

OCTOBER 2020



CUNDERDIN-WYALKATCHEM ROAD SURVEY REPORT

FLORA AND VEGETATION SURVEY

DYLAN COPELAND
WHEATBELT REVEGETATION AND CARBON
wheatbeltrevegetation.com.au

TABLE OF CONTENTS

EXECUTIVE SUMMARY	- 1 -
INTRODUCTION	- 1 -
BACKGROUND	- 2 -
<i>Scope</i>	- 2 -
<i>Catchment landscape context</i>	- 2 -
Climate	- 2 -
Geology	- 2 -
Soils	- 3 -
Vegetation	- 3 -
Land use	- 3 -
METHODOLOGY	- 3 -
<i>Desktop study</i>	- 3 -
<i>Field Investigation</i>	- 4 -
RESULTS	- 4 -
<i>Desktop study</i>	- 4 -
Vegetation	- 4 -
IBRA Region	- 5 -
IBRA Subregion	- 5 -
System Association	- 5 -
Vegetation Association	- 5 -
Description	- 5 -
Remaining % (System/ Vegetation)	- 5 -
Soils	- 6 -
System ID	- 7 -
System Name	- 7 -
System Description	- 7 -
Rare and Priority Flora	- 8 -
TECs	- 8 -
Environmentally Sensitive Areas	- 8 -
<i>Field Flora Survey</i>	- 8 -
Rare and Priority Flora	- 8 -
TECs	- 8 -
Environmentally Sensitive Areas	- 13 -
Photographs	- 13 -
CONCLUSION	- 14 -
REFERENCES	- 16 -
<i>GIS Databases:</i>	- 16 -
APPENDICES	- 17 -
<i>Appendix A—About the Authors</i>	- 17 -
Dylan Copeland, Wheatbelt Revegetation and Carbon	- 17 -
Steve Fry, Santaleuca Consulting	- 17 -
<i>Appendix B—Species List from Gravel Reserve</i>	- 18 -

EXECUTIVE SUMMARY

The Shire of Wyalkatchem have a clearing permit application (CPS 8560/1) with the Department of Water and Environmental Regulation. This application covers approximately 10 kilometres of roadsides along Cunderdin–Wyalkatchem Road between the SLKs 7.8–17.9. Within this area, DWER suggested that the area between SLKs 14.6–17.5 be surveyed.

The Shire of Wyalkatchem decided to survey the whole length of Cunderdin–Wyalkatchem Road that occurs in their Local Government Area (LGA). This work was contracted to Dylan Copeland of Wheatbelt Revegetation and Carbon, assisted by Steve Fry of Santaleuca Consulting (the authors).

The survey found that much of the roadside vegetation consisted of agricultural weeds and planted eucalypt species not native to the area. Neither Declared Rare Flora (DRF) nor Threatened Ecological Communities (TECs) were observed in the survey area.

The most significant patch of remnant vegetation within the survey area was associated with an historic gravel pit at the intersection of Cunderdin–Wyalkatchem, Borgward, and Davies South Roads. This area was surveyed intensely, and a list of species produced, but no presence of DRF was observed.

INTRODUCTION

In June 2019, the Shire of Wyalkatchem applied for a clearing permit (CPS 8560/1) to clear 3.8068 hectares of native vegetation within the Cunderdin–Wyalkatchem Road reserve for the purpose of road construction/upgrades.

In correspondence from the Department of Water and Environmental Regulation dated 13 November 2019, the Shire was informed that a flora and vegetation survey was required, as was an assessment to confirm the presence/absence of the *Eucalypt Woodlands of Western Australian Wheatbelt* Threatened Ecological Community.

Based on this correspondence, and the Shire’s plans for future road upgrades, the decision was made to survey the entirety of the Cunderdin–Wyalkatchem Road reserve within the Shire.

This report is intended to be read alongside the report produced by Santaleuca Consulting, *Vegetation Condition Report: Wyalkatchem–Cunderdin Rd, Shire of Wyalkatchem* (included at the end of this report). As Botanist on the project, Steve Fry’s report contains the full results of the survey, while this report outlines the project scope and design, including the Desktop Survey, as well as a brief summary of the results of the surveys.

This survey was consistent with the EPA’s *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (December 2016)*.

BACKGROUND

Scope

Wheatbelt Revegetation and Carbon was engaged by the Shire of Wyalkatchem to conduct a flora and vegetation survey and assessment of the presence/absence of the *Eucalypt Woodlands of Western Australian Wheatbelt* TEC of the roadsides along Cunderdin–Wyalkatchem Road. The survey was to extend from Wyalkatchem townsite to the Shire boundary, some 31.2 km. Wheatbelt Revegetation and Carbon engaged the services of Steve Fry of Santaleuca Consulting as Botanist for the survey.

The survey was conducted on 3 September 2020, with a supplementary site visit conducted on 29 October 2020.

Catchment landscape context

The end of the Cunderdin–Wyalkatchem Road, at the southern edge of the Wyalkatchem townsite, sits at an elevation of approximately 315 m. Heading south from town, the elevation consistently decreases to approximately 250 m at the salt lake system associated with Derdibin Nature Reserve twenty kilometres from town. From here, the elevation steadily rises to 300 m at the Shire boundary. This is reflected in the vegetation types discussed below.

Climate

According to the Köppen climate type, this section of the Cunderdin–Wyalkatchem Road extends across the fringe between the hot semi-arid and the cold semi-arid.

The closest Bureau of Meteorology weather station is with the Wyalkatchem townsite (10140) and has a long-term average annual rainfall of 329.1 mm.¹

Geology

The length of the area to be surveyed means that it passes through several different geologic types. Most of the road occurs in the Northern Zone of Ancient Drainage, making it, “Deeply weathered mantle & alluvium over granitic, gneiss & greenstone rocks of the Yilgarn Craton.”²

¹ “Monthly rainfall: Bullfinch,” Bureau of Meteorology, accessed 21 September, 2020.
http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=010140

² Department of Primary Industries and Regional Development.
HydrologicalZonesofWesternAustraliaDPIRD_069. Shapefile. Last modified 05-12-2018.
<https://catalogue.data.wa.gov.au/dataset/hydrological-zones-of-western-australia>.

However, it does begin to crossover into the Northern Zone of Rejuvenated Drainage at the southern end, which “lies on a basement of granitoid rock at the western edge of the Yilgarn Craton.”³

Soils

The road moves through a range of different soil types. From salt lake flats and associated features, such as dunes, rising slightly in elevation to broad valley floors with sand over clay. As the elevation continues to rise, it passes through yellow sandplain and gravel. There are patches of white sand and red and greyish brown loamy sands.

See the results of the desktop study for further discussion of the site’s soils.

Vegetation

The site consists of the following Beard vegetation associations:

1. 1049: Woodland, York gum, salmon gum etc.
2. 1062: Samphire with thicket & scattered trees, Tea tree with York gum, casuarina, Tecticornia spp. Melaleuca spp. *Eucalyptus loxophleba*, *Casuarina obesa*.

See the results of the desktop study for further discussion of the site’s vegetation.

Land use

The immediate area surveyed was road reserve and an historic gravel pit. Beyond these areas, the land use of the surrounding area is agricultural, specifically broadacre cropping and livestock (predominantly sheep).

METHODOLOGY

Desktop study

A desktop study of existing geospatial information was undertaken prior to the site visit. This involved using Geographical Information System (GIS) to review existing site digital orthophotos, geology, elevation profiles, soil type, native and planted vegetation, IBRA classification, Threatened Flora (TF), Priority Flora (PF) and Threatened Ecological Communities (TECs).

State and Commonwealth database searches for potential DRF, PF, and Threatened Ecological Communities (TEC), within a twenty-kilometre buffer of the survey sites was undertaken as part of the desktop study.

Results of interest produced from the above were cross-referenced with FloraBase.

³ Ibid.

The Shire of Wyalkatchem also provided a copy of correspondence from DWER dated 13 November 2019. This was reviewed and its discussion around DRF and TECs was incorporated into the field investigation methodology.

Field Investigation

The first site visit was conducted on 3 September 2020. Given that there was over 31 kilometres to cover, the authors began by driving the road south from town to the Shire boundary to identify the main features. The roadsides were narrow, and the understorey dominated by agricultural weeds. Once the LGA boundary was reached, the authors began to slowly head back towards the Wyalkatchem townsite, stopping frequently to search the roadsides for species and to take photographs. Changes in vegetation type and condition were recorded. Species observed were logged according to SLK range.

The range of the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC, as outlined in Figure 7 in the correspondence from DWER, was visited and assessed for its actual presence.

RESULTS

Desktop study

Vegetation

Cross-referencing the *Pre_EuropeanVegetationDPIRD_006* shapefile with the spreadsheet, *Vegetation_Statistics_Statewide_2018_Full_report*, indicates that the vast majority of the site consists of medium woodland. Approximately 1.7 km of the 31.23 km of road passes through succulent steppe, as indicated on the map below. The Beard vegetation associations and percentages remaining within the Shire of Wyalkatchem are in Table 1.

Figure 1. Pre-European Vegetation Association

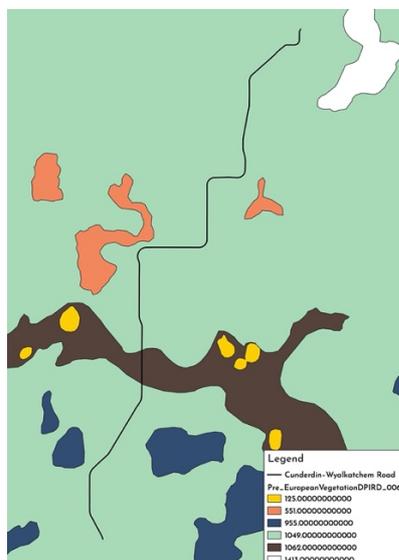


Table 1. System and Vegetation Associations

IBRA Region	IBRA Subregion	System Association	Vegetation Association	Description	Remaining % (System/Vegetation)
Avon Wheatbelt	Merredin	JIBBERDING	1049	Medium woodland; wandoo, York gum, salmon gum, morrel & gimlet	6.47 / 6.36
		JIBBERDING	1062	Succulent steppe with open woodland & thicket; york gum over Melaleuca thyiodes & samphire	48.80 / 48.80
		GOOMALLING	1049	Medium woodland; wandoo, York gum, salmon gum, morrel & gimlet	7.01 / 6.36

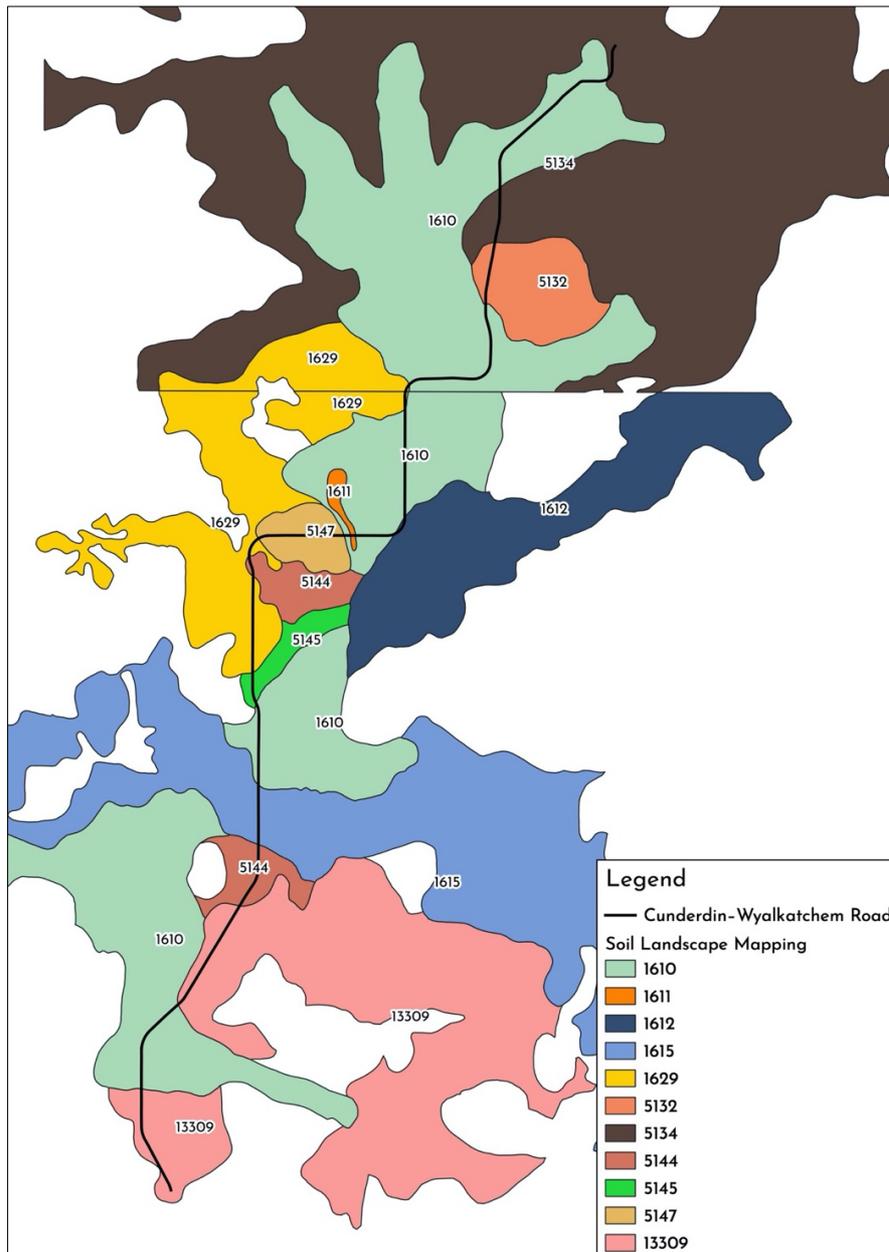
However, when inspecting the relevant aerial imagery, it appeared that the soil type may be suited to a slightly wider range of vegetation types. For example, at SLK 13.40—well within the medium woodland range—there appeared to be a gravel pit (this site is in an adjacent paddock and is not to be confused with the gravel reserve at ~SLK 14.8 which is discussed in detail elsewhere).

Subsequent consultation with the *SoilLandscapeMapping_BestAvailableDPIRD_027* shapefile revealed a much more complicated picture, covered in the following section.

Soils

Reviewing the Department of Primary Industries and Regional Development's *SoilLandscapeMapping_BestAvailableDPIRD_027*⁴ shapefile indicated a much more varied range of soil types than would appear to have been indicated by the vegetation associations. The contrast between the maps in Figures 1 and 2 is significant.

Figure 2. Soil Landscape Mapping



⁴ Department of Primary Industries and Regional Development. *SoilLandscapeMapping_BestAvailableDPIRD_027*. Shapefile. Last modified 02-08-2019. <https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-best-available>.

Table 2. Soil Type by System and Description

System ID	System Name	System Description
1610	Kellerberrin, Belka Subsystem	Broad, flat valleys of the central and eastern wheatbelt containing sand over clay soils.
1611	Kellerberrin, Belka saline Phase	Broad, flat valleys of the central and eastern wheatbelt containing sand over clay soils. Saline.
1612	Kellerberrin, Merredin Subsystem	Broad, flat valleys of the eastern wheatbelt containing heavy, red and grey soils.
1615	Wallambin, Baandee Subsystem	Salt lakes, channels, flats and associated dunes.
1629	Tandegin, Ulva Subsystem	Yellow sandplain and gravel plain of the Eastern wheatbelt. This unit contains small areas of pale sand.
5132	Kwolyin, Kwelkan Subsystem	Undulating granitic low hills, in the central Zone of Ancient Drainage, with bare rock, deep sandy duplex (grey and red), shallow sand (red and yellow/brown) and red loamy duplex. York gum-jam woodland.
5134	Kwolyin, Nembudding Subsystem	Rises and low hills, in the northern Zone of Ancient Drainage, with alkaline red loamy duplex (mostly shallow) and yellow sandy earth. Mallee scrub and woodland.
5144	Tandegin, Booraan Subsystem	Hillslopes predominantly containing hardsetting, grey to brownish sandy loam over clay soils.
5145	Tandegin, Collgar Subsystem	Gentle, lower slopes containing sandy surfaced duplex or "mallee soils".
5147	Tandegin, Danberrin Subsystem	Areas of rocky, red and greyish brown loamy sands and sandy loams formed from freshly exposed bedrock. Rock outcrop is common.
13309	Cunderdin subsystem	Yellow aeolian sand with patches of white sand and some areas of sand over gravel

Rare and Priority Flora

Correspondence from DWER to the Shire of Wyalkatchem listed the following Declared Rare Flora species:

- *Acacia volubilis* (T)
- *Daviesia cunderdin* (T)
- *Guichenotia seorsiflora* (T)
- *Verticordia hughanii* (T)
- *Verticordia mitchelliana* subsp. *mitchelliana* (P3)
- *Acacia campylophylla* (P3)
- *Urodon capitatus* (P3)
- *Phebalium drummondii* (P3)
- *Boronia ericifolia* (P2)
- *Podotheca pritzelii* (P3)
- *Daviesia smithiorum* (P2)

To this list we added the following species by cross-referencing the NatureMap report produced for the area with FloraBase records: *Acacia caesariata* (T) and *Melaleuca grieviana* (P1).

TECs

The Federal Government's Protected Matters Search Tool indicates that the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC is likely to occur within area and the aforementioned correspondence from DWER included a map of the potential areas of this TEC.

Environmentally Sensitive Areas

The only identified Environmentally Sensitive Areas (ESAs) are likely to be related to the presence of DRF.

Field Flora Survey

Rare and Priority Flora

No rare or priority flora were observed.

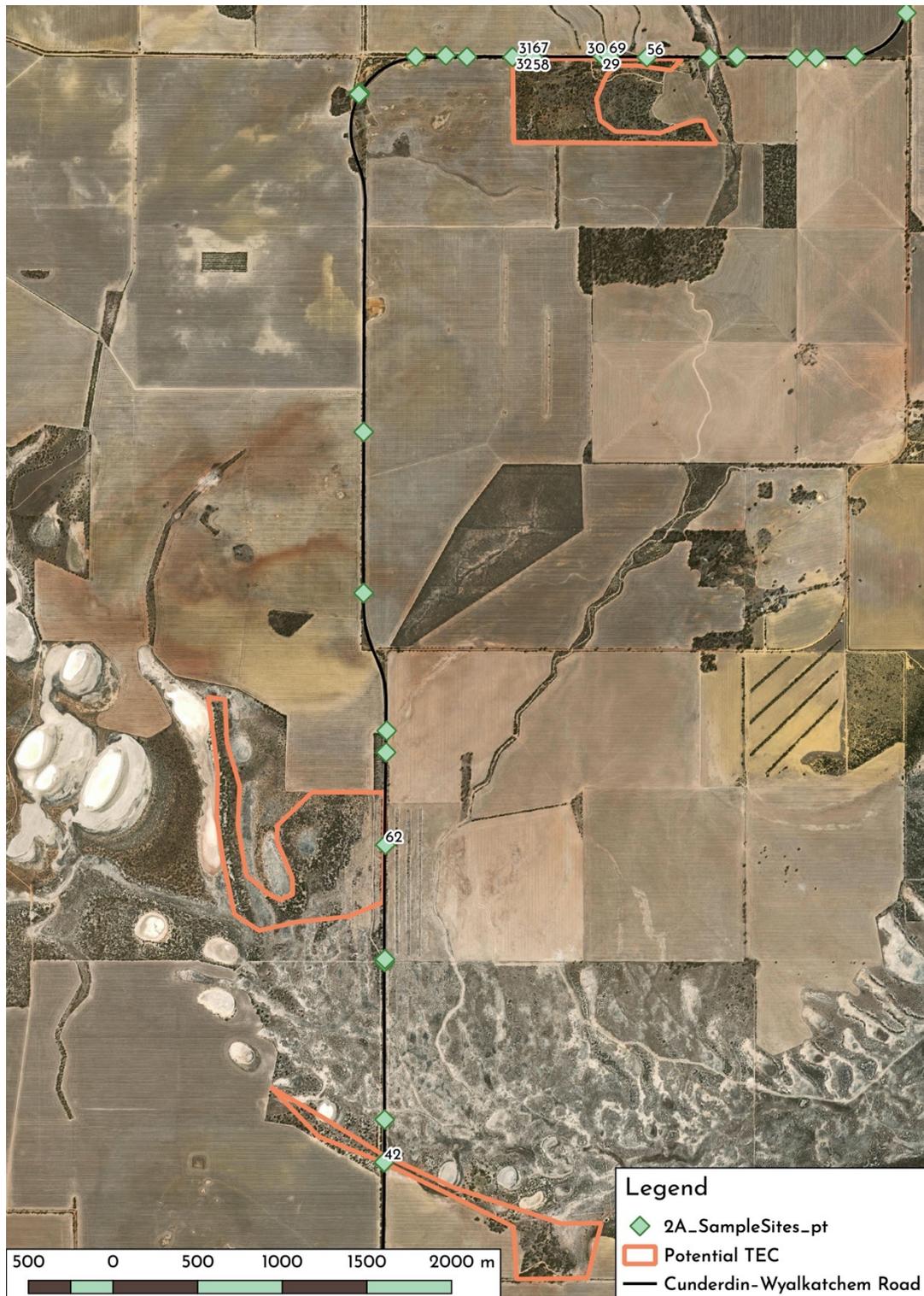
TECs

Included with the correspondence to the Shire of Wyalkatchem from DWER, was a map indicating areas that had potential to be *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC. The author created a shapefile that is a rough approximation of the relevant areas for the purpose of using GIS software to perform an analysis.

This shapefile has been cross-referenced with photographs taken from both site visits to produce a list of relevant photos, as seen in Figure 3. The number of the

photograph is a truncated version of the full name (e.g. photograph WM-CMT Rd 62 is simply labelled “62”).

Figure 3. Potential TEC Areas and Photopoints



It is clear from assessing the aerial imagery for the two most southern areas indicated as potential TEC are unlikely to meet the criteria for the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC. Photographs 1 and 2 taken at the site visits are below and show these two areas in more detail.

Photograph 1. WM-CMT Rd 42



Photograph 1 shows planted eucalypts on the western (left) road verge. Behind these trees is historic revegetation. Behind the trees on the eastern (right) side is salt lake. The roadside vegetation is not part of a continuous patch of *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC.

In Photograph 2 there is the occasional planted tree in the foreground, with saltbush revegetation in the background. The roadside vegetation is not part of a continuous patch of *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC.

Photograph 2. WM-CMT Rd 62



The northern-most area indicated as potential TEC is less readily assessed from the aerial imagery. However, the site inspection revealed that, from the road to approximately 200 m south into the patch, wherever the dominant overstorey species was a eucalypt it was a mallee and not the required tree form. There may indeed be *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC within the larger remnant but if there is it does not form a continuous patch with the roadside vegetation. See Photographs 3 to 5 below.

Photograph 3. WM-CMT Rd 56



Photograph 4. WM-CMT Rd 58



Photograph 5. WM-CMT Rd 30



Environmentally Sensitive Areas

The only likely ESAs would be in relation to DRF, and no DRF were observed.

Photographs

Photographs were taken regularly along the road. Examples of the photographs can be seen above.

All the photographs taken are available as full-sized, stamped, geo-tagged photographs at <https://www.wheatbeltrevegetation.com.au/shire-of-wyalkatchem-photos> (password: SeventeenMileGate).

CONCLUSION

The approximately 31.2 km of roadsides of Cunderdin–Wyalkatchem Road, from the Shire of Wyalkatchem’s boundary with the Shire of Cunderdin to the townsite of Wyalkatchem is dominated by agricultural weeds and planted eucalypt species not native to the area. Even beyond the road reserve there are significant areas that have been revegetated. There are areas of remnant vegetation, usually associated with gravel soils. Elsewhere, there are isolated native eucalypt species, and larger sections of acacias and melaleucas.

Photograph 6 shows an avenue of planted eucalypt species with two Salmon Gums in the distance. The view is even more stark looking back when the Salmon Gums are in the foreground (Photograph 7).

At no stage is the road reserve dominated by native eucalypt species appropriate to the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC. Neither are there any areas of the road reserve that form a continuous patch with adjacent vegetation consistent with the listing advice for the TEC.

Photograph 6. Planted Eucalypts with Salmon Gums in the Distance.



Photograph 7. Two Salmon Gums Among an Avenue of Planted Eucalypts



REFERENCES

- Threatened Species Scientific Committee (TSSC) (2015). *Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt*. Department of the Environment. Canberra. Available from:
<http://www.environment.gov.au/biodiversity/threatened/communities/pubs/128-conservation-advice.pdf>.
- Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions.
<https://florabase.dpaw.wa.gov.au/> (Accessed September–October 2020).

GIS Databases:

- SoilLandscapeMapping_BestAvailableDPIRD_027
- HydrologicalZonesofWesternAustraliaDPIRD_069
- 10metrecontoursDPIRD_073
- WheatbeltWetlandsStage1DBCA_021
- GeologicUnitPolygons1M
- ibra7_regions
- ibra7_subregions
- Pre_EuropeanVegetationDPIRD_006

APPENDICES

Appendix A – About the Authors

This report was produced by Dylan Copeland of Wheatbelt Revegetation and Carbon, in association with Steve Fry of Santaleuca Consulting. Steve was the Principal Botanist and Dylan was the Project Manager, and responsible for GIS and photography.

Steve and Dylan have worked together on various flora surveys for clearing permit applications for the Shires of Kellerberrin, Mt Marshall, and Westonia. Together they have also produced Revegetation Plan for Lot 306 on Deposited Plan 409422 as part of an offset proposal to the Department of Water and Environment Regulation (DWER) for the Shire of Kellerberrin under CPS 8253/1.

Dylan Copeland, Wheatbelt Revegetation and Carbon

Although Wheatbelt Revegetation and Carbon is a new venture for Dylan Copeland, since 2013 he has been providing Natural Resource Management Officer services to a number of Local Governments in the eastern Wheatbelt. During this time, he has been a Project Manager on nineteen revegetation projects, including the Federally-funded *Connecting Biodiversity Across the Wheatbelt of Western Australia* project, as well as many State NRM Office-funded projects.

This role included all aspects of the project, from design, development, and funding application, through to site visits, seedling lists and nursery orders, and reporting and acquittal (some of these projects are completed and some ongoing).

Dylan Copeland is contactable at the following addresses:

Email: dylan@wheatbeltrevegetation.com.au

Postal: Wheatbelt Revegetation and Carbon
PO Box 187
Mukinbudin WA 6479

Steve Fry, Santaleuca Consulting

Since 1994, Steve Fry has been involved in all aspects of seed collecting and revegetation. Steve owned and operated Perenjori Tree Farm, provided contract revegetation services, collected and traded native seed, worked for various LGAs (both as an employee and consultant), and established his own sandalwood plantation (as well as contract services). Steve has submitted many flora and vegetation surveys and reports to DWER.

Steve Fry is contactable at the following addresses:

Email: fryclan@bigpond.com

Postal: Santaleuca Consulting
PO Box 278
Narembeen WA 6369

Appendix B–Species List from Gravel Reserve

<i>Genus</i>	<i>Species</i>	<i>Common Name</i>
Acacia	neurophylla	<i>Wodjil</i>
Acacia	tetragonaphylla	<i>Prickly acacia</i>
Allocastraria	acutivalvis	<i>Black tammar</i>
Allocastraria	campestris	<i>Tammar</i>
Astroloma	seratifolium	<i>Astroloma</i>
Austrostipa	elegantissima	<i>Feathergrass</i>
Comesperma	integerrimum	<i>Blue milkwort</i>
Eucalyptus	erythronema	
Eucalyptus	subangusta <i>ssp</i> subangusta	
Eucalyptus	capillosa	<i>Inland wandoo</i>
Grevillea	paradoxa	<i>Red bottlebrush</i>
Leptospermum	erubescens	<i>Tee tree</i>
Melaleuca	hamata	<i>Brushwood</i>
Melaleuca	marginata	<i>Prickly devil</i>
Melaleuca	conothamnoides	<i>Pom pom melaleuca</i>
Olearia	muellerii	<i>Goldfields daisy</i>
Phebalium	tuberculosum	
Thryptomene	<i>sp</i>	
Thysanotus	patersonii	<i>Climbing fringed lilly</i>
Trachymene	cyanopetala	
Waitzia	acuminatum	<i>Waitzia</i>
Wurmbea	<i>sp</i>	<i>Purple bulb</i>

**VEGETATION CONDITION REPORT
WYALKATCHEM – CUNDERDIN RD,
SHIRE OF WYALKATCHEM.**

**CONDUCTED BY STEPHEN FRY:
ON
3 SEPTEMBER 2020**

Santaleuca Consulting
Steve & Michelle Fry (owners and proprietors)
PO Box 278, Narembeen, WA, 6369
0428 647 419 | 0428 647 409 | info@santaleucasandalwood.com.au
www.santaleucasandalwood.com.au | www.facebook.com/Santaleuca



INTRODUCTION:

The Shire of Wyalkatchem, in support of Clearing Permit Application Number CPS 8560/1, engaged Wheatbelt Revegetation and Carbon to provide a flora and vegetation survey for the section of the Cunderdin–Wyalkatchem Road occurring within the Shire of Wyalkatchem. Wheatbelt Revegetation and Carbon engaged Steve Fry of Santaleuca Consulting as Principal Botanist for the survey.

Cunderdin–Wyalkatchem Road starts at SLK 0.0, the Shire’s boundary with the Shire of Cunderdin, and terminates at the Wyalkatchem townsite at SLK 31.23.

Overall, the road is generally a classic 1 chain road reserve or approximately 23 metres in width. The constructed road width averages 20 metres and the maintenance zone encompasses at least 20 metres and in places the spoil heaps actually reach from fence to fence. Where there is remnant vegetation, it is confined to within 1 or 2 metre strips outside the maintenance zone. Throughout the survey area, agricultural weeds dominate the roadside and only at one place, between SLK 14.4 and SLK 15.3 does a remnant occur which could be considered in Very Good condition according to the Keighery scale.

The landscape generally undulates through a myriad of soil types and landscapes. At the bottom of each successive set of undulations are sections of salt affected valley floor, which rise slowly through loamy and then sandy soil profiles until peaking at gravel hills. This pattern repeats many times.

The most noteworthy feature of the road as a whole is the historical tree planting which occurred probably over 20 years ago. They have matured into large trees, but again are only within the 1-2 metre strip left after maintenance works have been carried out to the road verges. This strip of planted vegetation is not normally found in remnants in the area. They consist of species such as *Eucalyptus cladocalyx* (Sugar gum), *E. camaldulensis* (Red River gum), *E. sargentii* (Salt river gum), *E. leucoxylin rosea* (Red flowering gum), *E. plennisima* (Oil mallee), and *E. torquata* (Coral gum).

METHODOLOGY:

Starting at SLK00 on the Cunderdin border, the road was driven several times and notes as to vegetation condition, type, soils and species noted were recorded in log form. Where anomalies or unknown species were observed, we stopped and investigated in order to identify unknown species or any other thing of interest that was not readily identifiable. At SLK14.4 was a gravel pit site with a small remnant around it. As this was the only remnant which was adjacent to the road a species list of plants was made just in case any Priority or Threatened species may have been present. There were no species found that could be considered on this list, however. The following log uses the Keighery Scale to rate each section as to its condition score.

LOG:

SLK LOG	NOTES	RATING
00 – 2.52	Pipeline on east side, 7 metre bitumen seal, no native vegetation. Ag weeds dominate road reserve.	Completely degraded
2.52 – 2.8	For 300m a single line of remnant <i>E. salubris</i> (Gimlet) <i>E. salmonophloia</i> (Salmon gum). 5 potential habitat trees. Sandy clay soils. Some <i>Santalum acuminatum</i> (Quandong) and <i>Dianella revoluta</i> .	Good
2.8 - 3.6	Pipeline has gone underground. No native veg, all weeds	Completely degraded
3.6 - 4.2	Valley floor dominated by River saltbush, <i>Enchylaena tomentosa</i> , bluebush and weed. On either side duplex sand over clay with <i>Grevillea paniculata</i> , <i>Acacia hemetiles</i> , <i>Melaleuca eleuterostachya</i> .	Good
4.2 - 4.7	No native veg, just weeds	Completely degraded
4.7 - 7.1	No native veg apart from occasional <i>Melaleucas</i>	Completely degraded
7.1 – 7.6	Minimal vegetation. Occasional Quandong, <i>Melaleuca atroviridis</i> , <i>Acacia sessilis</i> and <i>E. plennisima</i> .	Degraded
7.6 – 8.6	Sugar gums on west side, descending to salt valley floor. Weeds solid.	Completely degraded
8.6 – 11.6	An extensive broad valley floor, with varied native vegetation depending on severity of salt. In the better areas, mostly <i>Melaleucas viminea</i> , <i>lateriflora</i> , <i>atroviridis</i> . In the more salt affected areas, various <i>Atriplex</i> species, <i>Enchylaena</i> , <i>Carpobrotus</i> , <i>Samphire</i> with ag weeds filling all other available habitats.	Good
11.6 – 12.4	Uphill on sandplain. Planted <i>E. loxophleba</i> ssp <i>lissophloia</i> (oil mallees) in a line on east side, otherwise weeds.	Completely degraded
12.4 -14.3	Mix of planted Red river gums and Sugar gums, with occasional <i>Allocasuarina</i> and <i>Melaleucas</i> . Weeds dominate.	Completely degraded
14.3 – 14.4	Line of remnant <i>Eucalyptus capillosa</i> (Inland wandoo)	Good
14.4 – 15.32	Gravel extraction Reserve, very good condition remnant apart from	Very Good

	disturbances caused by historical gravel mining. See species list following log.	
15.32 – 15.8	Remnant <i>E. erythronema</i> , <i>Eremophila drummondii</i> , and <i>Allocasuarinas</i> on hill, an extension of the gravel pit ecosystem on east side of road.	Good
15.8 – 16.45	Downhill through sandplain with a mix of <i>Melaleucas hamata</i> , <i>marginata</i> and <i>Acacia acuminata</i> (Jam) and <i>Allocasuarina campestris</i> and <i>acutivalvis</i> .	Good
16.45- 19.07	Salmon gum flats. Sparse remnants of Salmon and Gimlet. Interplanted with <i>E. Sargentii</i> . Very weedy. Adjacent farmland on east salt affected. Drain on west side.	Degraded
19.07- 19.26	Remnant Salmon, Gimlet and York Gums, but only occasional. Weeds.	Good
19.26- 20.6	Bare of remnants. Very weedy.	Completely degraded
20.6- 21.46	Uphill to remnant gravel soils <i>E. capillosa</i> mallee and mixed <i>Allocasuarina</i> on west side farm based remnant. Very weedy.	Good
21.46- 22.8	Sparse remnant old growth York gum, Salmon and Gimlet interplanted with <i>E. sargentii</i> and Salmon gum.	Good
22.8-24.2	Mostly bare, with very weedy verges with some <i>E. torquata</i> planted around 23.2.	Completely degraded
24.2-25.5	Mostly bare, with weeds except at 24.4-24.7 where there are 8 old growth Morell and Salmon gums.	Degraded
25.5-27	Occasional York Gum and Gimlet, with hundreds of metres of occasional <i>Melaleucas</i> and <i>Acacias</i> . Solid weeds throughout.	Good
27-28.44	<i>E. erythronema</i> , oil mallee, red river gums and <i>Callistemon phoeniceus</i> (Bottlebrush) planted. Some Quandongs remnant. Very weedy.	Degraded
28.44- 31.23	Drain on west side of road, no vegetation apart from saline weeds and Saltbushes.	Completely degraded
31.23	Red river gums planted, some <i>Melaleucas</i> and plenty of weeds.	Degraded

The following table is a list of species found at the Gravel pit site at SLK14.4-15.32. Although highly disturbed from historical gravel extraction, the site has rehabilitated well with few weed species within it. On the Keighery scale it would rate as Very Good.

Gravel reserve at SLK 14.4-15.32 Wyalkatchem - Cunderdin Rd.

GENUS	SPECIES	COMMON NAME
Acacia	neurophylla	Wodjil
Acacia	tetragonaphylla	Prickly acacia
Allocasuarina	acutivalvis	Black tammar
Allocasuarina	campestris	Tammar
Astroloma	seratifolium	Astroloma
Austrostipa	elegantissima	Feathergrass
Comesperma	integerrimum	Blue milkwort
Eucalyptus	erythronema	
Eucalyptus	subangusta ssp subangusta	
Eucalyptus	capillosa	Inland wandoo
Grevillea	paradoxa	Red bottlebrush
Leptospermum	erubescens	Tee tree
Melaleuca	hamata	Brushwood
Melaleuca	marginata	Prickly devil
Melaleuca	conothamnoides	Pom pom melaleuca
Olearia	muellerii	Goldfields daisy
Phebalium	tuberculosum	
Thryptomene	sp	
Thysanotus	patersonii	Climbing fringed lilly
Trachymene	cyanopetala	
Waitzia	acuminatum	Waitzia
Wurmbea	sp	Purple bulb

DISCUSSION:

The section of road surveyed was a narrow road verge with maintenance grading to within 1 to 2 metres of the fence line. In some places it left grader spoil to the fence lines.

Throughout the road, agricultural weeds dominate the soil surface allowing no opportunity for native remnants to exist. Only where the land is affected by salinity do remnant Saltbushes, Samphires and other salt tolerant species survive.

Some Melaleucas and Acacias occasionally inhabit areas of the roadside but they are neither abundant nor dominant.

Some remnant Eucalypt species remain in isolated spots either singularly or in only groups of 2 to a maximum of 8 in one place at SLK 24.4. These trees are all very old growth and

often contain habitat hollows. They would not be considered to be a viable patch for the purposes of declaring them as a Threatened Environmental Community under Federal Environmental laws.

A feature of the road is the historical plantings of exotic species of Eucalypts such as Coral gum, Red river gums, Sugar gums, Oil mallees and Salt river gums. They exist in lines only one tree wide on the road reserve as that is all that can survive on the 1-2 metres left of the road reserve.

The only patch of bush which is complete, with little weed burden is between SLK14.4 and 15.32. This is the remnant gravel extraction reserve and is classed as Very Good. No Threatened or Priority species were found during a comprehensive survey of the small area. Elsewhere, throughout the length of the surveyed road, no similar quality remnant was found.

CONCLUSION:

The total of 31.2 kilometres of road which was surveyed is consistently 1 chain wide or approximately 23 metres wide. It is maintained out to approximately 18 to 20 metres and in some places fence to fence. This leaves barely 2 metres each side for vegetation to grow on. Throughout its' length agricultural weeds dominate, apart from the valley floor areas affected by salinity, which are dominated by Saltbush and Samphire species, mostly endemic.

Of the overstorey species, remnant Eucalyptus species are scattered but old growth, with some isolated trees harbouring habitat hollows suitable for bird nesting. Historical plantings, one tree wide are a constant feature over much of its' length. Melaleuca, Allocasuarina and Acacia shrubs appear sporadically over its' length.

No rare or priority species were found especially in the gravel pit at SLK 14.4 which was surveyed extensively. No other remnant areas were surveyed to this extent as there were no areas with enough remnant vegetation or vegetation associations of any quality which could harbour plants due to the extensive dominance of agricultural weeds.

In essence, the road has been maintained consistently wide over many years, coupled with a crippling agricultural weed burden, little opportunity exists for any meaningful vegetation associations to exist. Scattered and isolated remnant Eucalypts, Melaleucas and some Acacias are the only redeeming feature of the roads' remnant vegetation, with infill plantings of exotic Eucalypts.