A targeted Declared Rare and Priority Flora survey of the verges of sections of three roads near Mukinbudin

Prepared for

The Shire of Mukinbudin

by

Malcolm Trudgen

Consultant Botanist

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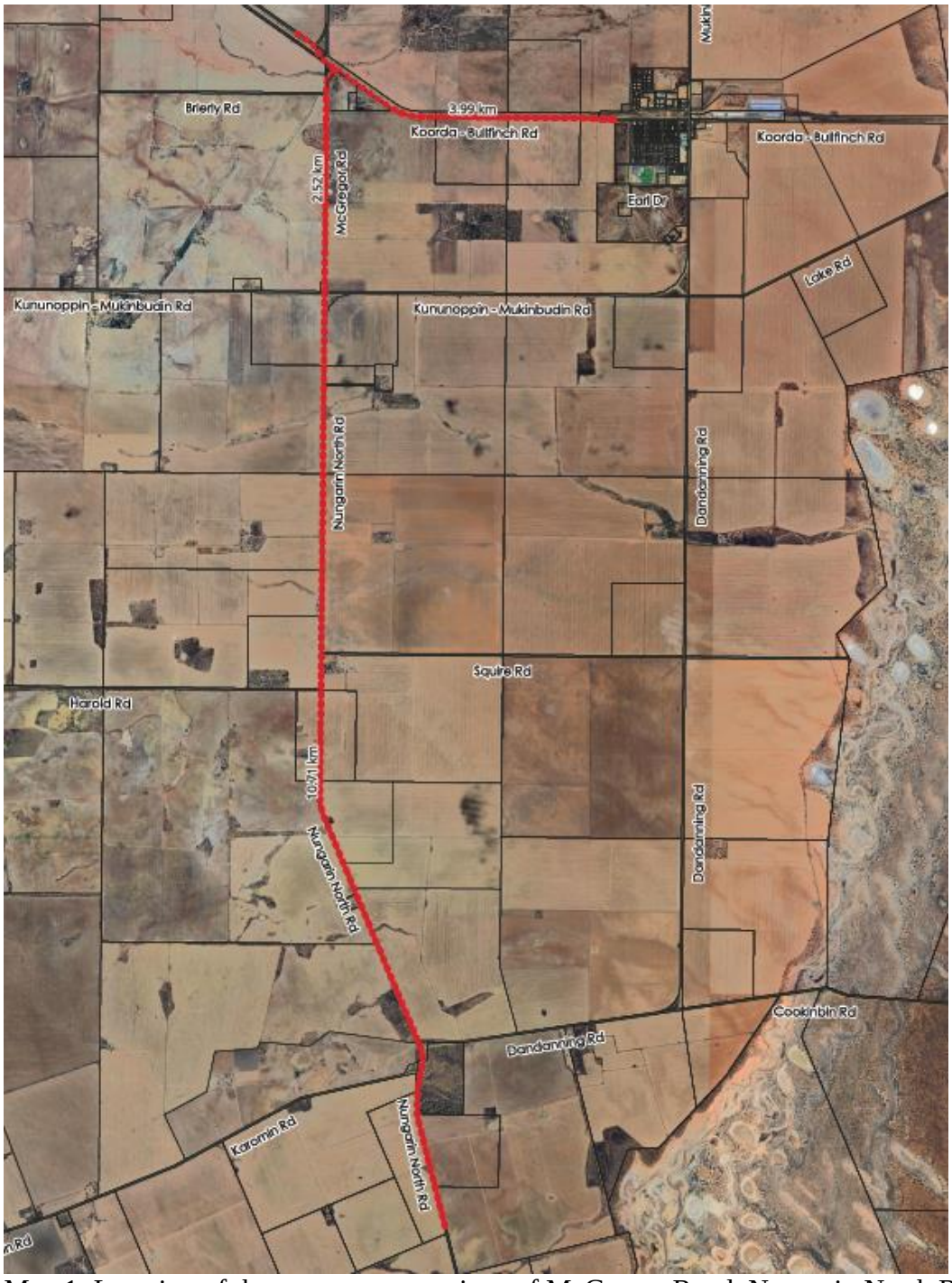
1.0 INTRODUCTION

1.1 Location and size of the survey area

The survey area (Map 1) is located about 250 kilometres north-east of Perth in the Shire of Mukinbudin. It mostly consists of the verges of parts of three roads: McGregor Road, Nungarin North Road and the Koorda-Bullfinch Road. In addition, a small area of remnant bushland in the south-east corner of McGregor Road and the Koorda-Bullfinch Road was surveyed.



Map 1: Location of the survey area sections of McGregor Road, Nungarin North Road and the Koorda-Bullfinch Road.

1.2 Purpose of the study

The study was commissioned to survey a small area of remnant bushland in the south-east corner of McGregor Road and the Koorda-Bullfinch Road and the verges of sections of McGregor Road, Nungarin North Road and the Koorda-Bullfinch Road in the Mukinbudin area for Declared Rare and Priority Flora. The search was to target Declared Rare and Priority Flora likely to be in the area, but was not restricted to those taxa.

1.3 Physical environment of the survey area

The survey area is located on the Yilgarn Plateau, a very old landscape. The section of the road verges sampled mostly traverse a gently undulating plain with slight to moderate relief. A few small areas of sheet granitic outcrop were observed and there were some more pronounced rises adjacent to areas of granitic outcrop or lateritic areas inside the adjoining paddocks.

The small area of remnant bushland in the south-east corner of McGregor Road and the Koorda-Bullfinch Road is quite flat, with *Eucalyptus* woodland over a very open understorey. This area is fenced off, but has presumably been grazed in the past.

2.0 METHODS AND LIMITATIONS

2.1 Field survey methods

The sections of the three roads where the verges were surveyed were visited on the 10th to 12th of October 2023 with Mr Dylan Copeland (representing the Shire of Mukinbudin). The verges were walked unless either it was obvious that degradation was complete or nearly so and no or very little native flora was present. Any such sections were still examined by driving very slowly along them. For such sections, Mr Copeland drove so I could properly examine the verge from the passenger side of the vehicle. The small area of remnant bushland in the south-east corner of McGregor Road and the Koorda-Bullfinch Road was walked through and thoroughly examined for the target species being searched for.

No flora specimens were collected, with photographs taken of the species recorded. A conservative approach was taken, that is any taxon that might possibly be either Declared Rare or Priority Flora was photographed, and its location recorded using a GPS device and population size recorded.

2.2 Species identification

Species were identified by comparison of the photographs taken to previously identified reference specimens (at the Western Australian Herbarium reference collection) and by consulting FloraBase (DBCA 2023), Australasia's Virtual Herbarium (AVH 2023) and other online resources such as World Wide Wattle (2023).

2.3 Limitations of the targeted flora survey

In the more degraded areas the limitations on locating target species was very low as there were few native plants remaining. In areas with better condition vegetation remaining the possibility of not finding target species that were in fact there obviously increased. Much more attention was paid to these areas to reduce this limitation as far as possible. However, there remains a small possibility that some individuals (particularly of smaller species or juveniles) could have been missed.

3.0 SURVEY RESULTS

3.1 Survey area condition, general comments

A more detailed assessment of the condition of the vegetation of the sections of road surveyed for this report will be provided in another report (Dylan Copeland, pers. comm.). This section is simply aimed at providing a general assessment of the condition to support the adequacy of the targeted rare flora search.

The condition of the road verges in the survey areas varied quite substantially, from completely degraded (mown or slashed verge) through various degrees of parkland cleared and very poor condition to poor to good condition and in some small areas good to very good condition. Weed invasion is high in many parts of the road verges, but even then some native flora (Photograph 1) can persist, although this may diminish over time as weed levels increase and more aggressive species of weeds invade the verges.

Photograph 1: Plant of *Ptilotus obovatus* (forma) growing with the grasses **Bromus diandrus* and an *Austrostipa* species.

Photograph 2: A section of the west side of McGregor Road that was recorded from a vehicle rather than walking due to the high level of degradation

Photograph 3: A section of the Koorda-Bullfinch Road west of Mukinbudin showing complete degradation with native flora replaced by weeds. This section was also recorded from a vehicle.

3.2 Some species recorded in the survey area excluded as target species

Some species recorded in the survey area are members of the same genera as some target species. They are briefly discussed to show that target species have not been mis-determined. They include *Austrostipa*, *Dampiera*, *Lepidosperma*, *Acacia* and *Grevillea* species.

3.2.1 *Austrostipa* species recorded in the survey area

The Priority 2 species *Austrostipa* sp. Dowerin (G. Wiehl F 8004) (= *Austrostipa frankliniae*) is on the list of "target" species for the survey area. It has a distinctive combination of brown hairs on the lemmas and curled leaves that create circular patterns (Williams 2022). While two *Austrostipa* species were fairly common in the survey area neither had this distinctive combination of characters. One did have brown hairs on the lemmas, but consistently had straight leaves. The other taxon had white hairs on the lemmas. Numerous examinations of plants of *Austrostipa* were made through the survey areas to ensure that the target *Austrostipa* species was unlikely to be overlooked.

3.2.2 *Dampiera* species recorded in the survey area

Two *Dampiera* species are on the list of target species for the survey area; *Dampiera scaevolina* and *Dampiera* sp. Wialki. A *Dampiera* species was recorded at two localities during the survey; it was identified as the very widespread species *Dampiera lavandulacea*.

Photograph 4: *Dampiera lavandulacea* was recorded at two localities in the survey area.

3.2.3 *Hakea* species recorded in the survey area

Hakea rigida was one of the target species for the report. The closely related *Hakea scoparia* subspecies *scoparia* was recorded. *Hakea scoparia* subspecies *scoparia* (Photograph 5 below) has "prominent black-pusticulate tubercles" on the fruit (Flora of Australia vol. 17B, p155). Another quite distantly related *Hakea* was also recorded.

Photograph 5: *Hakea scoparia* subsp. *scoparia* a close relative of the target species *Hakea rigida* was recorded.

3.2.4 *Darwinia* species recorded in the survey area

Three plants of a *Darwinia* species (Photograph 6) were seen during the survey. Two were at one locality on Nungarin North Road, with one plant in the verge next to the fence (at 0612540 m E and 6569001 m N) with another plant just inside the fence. There is remnant bushland inside the fence on both sides of the road and it is possible that there are more plants there. The third plant was seen in a very disturbed road verge on the west side of Nungarin North Road at 0611844 m E 6570672 m N and was a large shrub 50 centimetres tall and 2 by 1.8 metres across (see Photograph 7).

One of the target species for the survey was *Darwinia* sp. Chiddarcooping which is related to *Darwinia purpurea*. *Darwinia* sp. Chiddarcooping has quite narrow linear leaves with a sharp point and a shallow triquetrous cross section. Its inflorescence bracts have broad bases that taper fairly abruptly into long linear tips that are sub-equal to the bases in length. These

characteristics do not match the taxon recorded during the survey, which has shorter leaves and inflorescence bracts without linear tips (see Photograph 6).

Photograph 6: *Darwinia purpurea* forma from the survey.

The *Darwinia* recorded is best identified as a "form" of *Darwinia purpurea*, which seems likely to be a species (or subspecies) complex. Miller and Barret (2010) identify variation (using DNA analysis techniques) in the material of *Darwinia purpurea* they sampled that appears to represent either sub-specific or species variation. However, their geographically closest sample was collected about 65 kilometres from the current survey area and their data may not include the same form of the taxon. The survey area records are from the eastern edge of the distribution of *Darwinia* purpurea (although not the most eastern part) and are in an area with no collections of the species in Australian herbaria. Interestingly, the type of the species is from outside the range of the species given on Australasia's Virtual Herbarium, which may indicate a problem with the application of the name. The *Darwinia* recorded therefore probably represents a taxon that needs further study to determine its conservation significance and appropriate name.

Photograph 7: A plant of *Darwinia purpurea* forma growing in an otherwise completely degraded road verge.

3.2.5 *Lepidosperma* species recorded in the survey area

Lepidosperma sp. Billyacatting was one of the target species for the survey. This taxon is a robust sedge with culms 1 metre long and 10-12 mm wide that are viscid at the base and have tuberculate margins. The original collection was recorded as growing at the "Well watered edge of south facing sheet granite rock beneath tall EW flared slope" (all data from label details for S.D. Hopper 8630 on Australasia's Virtual Herbarium).

While *Lepidosperma* species were recorded during the survey, they were smaller species with narrower culms that were not tuberculate. They also all occurred in quite different habitat to the reference collection (S.D. Hopper 8630) for the target species.

3.2.6 *Grevillea* species recorded in the survey area

Four *Grevillea* taxa were identified as target taxa in the search list provided. They are: *Grevillea minutiflora*, *Grevillea nana* subsp. *abbreviata*, *Grevillea petrophiloides* subsp. *remota* and *Grevillea squiresiae*.

Several populations of *Grevillea* species were recorded during the survey. Two of these were of *Grevillea petrophiloides*; however the combination of characters (style colour, leaf division, colour of old flowers) of the plants meant that both occurrences were referrable to *Grevillea petrophiloides* subspecies *petrophiloides* (see Photograph 8).

Photograph 8: Flowering branch of *Grevillea petrophiloides* subspecies *petrophiloides*; note the pink-red styles and more than ten terminal divisions to the leaves.

The other *Grevillea* species recorded were *Grevillea paniculata, Grevillea acuaria* and *Grevillea huegelii*. These are all widespread species that have been recorded in the area surrounding the survey area. There is a collection of *Grevillea paniculata* on Australasia's Virtual Herbarium from very close to one of the localities it was recorded at during the current survey.

3.2.7 *Eucalyptus* species recorded in the survey area

Three *Eucalyptus* taxa are on the target species list for the survey area. These are *Eucalyptus brevipes*, *Eucalyptus caesia* subsp. *magna* and *Eucalyptus leptophylla* var. *floribunda* (= *Eucalyptus efflorescens*).

Eucalyptus caesia subsp. *magna* has large flowers and fruit that are pruinose, no *Eucalyptus* at all like this was observed in the survey area, so it can be excluded. The other two target *Eucalyptus* species are mallees to five and ten metres tall respectively and both have narrow

leaves. Photographs were taken of a representative sample of the *Eucalyptus* species seen during the survey (form, bark, leaves, fruit and buds if available). None of the *Eucalyptus* species observed had the combination of characters that *Eucalyptus brevipes* and *Eucalyptus efflorescens* have.

3.2.8 *Acacia* species recorded in the survey area

Six *Acacia* taxa are on the target species list for the survey area. These are *Acacia ancistrophylla* var. *perarcuata*, *Acacia crenulata*, *Acacia denticulosa*, *Acacia lanei*, *Acacia merrickiae* and *Acacia sciophanes*. *Acacia* is a very speciose genus and it was not surprising that a number of *Acacia* were encountered during the survey. Each *Acacia* species encountered was checked in the field against a prepared print out of illustrations from World Wide Wattle showing diagnostic features and photographs of the target species. None of the target *Acacia* species was recorded and it was not considered necessary to identify the species observed, although photographs were taken if it became necessary.

3.2.9 *Eremophila* species recorded in the survey area

Three *Eremophila* species are on the "target" species list; *Eremophila resinosa*, *Eremophila virens* and *Eremophila viscida*. All three of these species have large more or less lanceolate leaves. Three *Eremophila* species were recorded in the survey area, but are all quite unlike the three target species. The three *Eremophila* species recorded were: *Eremophila granitica*, *Eremophila decipiens* subsp. *decipiens* and *Eremophila oppositifolia*

3.3 Priority flora species recorded

3.3.1 *Thysanotus tenuis* [Priority 3]

One plant of *Thysanotus tenuis* was recorded. The plant seen is compared in the table below to the plate in Edward's Botanical Register (1838, 24 t50) where the species was described (this seems to be the only image of the species readily available). Note the close similarity in form of the plant, the leaves, the anther type and the inflorescence structure between the plate and the photograph.




Table 1: Comparison of the plate from the original description of *Thysanotus tenuis* to photographs of the single plant recorded during the survey.

The one plant of *Thysanotus tenuis* recorded was observed within ten metres of 611925 m E and 6570470 m S, on the west side of Nungarin North Road. Due to a recording error a more accurate geocode is not available. The location is close to the southern edge of the *Baeckea exserta* (= *Balaustion exsertum*) population in one of the small areas of better condition in the survey area.

3.3.2 *Baeckea exserta* (=*Balaustion exsertum*) [Priority 3]

One population of *Baeckea exserta* (= *Balaustion exsertum*) was found during the survey. It was located on the verge of the west side of Nungarin North Road and was observed to extend into the adjoining property. The taxon observed was identified on a combination of characters,

including: the bracteoles well below bud/flower and persistent, the brownish hypanthium rim, the rugose-pitted hypanthium, plant form (low shrub, ground hugging), and leaf aggregation and shape. The population recorded is also located in the known distribution of the taxon.

Photograph 6: *Baeckea exserta* (= *Balaustion exsertum*) showing the bracteoles well below the hypanthium and persistent and other characteristics.

Number of plants	**Easting**	**Northing**
1 plant on fence line	0611917 E	6570488
3 plants on verge	0611904	6570523
2 plants on verge	0611903	6570527
2 plants on verge	0611899	6570538
2 plants on verge	0611903	6570530

Table 2: Location details of the population of *Baeckea exserta* (= *Balaustion exsertum*) recorded. The geocodes are WGS84 datum.

The population of *Baeckea exserta* (= *Balaustion exsertum*) was in the road verge and was observed to extend into the adjoining private property. The number of plants observed in the road verge and their locations is given in Table 2. Note that the population was not surveyed in the adjacent private property.

3.4 No Declared rare flora species were recorded

No Declared Rare Flora species were recorded in the study area.

3.5 Known *Eremophila viscida* locality in the survey area

A locality where *Eremophila viscida* has previously been recorded on the west side of Nungarin is marked by rare flora posts. This locality (and adjoining areas) was searched particularly intensively, but no plants of *Eremophila viscida* were seen. However, it is possible that seed of this species remains in the soil and might germinate after the appropriate stimulus (possibly fire). The southern rare flora post is at 0611974 m E 6570367 m N (WGS84 datum).

3.6 Remnant native vegetation on private land in the south-east corner of McGregor Road and Koorda-Bullfinch Road

Given the high degree of clearing of the landscape in the Mukinbudin region, any remnant of native vegetation, especially of flatter areas, has conservation value for flora and vegetation. However, none of the target species for the survey were recorded in the area. The vegetation consisted of *Eucalyptus* mixed woodland over *Acacia* scattered tall shrubs over *Atriplex, Maireana, Sclerolaena* low shrubland. Associated species noted included *Ptilotus obovatus, Lomandra* sp., *Ptilotus polystachyus, Dianella revoluta, Allocasuarina* sp. and *Aristida contorta*.

4.0 ACKNOWLEDGEMENTS

Map 1 was provided by the Shire of Mukinbudin's representative Mr Dylan Copeland, who also provided assistance in the field and the results of Nature Map Declared Rare and Priority Flora searches for an area 20 km around each of the three road sections surveyed.

The owners of the remnant native vegetation on private land in the south-east corner of McGregor Road and Koorda-Bullfinch Road kindly gave permission to enter the land and search for the target flora.

5.0 REFERENCES

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Miller, B. and M. Barret (2010). An integrated research program into the *ex situ* and *in situ* conservation, restoration and translocation requirements of *Darwinia masonii* and *Lepidosperma gibsonii* May 2007- June 2010. Report to Sponsors, October 2010. Botanic Gardens and Parks Authority (Kings Park and Botanic Garden).

Williams, Alexander R. (2022). *Austrostipa* (Poaceae) in Western Australia: new species, new records, keys and character notes. *Nuytsia* 33. Pp39-101.

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6.0 APPENDIX 1. List of Declared Rare and Priority Flora from Nature Map for a 20 km radius from the survey area

Lists of Declared Rare and Priority Flora from Nature Map for a 20 km radius for each of the three road sections were supplied by Mr Dylan Copeland. These were combined to provide an overall list for the three areas.

Acacia ancistrophylla var. perarcuata
Acacia crenulata
Acacia denticulosa
Acacia lanei
Acacia merrickiae
Acacia sciophanes
Aluta aspera subsp. localis
Austrostipa sp. Dowerin (G. Wiehl F 8004) (Austrostipa frankliniae)
Baeckea exserta (Balaustion exsertum)
Baeckea sp. Beringbooding (A.R. Main 11/9/1957) (Balaustion filifolium)
Baeckea sp. Stockton Road (M.E. Trudgen MET22077 & B. Rye) (Balaustion bimucronatum)
Boronia adamsiana
Calytrix plumulosa
Chamelaucium sp. Mukinbudin (M. Squire 007)
Dampiera scaevolina
Dampiera sp. Wialki (B.H. Smith 482)
Darwinia sp. Chiddarcooping (S.D. Hopper 6944)
Drummondita sp. Trayning (A.M. George 97) (Drummondita billyacatting)
Eremophila resinosa
Eremophila virens
Eremophila viscida
Eucalyptus brevipes
Eucalyptus caesia subsp. magna
Eucalyptus leptophylla var. floribunda (Eucalyptus efflorescens)
Gastrolobium spectabile
Grevillea minutiflora

Grevillea nana subsp. abbreviata
Grevillea petrophiloides subsp. remota
Grevillea squiresiae
Hakea rigida
Hysterobaeckea ochropetala subsp. ochropetala
Lechenaultia galactites
Lepidium genistoides
Lepidosperma sp. Billyacatting (S.D. Hopper 8630)
Melaleuca sciotostyla
Stylidium merrallii
Tecticornia sp. Lake Wallambin (K.A. Shepherd KS 1157)
Thysanotus tenuis
Verticordia mitodes
Verticordia roei subsp. meiogona