Solanaceae	Solanum		centrale				
Solanaceae	Solanum		cleistogamum				
Solanaceae	Solanum		gilesii				y
Solanaceae	Solanum		lasiophyllum				
Solanaceae	Solanum		orbiculatum				
Stylidiaceae	Levenhookia		chippendalei				
Stylidiaceae	Stylidium		inaequipetalum				y
Thymelaeaceae	Pimelea		microcephala				
Zygophyllaceae	Tribulus		suberosus				y
Zygophyllaceae	Zygophyllum		compressum				
Zygophyllaceae	Zygophyllum		eremaeum				
Zygophyllaceae	Zygophyllum		ovatum				

Appendix 3. Taxa that were only recorded from wetlands to the west and southwest of the PETERSWALD map sheet. All wetlands were within the Great Victoria Desert bioregion.

Family	Taxon
Amaranthaceae	Surreya diandra
Asteraceae	Helichrysum luteoalbum
Asteraceae	Senecio lacustrinus
Boraginaceae	Heliotropium curassavicum
Casuarinaceae	Casuarina obesa
Centrolepidaceae	Centrolepis eremica
Chenopodiaceae	Maireana luehmannii
Chenopodiaceae	Maireana pentatropis
Chenopodiaceae	Sclerolaena fimbriolata
Chenopodiaceae	Tecticornia pruinosa
Crassulaceae	Crassula colorata var. acuminata
Cyperaceae	Cyperus hamulosus
Cyperaceae	Eleocharis papillosa
Cyperaceae	Isolepis congrua
Cyperaceae	Schoenoplectus dissachanthus
Elatinaceae	Bergia trimera
Elatinaceae	Elatine macrocalyx
Fabaceae	Acacia tysonii
Goodeniaceae	Goodenia gypsicola
Juncaginaceae	Triglochin hexagona
Myrtaceae	Melaleuca apostiba
Phrymaceae	Glossostigma diandrum
Phrymaceae	Mimulus repens
Polygonaceae	Duma florulenta
Solanaceae	Nicotiana rosulata
Stylidiaceae	Stylidium inaequipetalum

Appendix 4. Plates of PETERSWALD flora, index table gives photo number, new record for Great Victoria Desert and current conservation code.

Family	Taxon	Photo number	New record GVD	Conservation code
Amaranthaceae	Ptilotus aervoides	36		
Amaranthaceae	Ptilotus chamaecladus	33		
Amaranthaceae	Ptilotus obovatus	34		
Amaranthaceae	Ptilotus polystachyus	35		
Asparagaceae	Thysanotus aff. patersonii	74		
Asteraceae	Angianthus cyathifer	7	y	
Asteraceae	Brachyscome iberidifolia	14		
Asteraceae	Brachyscome sp. Wanna Munna Flats (S. van Leeuwen 4662)	13	y	1
Asteraceae	Calotis erinacea	2		
Asteraceae	Chrysocephalum eremaeum	8		
Asteraceae	Gnephosis sp.	4		
Asteraceae	Leucochrysum stipitatum	5		
Asteraceae	Myriocephalus rudallii	1	y	
Asteraceae	Olearia calcarea	18	y	
Asteraceae	Pluchea dunlopii	16	y	
Asteraceae	Podolepis canescens	3		
Asteraceae	Rhodanthe charsleyae	10		
Asteraceae	Rhodanthe chlorocephala subsp. splendida	12	y	
Asteraceae	Rhodanthe floribunda	11		
Asteraceae	Rhodanthe humboldtiana	9	y	
Asteraceae	Schoenia cassiniana	15		
Asteraceae	Streptoglossa liatroides	17		
Asteraceae	Waitzia acuminata	6		
Boraginaceae	Halgania glabra	91	y	
Boraginaceae	Heliotropium curassavicum	92		
Brassicaceae	Stenopetalum pedicellare	65	y	
Campanulaceae	Isotoma petraea	73		
Celastraceae	Macgregoria racemigera	96		
Chenopodiaceae	Maireana carnosa	62		
Chenopodiaceae	Maireana glomerifolia	61		
Chenopodiaceae	Sclerolaena eurotioides	63		
Chenopodiaceae	Tecticornia indica subsp. bidens	64		
Convolvulaceae	Bonamia erecta	106		
Convolvulaceae	Duperreya commixta	105		
Cyperaceae	Eleocharis papillosa	102	y	3
Fabaceae	Acacia abrupta	55		
Fabaceae	Acacia doreta	56		
Fabaceae	Acacia pruinocarpa	48		
Fabaceae	Aenictophyton anomalum	49	y	
Fabaceae	Kennedia prorepens	53		
Fabaceae	Senna artemisioides subsp. filifolia	54		
Fabaceae	Swainsona formosa	50		
Fabaceae	Swainsona microphylla	51		
Fabaceae	Swainsona oroboides	52		
Frankeniaceae	Frankenia cinerea	77		
Frankeniaceae	Frankenia pauciflora	78	y	
Goodeniaceae	Brunonia australis	37		
Goodeniaceae	Dampiera dentata	42		
Goodeniaceae	Goodenia centralis	39		
Goodeniaceae	Goodenia lyrata	38	y	3
Goodeniaceae	Lechenaultia striata	40		
Goodeniaceae	Scaevola collaris	41		
Gyrostemonaceae	Codonocarpus cotinifolius	80		

Family	Taxon	Photo number	New record GVD	Conservation code
Gyrostemonaceae	Gyrostemon ramulosus	82		
Gyrostemonaceae	Gyrostemon tepperi	81		
Juncaginaceae	Triglochin hexagona	100	y	
Juncaginaceae	Triglochin nana	99		
Lamiaceae	Newcastelia cephalantha	66		
Loranthaceae	Amyema fitzgeraldii	94		
Loranthaceae	Amyema hilliana	95	y	
Loranthaceae	Lysiana murrayi	93		
Malvaceae	Alyogyne pinoniana var. pinoniana	87		
Malvaceae	Keraudrenia velutina subsp. elliptica	88		
Malvaceae	Lawrencia glomerata	89		
Malvaceae	Sida calyxhymenia	90	y	
Myrtaceae	Eucalyptus gongylocarpa	58		
Myrtaceae	Eucalyptus youngiana	57		
Myrtaceae	Homalocalyx thryptomenoides	59		
Myrtaceae	Micromyrtus flaviflora	60		
Phrymaceae	Mimulus repens	101	y	
Poaceae	Triodia basedowii	97		
Poaceae	Triodia concinna	98		
Portulacaceae	Calandrinia balonensis	72		
Portulacaceae	Calandrinia creethiae	71	y	
Portulacaceae	Calandrinia pleiopetala	69	y	
Portulacaceae	Calandrinia pleiopetala & C. creethiae	70	y	
Portulacaceae	Calandrinia polyandra	68		
Portulacaceae	Calandrinia pumila	67	y	
Proteaceae	Grevillea eriostachya	43		
Proteaceae	Grevillea sarissa subsp. sarissa	45		
Proteaceae	Grevillea sarissa subsp. bicolor	44		
Proteaceae	Grevillea sarissa subsp. sarissa	46		
Proteaceae	Hakea lorea	47		
Rubiaceae	Pomax sp. desert (A.S. George 11968)	103		
Rubiaceae	Synaptantha tillaeacea var. tillaeacea	104		
Sapindaceae	Dodonaea petiolaris	84	y	
Sapindaceae	Dodonaea rigida	83		
Scrophulariaceae	Eremophila forrestii subsp. forrestii	29		
Scrophulariaceae	Eremophila galeata	31	y	
Scrophulariaceae	Eremophila gibsonii	23		
Scrophulariaceae	Eremophila gilesii subsp. gilesii	22		
Scrophulariaceae	Eremophila glabra subsp. Inland Salt Lakes (B. & B. Backhouse SR 191)	28	y	
Scrophulariaceae	Eremophila latrobei	30		
Scrophulariaceae	Eremophila maculata subsp. brevifolia	27	y	
Scrophulariaceae	Eremophila malacoides	19	y	
Scrophulariaceae	Eremophila miniata	26		
Scrophulariaceae	Eremophila pantonii	20		
Scrophulariaceae	Eremophila platythamnos subsp. exotrachys	21		
Scrophulariaceae	Eremophila serrulata	32		
Scrophulariaceae	Eremophila sp. Plumridge Lakes (S.G.M. Carr 534)	24		
Scrophulariaceae	Eremophila youngii	25		
Solanaceae	Solanum cleistogamum	85		
Solanaceae	Solanum lasiophyllum	86		
Stylidiaceae	Levenhookia chippendalei	75		
Stylidiaceae	Stylidium inaequipetalum	76	y	
Zygophyllaceae	Zygophyllum eremaeum	79		

1) Myriocephalus rudallii (ASTERACEAE)

2) Calotis erinacea (ASTERACEAE)

3) Podolepis canescens (ASTERACEAE)

4) Pogonolepis strictus (ASTERACEAE)

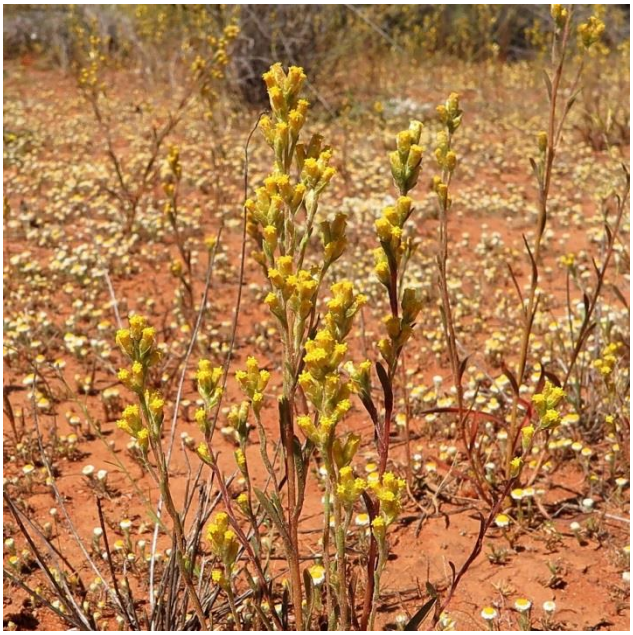
5) Leucochrysum stipitatum (ASTERACEAE)

6) Waitzia acuminata (ASTERACEAE)

7) Angianthus cyathifer (ASTERACEAE)

8) Chrysocephalum eremaeum (ASTERACEAE)

9) Rhodanthe humboldtiana (ASTERACEAE)



10) Rhodanthe charsleyae (ASTERACEAE)

11) Rhodanthe floribunda (ASTERACEAE)

12) Rhodanthe chlorocephala subsp. splendida (ASTERACEAE)

13) Brachyscome sp. Wanna Munna Flats (ASTERACEAE)

14) Brachyscome iberidifolia (ASTERACEAE)

15) Schoenia cassiniana (ASTERACEAE)

16) Pluchea dunlopii (ASTERACEAE)

17) Streptoglossa liatroides (ASTERACEAE)

18) Olearia eremaea (ASTERACEAE)

19) Eremophila malacoides (SCROPHULARIACEAE)

20) Eremophila pantonii (SCROPHULARIACEAE)

21) Eremophila platythamnos subsp. exotrachys (SCROPHULARIACEAE)

22) Eremophila gilesii subsp. gilesii (SCROPHULARIACEAE)

23) Eremophila gibsonii (SCROPHULARIACEAE)

24) Eremophila sp. Plumridge Lakes (SCROPHULARIACEAE)

25) Eremophila youngii (SCROPHULARIACEAE)

26) Eremophila miniata (SCROPHULARIACEAE)

27) Eremophila maculata subsp. brevifolia (SCROPHULARIACEAE)

28) Eremophila glabra sp. Inland Salt Lakes (SCROPHULARIACEAE)

29) Eremophila forrestii subsp. forrestii (SCROPHULARIACEAE)

30) Eremophila latrobei (SCROPHULARIACEAE)

31) Eremophila galeata (SCROPHULARIACEAE)

32) Eremophila serrulata (SCROPHULARIACEAE)

33) Ptilotus chamaecladus (AMARANTHACEAE)

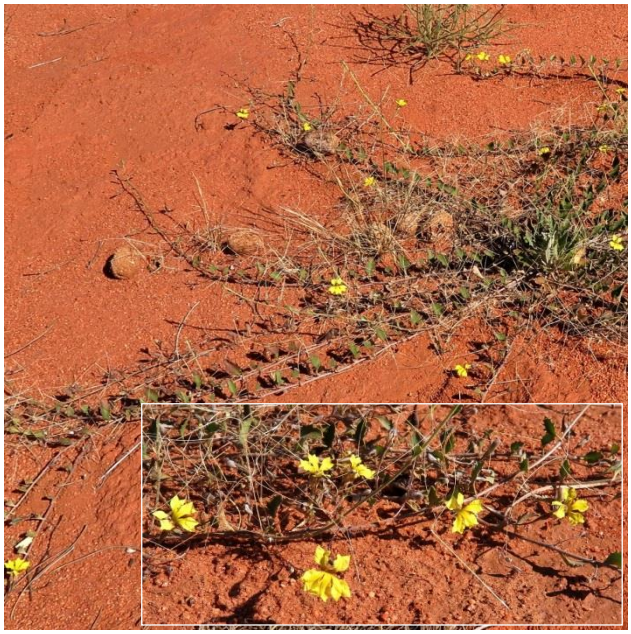
34) Ptilotus obovatus (AMARANTHACEAE)

35) Ptilotus polystachyus (AMARANTHACEAE)

36) Ptilotus aervoides (AMARANTHACEAE)

37) Brunonia australis (GOODENIACEAE)

38) Goodenia lyrata (GOODENIACEAE)



39) Goodenia centralis (GOODENIACEAE)

40) Lechenaultia striata (GOODENIACEAE)

41) Scaevola collaris (GOODENIACEAE)

42) Dampiera dentata (GOODENIACEAE)

43) Grevillea eriostachya (PROTEACEAE)

44) Grevillea sarissa subsp. bicolor (PROTEACEAE)

45) Grevillea sarissa subsp. sarissa (PROTEACEAE)

46) Grevillea sarissa subsp. sarissa (PROTEACEAE)

47) Hakea lorea (PROTEACEAE)

48) Acacia pruinocarpa (FABACEAE)

49) Aenictophyton anomalum (FABACEAE)

50) Swainsona formosa (FABACEAE)

51) Swainsona microphylla (FABACEAE)

52) Swainsona oroboides (FABACEAE)

53) Kennedia prorepens (FABACEAE)

54) Senna artemisioides subsp. filifolia (FABACEAE)

55) Acacia abrupta (FABACEAE)

56) Acacia doreta (FABACEAE)

57) Eucalyptus youngiana (MYRTACEAE)

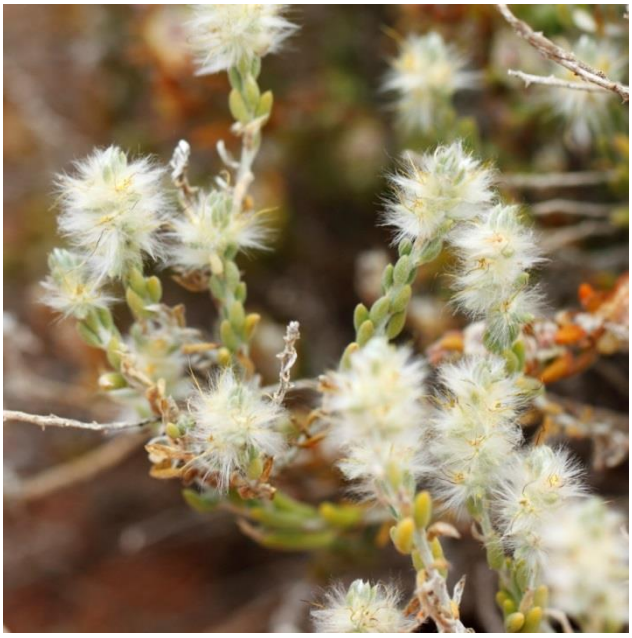
58) Eucalyptus gongylocarpa (MYRTACEAE)

59) Homalocalyx thryptomenoides (MYRTACEAE)

60) Micromyrtus flaviflora (MYRTACEAE)

61) Maireana glomerifolia (CHENOPODIACEAE)

62) Maireana carnosa (CHENOPODIACEAE)



63) Sclerolaena eurotioides (CHENOPODIACEAE)

64) Tecticornia indica subsp. bidens (CHENOPODIACEAE)

65) Stenopetalum pedicellare (BRASSICACEAE)

66) Newcastelia cephalantha (LAMIACEAE)

67) Calandrinia pumila (PORTULACACEAE)

68) Calandrinia polyandra (PORTULACACEAE)

69) Calandrinia pleiopetala (PORTULACACEAE)

70) Calandrinia pleiopetala & Calandrinia creethiae

71) Calandrinia creethiae (PORTULACACEAE)

72) Calandrinia balonensis (PORTULACACEAE)

73) Isotoma petraea (CAMPANULACEAE)

74) Thysanotus aff. patersonii (ASPARAGACEAE)

75) Levenhookia chippendalei (STYLIDIACEAE)

76) Stylidium inaequipetalum (STYLIDIACEAE)

77) Frankenia cinerea (FRANKENIACEAE)

78) Frankenia pauciflora (FRANKENIACEAE)

79) Zygophyllum eremaeum (ZYGOPHYLLACEAE)

80) Codonocarpus cotinifolius (GYROSTEMONACEAE)

81) Gyrostemon tepperi (GYROSTEMONACEAE)

82) Gyrostemon ramulosus (GYROSTEMONACEAE)

83) Dodonaea rigida (SAPINDACEAE)

84) Dodonaea petiolaris (SAPINDACEAE)

85) Solanum cleistogamum (SOLANACEAE)

86) Solanum lasiophyllum (SOLANACEAE)

87) Alyogyne pinoniana var. pinoniana (MALVACEAE)

88) Keraudrenia velutina subsp. elliptica (MALVACEAE)

89) Lawrencia glomerata (MALVACEAE)

90) Sida calyxhymenia (MALVACEAE)

91) Halgania glabra (BORAGINACEAE)

92) Heliotropium curassavicum (BORAGINACEAE)

93) Lysiana murrayi (LORANTHACEAE)

94) Amyema fitzgeraldii (LORANTHACEAE)

95) Amyema hilliana (LORANTHACEAE)

96) Macgregoria racemigera (CELASTRACEAE)

97) Triodia basedowii (POACEAE)

98) Triodia concinna (POACEAE)

99) Triglochin nana (JUNCAGACEAE)

100) Triglochin hexagona (JUNCAGACEAE)

101) Mimulus repens (PHYRMACEAE)

102) Eleocharis papillosa (CYPERACEAE)

103) Pomax sp. desert RUBIACEAE

104) Synaptantha tillaeacea var. tillaeacea RUBIACEAE

105) Duperreya commixta (CONVOLVULACEAE)

106) Bonamia erecta (CONVOLVULACEAE)