

***Roadside Vegetation
and Conservation
Values in the Shire of
Carnamah***



January 2005
Roadside Conservation Committee



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Executive Summary

This report, produced by the Roadside Conservation Committee (RCC) provides an overview of roadside conservation issues relevant to the Shire of Carnamah. Primarily providing detailed results of the roadside survey, with accompanying management recommendations, it also briefly describes the natural environment in Carnamah.

The Shire of Carnamah, aware of the need to conserve roadside remnants, liaised with the RCC and university student Sonia Rob in 2004 to survey roads under their control and management. Surveys to assess the conservation values of roadside remnants were conducted from May to June 2004. The majority (84%) of the Shire's 759 km of roadsides were assessed by the RCC for their conservation status and maps produced via a Geographic Information System (GIS).

The survey indicated that high conservation value roadsides covered approximately 44% of the roadsides surveyed, with medium-high conservation value roadsides accounting for 29%. Medium-low and low conservation value roadsides occupied only 13% and 14%, respectively. A more detailed analysis of results is presented in Sonia Rob's Thesis, 2004.

It is envisaged that the prime use of the roadside survey data and roadside conservation value (RCV) map will be for use by Shire and community groups as a management and planning tool. Applications may range from prioritising work programs to formulating management strategies. Past experience has shown that this document and the accompanying maps are valuable as a road reserve planning and management tool, for example;

- identifying degraded areas for strategic rehabilitation or in need of specific management techniques and weed control programs;
- prioritising roadside vegetation protection and/or rehabilitation programs;
- establishing habitat linkages throughout the Shire's overall conservation network;
- developing regional or district fire management plans;
- identifying potential tourist routes, i.e. roads with high conservation value would provide visitors with an insight into the remnant vegetation of the district; and
- incorporating into Landcare or similar projects for 'whole of' landscape projects.

Progressive surveys of some Shires have revealed an alarming decline in the conservation status of many roadside reserves. In some cases the conservation value has declined at a rate of approximately 10% in 9 years. This trend indicates that without appropriate protection and management, roadside reserves will become veritable biological wastelands within the near future. However, proactive and innovative management of roadside vegetation has the potential to abate and reverse this general decline.

Opportunities exist for the Shire of Carnamah to utilise the Roadside Conservation Value map into many facets of its Landcare, tourism, road maintenance operations and Natural Resource Management strategy documents. In addition, the RCC is available to provide assistance with the development of roadside vegetation management plans and associated documents.

PART A

OVERVIEW OF ROADSIDE CONSERVATION

1.0 Why is Roadside Vegetation Important?

Since the settlement of Western Australia by Europeans, large areas of native vegetation in the south west of the state have been cleared for agriculture, roads, settlements, and other development. The fragmentation of the more or less continuous expanse of native vegetation communities by clearing has resulted in the isolation of plant and animal populations. This results in a mosaic of man-made biogeographical islands of small native vegetation remnants.

The flora and fauna in these areas are severely disadvantaged and these habitats are typically unreliable for sustaining wildlife due to limited and scarce food resources, increased disease risk and the reduced genetic diversity caused by a diminishing gene pool. Some habitat fragments may be too small to provide the requirements for even a small population; therefore, it is essential to their survival that they have a means of dispersing throughout the landscape. The presence of native vegetation along roadsides often fulfils an important role in alleviating this isolation effect by providing connectivity between bush remnants. While many roadside reserves are inadequate in size to support many plant and animal communities, they are integral in providing connections between larger areas of potentially more suitable remnant patches. It is therefore important that all native vegetation is protected regardless of the apparent conservation value it contains. It is important to acknowledge that even degraded roadsides have the ability to act as corridors for the dispersal of a variety of fauna.

Other important values of transport corridor remnants are that they:

- are often the only remaining example of original vegetation within extensively cleared areas;
- often contain rare and endangered plants and animals. Currently, roadside plants represent more than 80 per cent of the known populations of DRF and three species are known only to exist in roadside populations;
- provide the basis for our important wildflower tourism industry. The aesthetic appeal of well-maintained roadsides should not be overlooked, and they have the potential to improve local tourism and provide a sense of place;
- often contain sites of Aboriginal /European historic or cultural significance;
- provide windbreaks and stock shelter areas for adjoining farmland by helping to stabilise temperature and reduce evaporation.
- assist with erosion and salinity control, and not only in the land adjoining the road reserve; and
- provide a valuable source of seed for regeneration projects. This is especially pertinent to shrub species, as clearing and grazing beneath farm trees often removes this layer. Approval of the local shire and a CALM permit are required prior to collection. Guidelines for seed and timber harvesting can be found in Appendix 6.



Flora Roads are high conservation value roadside remnants.

Photo D. Lamont.

2.0 What are the Threats?

Lack of Awareness

The general decline of the roadside environment can, in many instances, be attributed to the lack of awareness of the functional and conservation value of the roadside remnants, both by the general community and those who work in the road reserve environment. As a consequence, there is a lack of knowledge of threatening processes (such as road maintenance and inappropriate use of fire) on the sustainability of the roadside reserve as a fauna corridor and habitat area. This situation can therefore act as a catalyst for decline in environmental quality.

Roadside Clearing

Western Australia's south-west agricultural region, also known as the Intensive Land-use Zone (ILZ), covers an area of approximately 25,091,622 ha, of which only 29.8% is covered by the original native vegetation. Of the 87 rural Local Government Authorities in this zone, 21 carry less than 10% of the original remnant vegetation, and a further 30 have less than 30% (Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. 2001).

Inappropriate road management practices, particularly the systematic and indiscriminate clearing of roadside vegetation in some areas has caused irreversible damage and impacted enormously upon the conservation value of roadsides in Western Australia. Clearing roadside vegetation reduces the viability of the roadside to act as a biological corridor, the diminished habitat width impeding the movement of wildlife throughout the surrounding landscape matrix. Roadside clearing activities have the potential to introduce and spread weeds, due to the movement and disturbance of soil, thus competing with native vegetation residing in the roadside. When coupled with poor site planning and preparation, road construction and maintenance projects can often introduce and spread weeds into previously undisturbed, weed-free roadsides. Roadsides are, in many cases, the only remaining example of remnant vegetation in agricultural areas, yet they are also at great risk due to ongoing inappropriate clearing.

Amendments to the *Environmental Protection Act* 1986 have put in place a permit application process designed to assess vegetation clearing based upon a number of clearing principles which ensure ecological, conservation and land degradation issues are considered. Under the Act clearing native vegetation requires a permit unless it is for exempt purposes. Maintaining *existing* clearances in transport corridors or the maintenance of *existing* infrastructure does not require a permit, while clearing to *establish* a new road or alignment does require a permit. These amendments are design to provide improved protection for native vegetation, maintain biodiversity and allow for some incidental clearing activities to continue, such as day-to-day farming practices, without the need for a permit.

Fire

Although Western Australia's flora and fauna have evolved with a tolerance to pre-European fire regimes these are generally not present today. Fire in transport corridors will inevitably alter the native vegetation, but the extent of changes is dependent on a number of factors such as:

- species present;

- intensity of fire;
- frequency of fire; and
- seasonality of the fire.

The RCC's policies on fire management are:

1. Roadside Burning should not take place without the consent of the managing authority;
2. Local Government Authorities should adopt by-laws to control roadside burning;
3. Roadside burning should be planned as part of a total Shire/area Fire Management Plan;
4. Only one side of a road should be burnt in any one year;
5. When designing a Fire Management Plan, the two principles which must be kept in mind are the ecological management of vegetation and the abatement of fire hazard;
6. No firebreaks should be permitted unless the width of the roadside vegetation strip is greater than 20m;
7. A firebreak on any road reserve should be permitted only when, in the opinion of the road manager, one is necessary for the protection of the roadside vegetation. The road manager shall specify the maximum width to which the break may be constructed;
8. In the case of any dispute concerning roadside fire management, the Bush Fires Board should be called in to arbitrate.

If a decision is made to use fire, only one side of a road should be burnt at a time, as this will ensure retention of some of the scenic values associated with the road and also provide habitat for associated fauna.

Fire can be particularly destructive to heritage sites, whether they are of Aboriginal or European origin. Before any decision is made to burn a road verge, particularly if threatened flora is present, the proponent should be aware of all values present and the impact the fire will have. It is illegal to burn roadsides where Declared Rare Flora (DRF) is present, without written permission from the Minister for the Environment.



Before a decision is made to burn a road verge, the impact on natural, cultural and landscape values should be carefully considered.

Photo D. Lamont

Weeds

Weeds are generally disturbance opportunists and as such the road verge often provides a vacant niche easily colonised. Their establishment can impinge on the survival of existing native plants, increase flammability of the vegetation and interfere with the engineering structure of the road. The effect of weed infestations on native plant populations can be severe, often with flow on effects for native fauna such as diminished habitat or food resources.

Once weeds become established in an area, they become a long-term management issue, costing considerable resources to control or eradicate. The roadside survey recorded populations of 6 weed groups, 3 of which were then mapped in addition to the roadside conservation values. The 6 nominated weed groups were:

- *Wild Radish,
- *African Lovegrass,
- Broad leaf weeds;
- General grassy weeds,
- Saffron Thistle; and
- *Melons.

(* Indicates weeds that were mapped by RCC on clear overlays.)

African lovegrass is an invasive weed worth noting, as it greatly increases the cost of road maintenance, and is becoming more prevalent on roadsides in the Shire of Carnamah. African lovegrass tends to grow on the edge of the bitumen, and slowly breaks it up by root penetration thereby allowing moisture to penetrate the road substrate.



African lovegrass 'bunches' under the grader blade, requiring extra runs to remove it.

Photo K. Jackson



Echium plantagineum

Photos: R. Knox & J. Dodds

Paterson's curse is a widespread pasture weed that is spread by seed, making roadside populations a priority for control.

Photography by R. Knox and J. Dodd Photo used with the permission of the WA Herbarium, CALM <http://florabase.calm.wa.gov.au/help/photos#reuse>.

3.0 Legislative Requirements

Uncertainty often exists in the minds of many with regard to the 'ownership', control and management of 'the roadside'. This problem is also exacerbated by the multitude of legislative reference to activities within a transport corridor.

The Department of Conservation and Land Management (CALM) has the legislative responsibility to manage and protect all native flora and fauna in Western Australia. It is important to note that all native flora and fauna is protected under provisions of the *Wildlife Conservation Act* 1950, and cannot be taken unless it is taken in a lawful manner. In addition to the general provisions relating to protected flora under the *Wildlife Conservation Act*, special protection is afforded to flora that is declared as rare or threatened under section 23F of the *Wildlife Conservation Act*.

The legislation pertaining to the management of road reserves is complex and includes those listed below.

State legislation:

- *Aboriginal Heritage Act* 1972
- *Agriculture and Related Resources Protection Act* 1976
- *Bush Fires Act* 1954
- *Conservation and Land Management Act* 1984
- **Environmental Protection Act* 1986
- *Heritage of WA Act* 1990
- *Land Act* 1933
- *Local Government Act* 1995
- *Main Roads Act* 1930
- *Mining Act* 1978
- *Soil and Land Conservation Act* 1945
- *State Energy Commission Supply Act* 1979
- *Water Authority Act* 1987
- *Wildlife Conservation Act* 1950-1979

Commonwealth legislation:

- *Environment Protection and Biodiversity Conservation Act* 1999

* The State Government has recently made changes to the *Environmental Protection Act* 1986.

New legalisation has been introduced under the *Environmental Protection Act* 1986 which specify that all clearing of native vegetation require a permit, unless it is for an exempt purpose. The Environmental Protection (Clearing of Native Vegetation) Regulations 2004 provide an outline of these exemptions. Clearing applications are assessed against twelve clearing principles, which look at values such as the;

- biological value of the remnant vegetation,
- potential impact on wetlands and drainage,
- existence of rare flora and threatened ecological communities, and
- likely land degradation impacts.

This assessment process is designed to provide a more comprehensive and stringent land clearing control system. There are two land clearing permits available, an area permit and a purpose permit. Where clearing is for a once-off clearing event such as pasture clearing or an agricultural development for example, an area permit is required. Where ongoing clearing is necessary as part of a maintenance program for road or railway reserves for example, a purpose permit is needed. The exemptions are designed to enable farmers and landholders to continue regular incidental clearing without having to apply for a permit. In the case of Shire road construction and maintenance activities, clearing is allowed to occur if it is to the width and height previously cleared for that purpose. A permit will be required if clearing is needed to establish a new road, widen an existing road surface into roadside vegetation or create a new gravel pit on uncleared land for example.

It is recommended that a cautionary approach be taken when working within roadsides, and that the relevant authority be contacted if there is any doubt about the management or protection of heritage or conservation values present in the roadsides.

4.0 Special Environment Areas

A Special Environmental Area is a section of roadside that requires special protection for the following reasons:

- protection of rare or threatened species of native plants;
- protection of sites that have other high conservation, scientific or aesthetic values;
- protection of Aboriginal or European cultural sites.

Special Environmental Areas can be delineated by the use of site markers. See the RCC publication *Guidelines for Managing Special Environmental Areas in Transport Corridors* for design and placement of SEA markers. Workers who come across a 'Special Environmental Area' marker in the field should not disturb the area between the markers unless specifically instructed. If in doubt, the Supervisor, Shire Engineer or CEO should be contacted. Western Power and West Net rail also have systems for marking sites near power or rail lines.

To ensure that knowledge of rare flora and other sites does not get lost due, perhaps, to staff changes, the Local Authority should establish a *Special Environmental Area Register*. This should outline any special treatment, which the site should receive, and be consulted prior to any work being initiated in the area.

The Special Environmental Area Register should be consulted by the appropriate person prior to work commencing on any particular road. This will ensure that inadvertent damage does not occur.



Roadside SEA markers are highly visible.

Photo by K. Jackson

Local Government is encouraged to permanently mark Special Environmental Areas to prevent inadvertent or inappropriate damage to the rare flora or other values being protected. Markers of a uniform shape and colour will make recognition easier for other authorities using road reserves.

5.0 Flora Roads

A flora road is one which has special conservation value because of the vegetation contained within the road reserve. The managing authority may decide to declare a Flora Road based on the results of the survey of roadside conservation value. The Roadside Conservation Committee has prepared *Guidelines for the Nomination and Management of Flora Roads*, refer to Appendix 7. The Flora Road signs (provided by the RCC) draw the attention of both the tourist and anyone working in the road reserve, to the roadside flora, indicating that it's special and worthy of protection. The program seeks to raise the profile of roadsides within both the community and road management authorities.

Although presently there are no Flora Roads designated within the Shire of Carnamah, the roadside survey and the roadside conservation value (RCV) map highlighted a number of roadsides that have the potential to be declared as Flora Roads. These, and other roads may be investigated further to see if they warrant a declaration as a Flora Road. This has the dual effect of drawing the attention of tourists to the high conservation value roadside and also alerting all that work in the roadside environment that the marked section of roadside requires due care to protect the values present.



Roadsides are one of the most accessible places for tourists to view wildflowers.

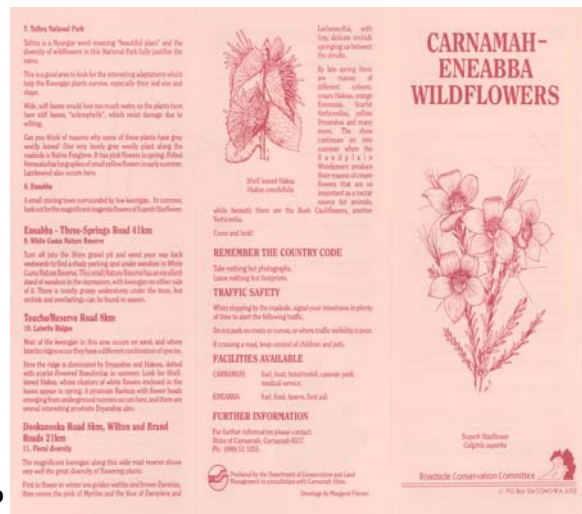
Photo by CALM

In order to plan roadworks so that important areas of roadside vegetation are not disturbed, road managers should know of these areas. It is important to the sustainability of the designated flora roads, that all road managers are aware of the location of flora roads under their control. It is suggested that the Shire establish a *Special Environmental Area Register* important for conservation.

Attractive roadside drives are an important focus in Western Australia, the "Wildflower State". Declared Flora Roads will, by their very nature, be attractive to tourists and would often be suitable as part of a tourist drive network. Consideration should be given to:

- promoting the road by means of a small brochure or booklet,
- showing all Flora Roads on a map of the region or State,
- using specially designed signs to delineate the Flora Road section (contact the RCC).

Right: The RCC has assisted local communities to produce wildflower drive pamphlets.



PART B

The Natural Environment in Carnamah

1.0 Flora

On a global scale, Western Australia has almost ten times the amount of vascular plant varieties than countries such as Great Britain. In fact Western Australia has some 4.8% of the 250,000 known vascular flora present on Earth. The Western Australian flora is also unique, with the majority of species being endemic, that is, found nowhere else in the world. Up to 75% of the 6,000 species in the southwest, are endemic.

The WA Herbarium lists over 1500 species of plants present in the Shire of Carnamah. The complete list of recorded flora can be seen in Appendix 4 of this report. The WA Herbarium records list over 1500 species of plants from the Shire of Carnamah. The most prolific species were *Acacia* spp. 93, *Eucalyptus* spp. 66, *Grevillea* spp. 48, *Verticordia* spp. 43, *Melaleuca* spp. 40 and *Stylidium* spp. 36.

2.0 Declared Rare Flora (DRF)

Declared Rare Flora (DRF) species, or populations, are of great conservation significance and should therefore be treated with special care when road and utility service, construction or maintenance is undertaken. Populations of DRF along roadsides are designated Special Environmental Areas (SEA's) and are delineated by yellow stakes with an identification plate welded on.

It is suggested that the RCC publication *Guidelines for Managing SEA's in Transport Corridors* is used as a guideline for managing these sites. It is the responsibility of the road manager to ensure these markers are installed, and guides for this are available from the Roadside Conservation Committee. For information regarding DRF, contact the CALM Flora Officer for the Merredin District. If roadworks are to be carried out near DRF sites, it is advisable to contact CALM at least one week in advance.

As at July 2004, 6 species of DRF and 17 priority species are known to be in roadside populations within the Shire of Carnamah (Dept. CALM). Species of DRF recorded from the Shire of Carnamah are:

- *Ptilotus fasciculatus*
- *Daviesia speciosa*
- *Darwinia sp. Carnamah*
- *Chorizema humile*
- *Acacia aprica*

3.0 Fauna

The Western Australian Museum records approximately 165 species of native fauna from the Carnamah area, listed in Appendix 5. WA Museum fauna records comprise specimen records, museum collections and observations from 1850 to present; therefore it is intended to act only as a general representation of the fauna in the area. Of the native fauna species recorded in the Carnamah area, there were 69 bird, 10 amphibia, 17 mammal and 69 reptile species.

The *Wildlife Conservation Act* 1950 provides for native fauna (and flora) to be specially protected where they are under identifiable threat of extinction, and as such, are considered to be "threatened". Based on distributional data from the Department of CALM, eight species of threatened and priority fauna have been recorded or sighted throughout the Shire of Carnamah, and these are listed below.

- *Calyptorhynchus sp* White-tailed Black Cockatoo

- *Egernia stokesii badia* Western Spiny-tailed Skink
- *Idiosoma nigrum* Shield-backed Trapdoor Spider
- *Neophoca cinerea* Australian Sea-lion
- *Hemisaga vepreculae*
- *Hyaleus globuliferus*
- *Calamanthus campestris montanellus* Rufous Fieldwren
- *Oreoica gutturalis gutturalis* Crested Bellbird

Many fauna species, particularly small birds need continuous corridors of dense vegetation to move throughout the landscape. Roadsides therefore are of particular importance to these avifauna because they usually contain the only continuous linear vegetation connection in some areas.

4.0 Remnant Vegetation Cover

Only 10.6 per cent of the original native vegetation remains in the Shire of Carnamah. Whilst this is higher than several other NEWROC Shires, the remaining remnants can be depleted if proactive measures are not taken to manage this priceless resource. This figure does not account for land in the pastoral areas of the Shires.

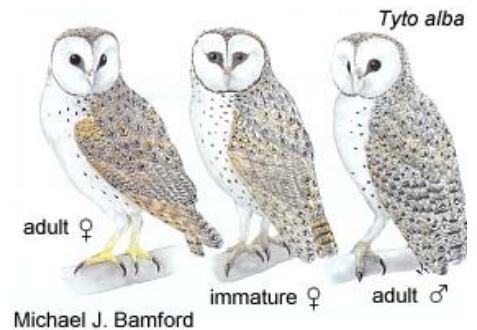
Shire	Total Area (ha)	% Remnant Vegetation
Carnamah	286,940	38.9
Coorow	424,583	38.8
Three Springs	258,882	19.7
Morawa	341,836	19.4
Perenjori	833,844	8.4
Mullewa	1,076,999	7.1
Mingenew	194,452	6.6

Table 1. Remnant vegetation remaining in agricultural areas of Carnamah and surrounding Shires (Shepherd, Beeston and Hopkins, 2001). N.B. Figures do not account for pastoral lease areas.

The continued presence of the flora and fauna living in these fragmented remnants is dependant on the connectivity throughout the landscape. This enables access to habitat and food resources essential for the survival of species and the overall biodiversity of the region. In many situations remnant native vegetation in transport corridors is of vital importance as it provides the only continuous link throughout the landscape.



Tree hollows are of vital importance to breeding birds.



The Barn Owl (*Tyto alba*) occurs in the Carnamah area.

Illustration by M. Bamford, Illustration used with the permission of the WA Museum, FaunaBase (<http://www.museum.wa.gov.au/faunabase.htm>).

PART C

**ROADSIDE
SURVEYS IN THE
SHIRE OF
CARNAMAH**

1.0 Introduction

The roadside survey and mapping program was developed to provide a method of readily determining the conservation status of roadsides. Using this method, community volunteers are able to participate in a 'snapshot' survey of roadside vegetation to identify a range of attributes that, when combined, give an overall indication of the conservation status of the vegetation.

The majority (84%) of the Shire of Carnamah's 759 km of roadsides were assessed and subsequently mapped to determine the conservation status of the road reserves. Fieldwork was carried out throughout the months of May and June 2004 by Roadside Conservation Committee Technical Officers Kate Jackson and Michael Roberts. The enthusiastic efforts of other roadside surveyors, particularly Sonia Rob, and the support provided by Council and Shire staff ensured that this project was successfully completed.

1.1 Methods

Roadside surveys were undertaken in a vehicle, with two to three people in a vehicle. The passenger recorded all the roadside survey data using the RCC's hand-held computers (iPAQ's) to record and store the roadside survey data. At the end of the survey, the iPAQ's were sent to the RCC in Perth for analysis and mapping.

The methods to assess and calculate the conservation value of the roadside reserves are described in *Assessing Roadsides: A guide for Rating Conservation Value* (Jackson, 2002). The process involves scoring a set of pre-selected attributes, which, when combined, represent a roadside's conservation status. A list of these attributes is presented on a standard survey sheet in Appendix 1. This provides both a convenient and uniform method of scoring.

The following attributes were used to produce a quantitative measure of conservation value:

- structure of native vegetation on roadside;
- extent of native vegetation along roadside;
- number of native species;
- level of weed infestation;
- value as a biological corridor; and
- predominant adjoining land use.

Each of these 6 attributes was given a score ranging from 0 to 2 points. Their combined scores provided a conservation value score ranging from 0 to 12. The conservation values, in the form of conservation status categories, are represented on the roadside conservation value map by the following colour codes.

Conservation Value	Conservation Status	Colour Code
9 – 12	High	Dark Green
7 – 8	Medium High	Light Green
5 – 6	Medium Low	Dark Yellow
0 – 4	Low	Light Yellow

The following attributes were also noted but did not contribute to the conservation value score:

- width of road reserve;
- width of vegetated roadside;
- presence of utilities/disturbances;
- general comments.

It is felt that the recording of these attributes will provide a dataset capable of being used by a broad range of community land management interests.

1.2 Mapping Roadside Conservation Values

The RCC produced a computer-generated map (using a Geographic Information System, or GIS), at a scale of 1:100,000 for the Shire of Carnamah. Known as the Roadside Conservation Value (RCV) map, it depicts the conservation status of the roadside vegetation and the width of the road reserves within the Shire of Carnamah. The data used to produce both the map and the following figures and tables are presented in Appendix 2. Road names and length information can be found in Appendix 3.

Digital information was obtained from the Department of CALM, Main Roads WA and the Department of Agriculture WA and used in the map, depicting the location of remnant vegetation on both the Crown estate and privately owned land. Watercourses are also depicted on the RCV map.

1.3 Roadside Conservation Value Categories

High conservation value roadsides are those with a score between 9-12, and generally display the following characteristics:

- intact natural structure consisting of a number of layers, i.e. ground, shrub, tree layers;
- extent of native vegetation greater than 80%, i.e. little or no disturbance;
- high diversity of native flora, i.e. greater than 20 different species,
- few weeds, i.e. less than 20% of the total plants; and
- high value as a biological corridor, i.e. may connect uncleared areas, contain flowering shrubs, tree hollows and/or hollow logs for habitat.

Medium-high conservation value roadsides are those with a score between 7-8, and generally have the following characteristics:

- generally intact natural structure, with one layer disturbed or absent;
- extent of native vegetation between 20-80%;
- medium to high diversity of native flora, i.e. between 6-19 species;



This high conservation value roadside in Carnamah contains relatively intact, undisturbed and diverse remnant vegetation.

Photo K. Trustum.



Medium-high conservation value roadsides contains a moderate number of native species, some disturbance and weed invasion, but have relatively intact natural structure.

Photo RCC.

- few to half weeds i.e. between 20-80% of the total plants;
- medium to high value as a biological corridor.

Medium-low conservation value roadsides are those with a score between 5-6, and generally have the following characteristics:

- natural structure disturbed, i.e. one or more vegetation layers absent;
- extent of native vegetation between 20-80%;
- medium to low diversity of native flora, i.e. between 0-5 species;
- half to mostly weeds, i.e. between 20-80% of total plants;
- medium to low value as a biological corridor.



Medium-low conservation value roadsides may contain Declared Rare Flora (DRF).

Photo by RCC

Low Conservation Value roadsides are those with a score between 0-4, and generally have the following characteristics:

- no natural structure i.e. two or more vegetation layers absent;
- low extent of native vegetation, i.e. less than 20%;
- low diversity of native flora, i.e. between 0-5 different species;
- mostly weeds, i.e. more than 80% of total plants, or ground layer totally weeds;
- low value as a biological corridor.



Low conservation value roadsides are typically dominated by weeds and have little or no native vegetation.

Photo by K. Trustum

As well as providing a road reserve planning and management tool, the roadside conservation value map can also be used for developing:

- regional or district fire management plans;
- Landcare and/or Bushcare projects that would be able to incorporate the information from this survey into 'whole of' landscape projects.
- tourist routes, i.e. roads depicted as high conservation value would provide visitors to the district with an insight to the flora of the district;



Weed control along a roadside

Photo MRWA



Catchment recovery projects, such as revegetation programs can utilise the information conveyed on roadside conservation value maps.

Photo by RCC



The road manager can declare high conservation value roads as Flora Roads.

Photo by D. Lamont.



The survey data and map can be used in developing regional or district fire management plans

Photo by DALM

3.0 RESULTS

Using the information collected by the roadside survey, totals of the 6 attributes used to calculate conservation values in the Shire of Carnamah is presented in Table 2. The survey data has been combined to provide the total kilometres and percentages of roadside occupied by each of the conservation status categories, and the attributes used to calculate the conservation values. As roadsides occur on both sides of the road, roadside distances (km) are equal to *twice* the actual distance of road travelled.

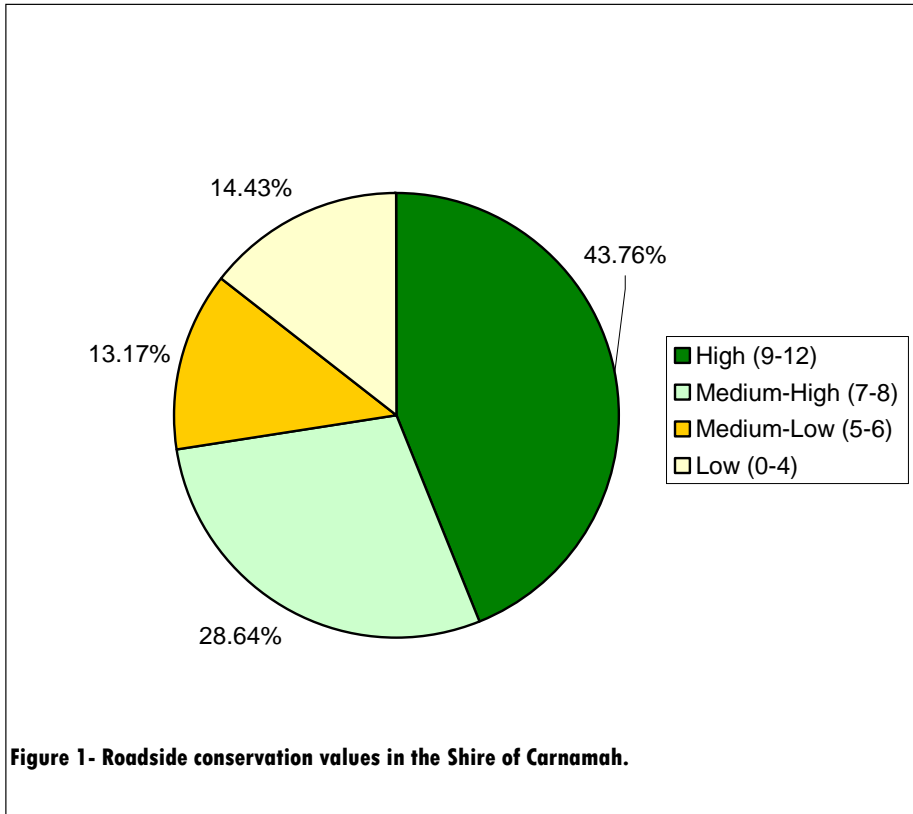
Summary Information: Shire of Carnamah 2004					
Length of Roadsides Surveyed: 1272.62km					
<u>Conservation Status</u>			<u>Native Vegetation on Roadsides</u>		
	Total (km)	%		Total (km)	%
High	556.95	43.76	2-3 vegetation layers	836.33	65.72
Medium-High	364.49	28.64	1 vegetation layer	339.32	26.66
Medium-Low	167.55	13.17	0 vegetation layers	96.97	7.62
Low	183.63	14.43			
Total	1272.62	100	Total	1272.62	100
<u>Number of Different Native Species</u>			<u>Extent of Native Vegetation</u>		
	Total (km)	%		Total (km)	%
Over 20	368.95	28.99	Over 80%	492.51	38.7
6 to 19	655.04	51.47	20 to 80%	585	45.97
0 to 5	248.63	19.54	Less than 20%	195.11	15.33
Total	1272.62	100	Total	1272.62	100
<u>Predominant Adjoining Landuse</u>			<u>Value as a Biological Corridor</u>		
	Total (km)	%		Total (km)	%
Completely Cleared	467.37	36.72	High	888.84	69.84
Scattered Vegetation	549.99	43.22	Medium	231.89	18.22
Uncleared	216.81	17.03	Low	151.89	11.94
Rail Reserve	17.7	1.39			
Drain	3.25	0.26	Total	1272.62	100
Urban/Industrial	1.9	0.15			
Plantation	1.1	0.09	<u>Weed Infestations</u>		
Other	14.5	1.14		Total (km)	%
Total	1272.62	100	Heavy	290.7	22.84
			Medium	488.1	38.35
			Light	493.82	38.81
			Total	1272.62	100

Roadside surveys were carried out between May-June 2004.

Table 2: Summary of results from the roadside survey in the Shire of Carnamah.

Roadside Conservation Values

Roadside sections of high conservation value covered 43.8 % of the length of roadsides surveyed (556.95 km). Medium-high conservation value roadsides accounted for 28.6% of the total surveyed (364.49 km), medium-low conservation roadside covered 13.2% of the total surveyed (167.55 km). Roadsides of low conservation value occupied 14.4% of the roadsides surveyed (183.63 km), see Figure 1.



Nominated Weeds

The following weeds/ weed groups were surveyed:

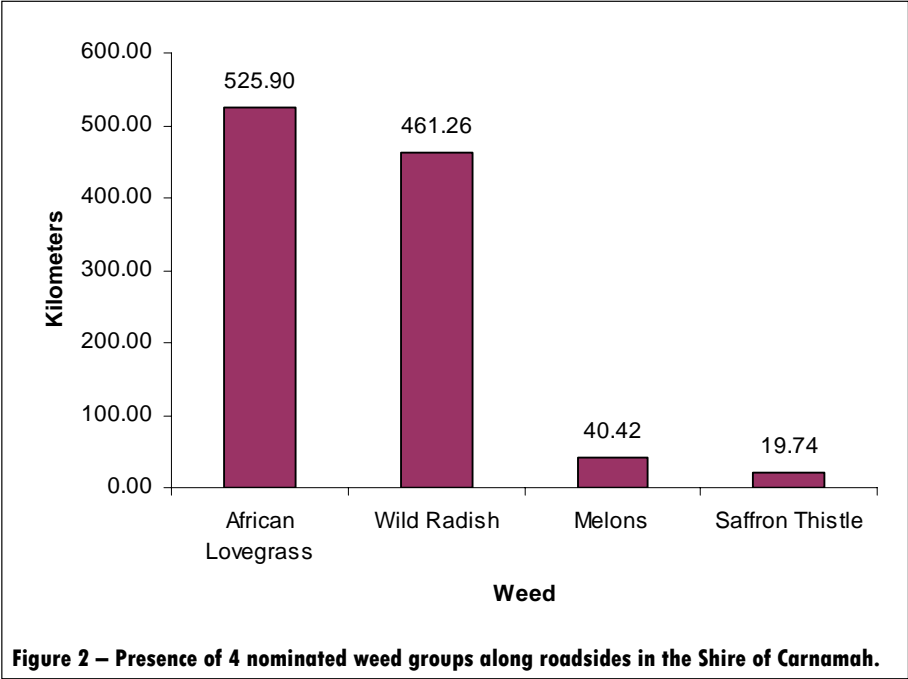
- Saffron Thistle (*Carthamus lanatus*);
- African Lovegrass (*Eragrostis curvula*);
- Melons (*Citrullis* or *Cucumis* spp.);
- Wild Radish (*Raphanus raphanistrum*);
- General broad leaf weeds; and
- Grassy weeds.

Due to the timing of the roadside surveys, little emergence of agricultural weeds had occurred therefore difficulties were encountered in the identification of weed species in the category of general broad leaf weeds and grassy weeds therefore, these 2 weed categories were not mapped. General broad-leaved weeds occurred along 763.62 km, and included weeds such as 'Cape Weed' and 'Doublegee'. General grasses occurred along 1045.54 km of the roadsides surveyed, and included weeds such as 'Brome Grass', 'Annual Ryegrass' and 'Wild Oats'.

The following 3 nominated weeds are depicted on clear overlays accompanying the 2004 Roadside Conservation Value Map for the Shire of Carnamah.

- Wild Radish (*Rhapanus raphanistrum*)
- African Lovegrass (*Eragrostis curvula*)
- Melons (*Citrullis* or *Cucumis* spp.)

African Lovegrass occurred along 525.90 km of roadsides. Wild Radish occurred along 461.26 km of roadsides. Melons ('Afghan' or 'Paddy') occurred on 40.42 km of roadsides and Saffron Thistle occurred along 19.74 km of roadsides refer to Figure 2.



Flora Roads

A flora road is one which has special conservation value because of the vegetation contained within the road reserve. The Roadside Conservation Committee has prepared *Guidelines for the Nomination and Management of Flora Roads*, refer to Appendix 7.

Although presently there are no Flora Roads designated within the Shire of Carnamah, the roadside survey and the roadside conservation value (RCV) map highlighted a number of roadsides that have the potential to be declared as Flora Roads. Roadsides, or large sections of roadsides, determined as having high conservation value in the Shire of Carnamah include:

- Brand-Mudge Rd;
- Dawson-Touche Rd;
- Garibaldi-Willis Rd;
- Robertson Rd;
- Second North Rd;
- Winchester South Rd.
- Coolimba-Eneabba Rd;
- First North Rd;
- Reserve Rd;
- Rocky Spring Rd; and
- Turkey Flats Road.

4.0 Management Recommendations

The primary aim of road management is the creation and maintenance of a safe, efficient road system. However, the following management procedures are recommended. The following section provides general management recommendations that will assist in retaining and enhancing roadside conservation values.

The Executive Officer of the Roadside Conservation Committee is also available to provide assistance on all roadside conservation matters, and can be contacted on (08) 9334 0423. The following RCC publications provide guidelines and management recommendations that will assist Local Government Authorities:

- *RCC Roadside Manual*,
- *The Roadside Handbook*, and
- *Guidelines for Managing Special Environmental Areas in Transport Corridors*.

4.1 Management Recommendations

1. *Protect high conservation value roadsides by maintaining and enhancing the native plant communities.*

This can be achieved by:

- retaining remnant vegetation,
- minimising disturbance to existing roadside vegetation,
- minimising disturbance to soil, and
- preventing or controlling the introduction of weeds.

2. *Promote and raise awareness of the conservation value associated with roadside vegetation by:*

- establishing a register of Shire roads important for conservation,
- declaring suitable roadsides as Flora Roads,
- incorporating into tourist, wildflower and/or scenic drives.

3. *Improve roadside sections of medium to low conservation value by:*

- minimising disturbance caused by machinery, adjoining land practices and incidences of fire,
- carrying out a targeted weed control program,
- retaining remnant trees and shrubs,
- allowing natural regeneration,
- spreading local native seed to encourage regeneration, and
- encourage revegetation projects by adjacent landholders.

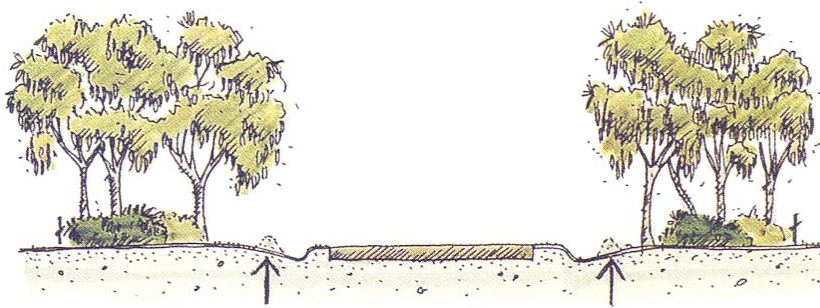


On-site inspections, consultation and cooperation with stakeholders, such as adjoining land owners; the RCC and Landcare can result in better environmental, social and economic outcomes overall.

4.2 Minimising Disturbance

Minimal disturbance can be achieved by:

- 4.2.1 Adopting a road design that occupies the minimum space;
- 4.2.2 Diverting the line of a table drain to avoid disturbing valuable flora;
- 4.2.3 Pruning branches, rather than removing the whole tree or shrub;
- 4.2.4 Not dumping spoil on areas of native flora;
- 4.2.5 Apply the Fire Threat Assessment (RCC Roadside Manual) before burning roadside vegetation, use methods other than fuel reduction burns to reduce fire threat; if roadside burning must be undertaken, incorporate it into a district fire management program;
- 4.2.6 Encourage adjacent landholders to set back fences to allow roadside vegetation to proliferate;
- 4.2.7 Encourage adjacent landholders to plant windbreaks or farm tree lots adjacent to roadside vegetation to create a denser windbreak or shelterbelt;
- 4.2.8 Encourage revegetation projects by adjacent landholders.

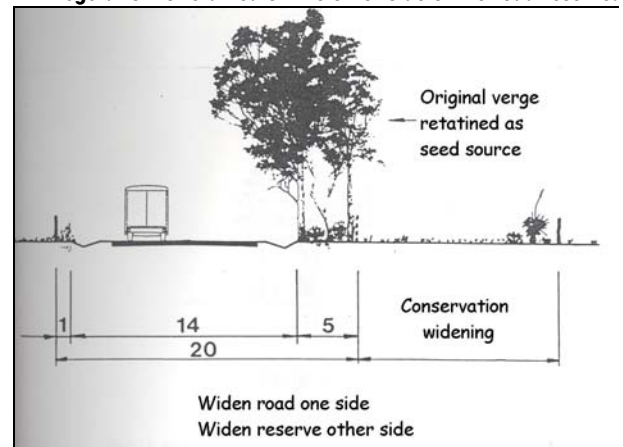


Avoid windrowing drain material into vegetation



Above: a high value road reserve in Tammin. The road was built on adjoining farmland in order to retain the important remnant bushland existing in the road reserve.

Figure 3 (below): Widening a road to one side only. Roadside vegetation is retained on the other side of the road reserve.



5.0 Planning for Roadsides

The RCC is able to provide comprehensive models of Roadside Management Plans and encourages all Shires to adopt this practice of planning for roadside conservation.

The following actions greatly enhance likelihood of a plan that changes behaviour and results in on-ground actions:

- Community support- encourage ongoing community involvement and commitment by establishing a local Roadside Advisory Committee or working group within the Shire Environmental Committee;
- Contract specifications- maintain roadside values by developing environmental specifications for inclusion in all tender documents or work practices;
- Community education- use of innovative and pertinent material can increase community understanding of roadside values;
- Training- promote local roadside planning initiatives and gain acceptance and understanding by involving shire staff, contractors, utility provider staff and the community in workshops, seminars or training days. The Roadside Conservation Committee can provide this training.

Training develops recognition and understanding of roadside values and highlights best work practices. Workshops are developed to ensure that local issues and environments are dealt with and they include site visits to high conservation remnants, current projects and works.

6.0 Setting Objectives

The objective of all roadside management should be to:

- **Protect**
 - native vegetation
 - rare or threatened flora or fauna
 - cultural and heritage values
 - community assets from fire
- **Maintain**
 - safe function of the road
 - native vegetation communities
 - fauna habitats and corridors
 - visual amenity and landscape qualities
 - water quality
- **Minimise**
 - land degradation
 - spread of weeds and vermin
 - spread of soil borne pathogens
 - risk and impact of fire
 - disturbance during installation and maintenance of service assets
- **Enhance**
 - indigenous vegetation communities
 - fauna habitats and corridors

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Appendix

1

Appendix

2

Road #	Road name	Section #	ODStart	ODFinish	NAT_VEG		EXT_VEG		# PLANT SPECIES		WEEDS		VAL_CORRIDOR		ADJ_LANDUSE		CONS_VALUE_TOTAL		DOM_WEEDS
					Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	
5010001	CARNAMAH-PERENJORI RD	1	0.00	1.68	1	1	0	0	0	0	0	0	0	0	2	2	2	2	AFRICAN_LOVEGRASS WILD_RADISH BROME_GRASS CAPE_WEED
5010001	CARNAMAH-PERENJORI RD	2	1.68	4.68	1	1	0	1	0	0	0	1	0	1	2	2	2	5	WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	3	4.68	6.68	1	2	1	1	1	1	1	1	1	2	1	1	7	8	BROME_GRASS AFRICAN_LOVEGRASS WILD_RADISH
5010001	CARNAMAH-PERENJORI RD	4	6.68	7.08	2	1	2	1	1	0	2	1	2	1	1	1	10	5	BROME_GRASS AFRICAN_LOVEGRASS WILD_RADISH
5010001	CARNAMAH-PERENJORI RD	5	7.08	8.18	1	1	1	1	1	0	1	1	1	1	1	1	6	5	BROME_GRASS WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	6	8.18	9.88	1	2	1	2	2	2	1	2	2	2	0	0	7	10	BROME_GRASS WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	7	9.88	11.48	1	1	1	1	0	0	1	1	2	2	0	1	5	6	BROME_GRASS WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	8	11.48	15.98	2	2	1	1	1	1	1	1	2	2	1	1	8	8	BROME_GRASS PATERSONS_CURSE WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	9	15.98	24.58	2	2	1	1	1	1	1	1	2	1	1	1	8	7	BROME_GRASS WILD_RADISH AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	10	24.58	25.58	1	1	1	1	0	0	2	2	0	0	1	1	5	5	BROME_GRASS AFRICAN_LOVEGRASS
5010001	CARNAMAH-PERENJORI RD	11	25.58	27.48	1	1	1	1	0	0	0	0	0	0	1	1	3	3	BROME_GRASS CAPE_WEED AFRICAN_LOVEGRASS WILD_RADISH
5010001	CARNAMAH-PERENJORI RD	12	27.48	30.98	2	2	2	2	1	1	2	2	2	2	1	1	10	10	BROME_GRASS CAPE_WEED AFRICAN_LOVEGRASS WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	1	0.00	0.65	1	1	1	1	0	1	0	0	2	2	1	1	5	6	AFRICAN_LOVEGRASS BROME_GRASS
5010002	BUNJIL-CARNAMAH RD	2	0.65	1.33	1	1	1	2	0	1	0	0	2	2	1	0	5	6	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	3	1.33	2.60	1	1	0	1	1	1	0	0	2	2	2	2	6	7	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	4	2.60	3.80	2	2	1	1	1	1	0	0	2	2	2	1	8	7	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	5	3.80	4.18	1	1	0	0	1	1	0	0	2	2	2	2	6	6	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	6	4.18	5.17	1	1	1	1	1	1	1	1	2	2	2	2	8	8	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	7	5.17	5.80	2	2	1	1	1	1	0	0	2	2	2	1	8	7	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	8	5.80	6.35	1	1	0	0	1	1	0	0	1	1	2	2	5	5	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	9	6.35	6.97	1	1	0	0	0	1	0	0	0	2	2	2	3	6	BROME_GRASS CAPE_WEED

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5010002	BUNJIL-CARNAMAH RD	10	6.97	7.61	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	11	7.61	8.28	1	1	1	1	1	1	0	0	2	1	1	1	6	5	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	12	8.28	8.80	2	1	1	1	1	1	0	0	2	0	1	0	7	3	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	13	8.80	9.41	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	14	9.41	9.73	2	2	1	1	1	1	1	1	2	2	1	1	8	8	BROME_GRASS
5010002	BUNJIL-CARNAMAH RD	15	9.73	12.07	2	2	1	1	1	1	1	1	2	2	1	1	8	8	BROME_GRASS CAPE_WEED
5010002	BUNJIL-CARNAMAH RD	16	12.07	14.18	1	1	1	1	1	1	1	1	1	1	1	1	6	6	BROME_GRASS CAPE_WEED
5010002	BUNJIL-CARNAMAH RD	17	14.18	18.81	1	1	1	1	1	1	0	0	2	2	1	1	6	6	BROME_GRASS CAPE_WEED
5010002	BUNJIL-CARNAMAH RD	18	18.81	21.00	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS CAPE_WEED WILD_RADISH
5010002	BUNJIL-CARNAMAH RD	19	21.00	21.72	2	2	1	2	1	1	0	1	2	2	2	2	8	10	BROME_GRASS CAPE_WEED
5010002	BUNJIL-CARNAMAH RD	20	21.72	22.92	1	1	1	1	1	1	1	1	2	2	1	2	7	8	BROME_GRASS CAPE_WEED
5010002	BUNJIL-CARNAMAH RD	21	22.92	24.62	2	2	2	2	2	2	2	2	2	2	2	2	12	12	BROME_GRASS CAPE_WEED
5010003	WINCHESTER WEST RD	1	0.00	0.33	2	2	1	1	1	1	0	0	2	2	1	1	7	7	BROME_GRASS CAPE_WEED
5010003	WINCHESTER WEST RD	2	0.33	2.90	0	0	0	0	0	0	0	0	2	2	1	1	3	3	WILD_RADISH PATERSONS_CURSE BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010003	WINCHESTER WEST RD	3	2.90	4.00	0	1	0	1	0	0	0	1	0	2	2	1	2	6	WILD_RADISH PATERSONS_CURSE BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010003	WINCHESTER WEST RD	4	4.00	6.44	0	0	0	0	0	0	0	0	0	0	2	2	2	2	WILD_RADISH PATERSONS_CURSE BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010004	CARON RD	1	0.00	2.30	2	1	1	1	1	1	1	1	2	1	2	0	9	5	AFRICAN_LOVEGRASS BROME_GRASS WILD_RADISH
5010004	CARON RD	2	2.30	6.80	2	2	1	1	1	1	1	1	2	2	2	1	9	8	AFRICAN_LOVEGRASS BROME_GRASS WILD_RADISH
5010004	CARON RD	3	6.80	7.60	2	2	1	1	0	0	1	1	0	0	1	1	5	5	AFRICAN_LOVEGRASS BROME_GRASS WILD_RADISH
5010004	CARON RD	4	7.60	20.50	2	2	1	2	1	1	1	2	2	2	1	1	8	10	BROME_GRASS AFRICAN_LOVEGRASS
5010004	CARON RD	5	20.50	22.40	2	1	2	1	0	0	2	1	2	0	1	1	9	4	BROME_GRASS AFRICAN_LOVEGRASS BROME_GRASS
5010004	CARON RD	6	22.40	23.98	1	1	1	1	1	1	1	1	1	1	2	2	7	7	BROME_GRASS CAPE_WEED BROME_GRASS
5010005	WINCHESTER EAST RD	1	0.00	0.78	0	1	0	0	0	0	0	0	0	0	2	2	2	3	WILD_RADISH BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	2	0.78	3.10	1	1	0	0	1	1	0	0	1	2	2	2	5	6	WILD_RADISH BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	3	3.10	3.70	2	2	1	1	1	1	1	1	2	2	2	2	9	9	WILD_RADISH BROME_GRASS CAPE_WEED

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5010005	WINCHESTER EAST RD	4	3.70	4.60	0	0	0	0	0	0	1	1	0	0	1	1	2	2	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	5	4.60	5.63	0	1	0	0	0	0	1	1	0	2	2	2	3	6	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	6	5.63	6.12	2	1	1	0	1	0	1	0	2	0	0	2	7	3	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	7	6.12	7.25	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	8	7.25	7.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	9	7.75	9.65	1	1	0	0	0	0	0	0	0	0	0	1	1	2	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	10	9.65	11.20	1	0	1	0	1	0	0	0	1	1	1	2	5	3	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	11	11.20	11.70	2	2	0	0	0	0	0	0	2	1	1	1	5	4	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	12	11.70	14.81	1	1	0	0	1	0	0	0	1	1	2	1	5	3	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	13	14.81	15.45	2	2	2	2	1	1	1	1	1	1	2	1	9	8	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	14	15.45	17.44	1	1	1	1	1	1	0	0	0	0	1	1	4	4	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	15	17.44	18.35	1	1	0	0	0	0	1	1	1	1	1	1	4	4	BROME_GRASS CAPE_WEED
5010005	WINCHESTER EAST RD	16	18.35	19.75	2	2	1	1	1	1	1	1	2	2	1	1	8	8	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	1	0.00	3.05	2	2	1	1	1	1	1	1	2	2	1	2	8	9	BROME_GRASS
5010006	BILLEROO RD	2	3.05	3.27	2	2	1	1	1	1	2	2	2	2	0	1	8	9	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	3	3.27	5.90	2	2	1	1	1	1	0	0	2	2	0	1	6	7	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	4	5.90	6.57	2	2	1	1	1	1	1	1	2	2	2	2	9	9	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	5	6.57	7.20	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS CAPE_WEED WILD_RADISH
5010006	BILLEROO RD	6	7.20	7.76	2	2	1	1	1	1	1	1	1	1	2	2	8	8	BROME_GRASS CAPE_WEED WILD_RADISH
5010006	BILLEROO RD	7	7.76	8.57	1	2	0	1	1	1	0	1	1	2	2	2	5	9	BROME_GRASS CAPE_WEED WILD_RADISH
5010006	BILLEROO RD	8	8.57	11.29	1	1	0	0	1	1	0	0	1	1	2	2	5	5	BROME_GRASS CAPE_WEED WILD_RADISH
5010006	BILLEROO RD	9	11.29	12.60	2	2	1	1	1	1	0	0	2	2	2	2	8	8	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	10	12.60	13.85	1	1	1	1	0	0	0	0	1	1	2	2	5	5	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	11	13.85	15.52	2	2	1	1	1	1	1	1	2	2	2	0	9	7	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	12	15.52	16.07	1	1	0	0	0	0	1	1	0	0	2	0	4	2	BROME_GRASS WILD_RADISH CAPE_WEED AFRICAN_LOVEGRASS
5010006	BILLEROO RD	13	16.07	18.07	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS WILD_RADISH CAPE_WEED AFRICAN_LOVEGRASS
5010006	BILLEROO RD	14	18.07	21.30	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS CAPE_WEED
5010006	BILLEROO RD	15	21.30	21.77	2	2	2	2	2	2	2	2	2	2	0	0	10	10	
5010007	INERING RD	1	0.00	3.55	2	2	1	1	1	1	1	1	2	1	2	2	8	7	AFRICAN_LOVEGRASS WILD_RADISH BROME_GRASS
5010008	ERINDOON RD	1	0.00	1.90	2	2	1	1	1	1	2	2	1	2	1	0	8	8	BROME_GRASS

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5010008	ERINDOON RD	2	1.90	3.80	2	2	1	2	1	2	2	2	1	2	1	0	8	10	BROME_GRASS
5010008	ERINDOON RD	3	3.80	5.20	2	2	2	2	2	2	2	2	1	2	1	1	10	11	BROME_GRASS
5010009	POPE RD	1	0.00	3.48	1	1	1	1	1	1	0	0	2	2	1	1	6	6	BROME_GRASS CAPE_WEED WILD_RADISH
5010009	POPE RD	2	3.48	4.71	1	1	1	1	1	1	0	0	1	1	1	1	5	5	BROME_GRASS CAPE_WEED WILD_RADISH
5010009	POPE RD	3	4.71	4.96	2	2	2	2	1	1	2	2	2	2	1	2	10	11	BROME_GRASS CAPE_WEED
5010009	POPE RD	4	4.96	5.43	1	1	0	1	0	0	0	0	1	1	2	2	4	5	BROME_GRASS CAPE_WEED WILD_RADISH
5010009	POPE RD	5	5.43	5.92	1	1	1	1	1	1	0	0	2	2	2	0	7	5	BROME_GRASS CAPE_WEED
5010009	POPE RD	6	5.92	6.47	1	1	0	1	1	1	1	1	2	2	0	1	5	7	BROME_GRASS CAPE_WEED
5010009	POPE RD	7	6.47	6.82	2	2	1	1	1	1	2	2	2	2	0	0	8	8	BROME_GRASS
5010010	BODYCOAT RD	1	0.00	4.20	2	2	1	1	0	0	1	1	2	2	2	2	8	8	CAPE_WEED BROME_GRASS AFRICAN_LOVEGRASS WILD_RADISH
5010010	BODYCOAT RD	2	4.20	4.80	1	1	1	1	0	0	2	2	2	2	2	1	8	7	CAPE_WEED AFRICAN_LOVEGRASS
5010010	BODYCOAT RD	3	4.80	5.74	2	2	1	0	0	0	1	0	1	1	1	1	6	4	CAPE_WEED AFRICAN_LOVEGRASS
5010011	WATERS RD	1	0.00	0.76	0	0	0	0	1	1	0	0	1	1	2	2	4	4	CAPE_WEED BROME_GRASS WILD_RADISH
5010011	WATERS RD	2	0.76	2.20	2	2	1	1	1	1	0	0	2	2	1	1	7	7	CAPE_WEED BROME_GRASS
5010011	WATERS RD	3	2.20	4.10	1	1	1	1	1	1	0	0	2	2	1	1	6	6	CAPE_WEED BROME_GRASS
5010011	WATERS RD	4	4.10	5.61	1	1	1	1	1	1	0	0	2	2	1	1	6	6	CAPE_WEED BROME_GRASS
5010011	WATERS RD	5	5.61	5.80	0	0	0	0	0	0	1	1	0	0	1	1	2	2	CAPE_WEED BROME_GRASS
5010011	WATERS RD	6	5.80	7.07	1	1	0	0	0	0	0	0	1	1	1	2	3	4	CAPE_WEED BROME_GRASS
5010011	WATERS RD	7	7.07	8.12	1	1	0	1	1	1	0	0	1	1	2	2	5	6	CAPE_WEED BROME_GRASS
5010011	WATERS RD	8	8.12	8.75	0	1	0	0	0	1	1	0	0	1	1	1	2	4	CAPE_WEED BROME_GRASS
5010011	WATERS RD	9	8.75	9.58	1	1	0	0	0	0	0	0	0	0	2	2	3	3	CAPE_WEED BROME_GRASS WILD_RADISH
5010011	WATERS RD	10	9.58	10.50	1	1	1	0	1	1	1	0	2	1	2	2	8	5	CAPE_WEED BROME_GRASS WILD_RADISH
5010011	WATERS RD	11	10.50	13.00	0	0	0	0	1	1	0	0	0	0	2	2	3	3	CAPE_WEED BROME_GRASS WILD_RADISH
5010012	TURNER RD	1	0.00	0.53	1	1	0	0	0	0	0	0	1	1	2	1	4	3	BROME_GRASS CAPE_WEED
5010012	TURNER RD	2	0.53	1.00	2	2	1	0	1	0	0	0	2	1	2	1	8	4	BROME_GRASS CAPE_WEED
5010012	TURNER RD	3	1.00	2.26	1	1	1	1	0	0	0	0	2	2	2	1	6	5	BROME_GRASS CAPE_WEED
5010012	TURNER RD	4	2.26	3.33	2	2	1	1	1	1	0	0	2	2	2	2	8	8	BROME_GRASS CAPE_WEED
5010012	TURNER RD	5	3.33	4.60	1	1	0	0	1	1	0	0	1	1	1	2	4	5	BROME_GRASS CAPE_WEED
5010012	TURNER RD	6	4.60	7.65	1	1	1	1	1	1	0	0	2	2	1	2	6	7	BROME_GRASS CAPE_WEED
5010012	TURNER RD	7	7.65	8.08	0	0	0	0	1	1	0	0	1	1	2	2	4	4	BROME_GRASS CAPE_WEED
5010012	TURNER RD	8	8.08	8.66	2	2	1	1	1	1	2	2	2	2	0	0	8	8	BROME_GRASS CAPE_WEED
5010012	TURNER RD	9	8.66	9.79	1	1	1	1	1	1	1	1	2	2	2	2	8	8	BROME_GRASS CAPE_WEED
5010012	TURNER RD	10	9.79	10.50	2	2	1	1	1	1	1	1	2	2	2	1	9	8	BROME_GRASS CAPE_WEED
5010013	ROWLAND RD	1	0.00	3.40	2	2	1	1	1	1	1	1	2	1	2	2	9	8	BROME_GRASS CAPE_WEED
5010013	ROWLAND RD	2	3.40	4.48	1	1	1	0	0	0	0	0	1	1	2	2	5	4	BROME_GRASS CAPE_WEED

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5010013	ROWLAND RD	3	4.48	5.70	1	2	0	0	1	1	0	0	1	1	2	2	5	6	BROME_GRASS CAPE_WEED
5010013	ROWLAND RD	4	5.70	6.90	1	1	0	0	0	0	1	1	0	0	1	1	3	3	BROME_GRASS CAPE_WEED
5010013	ROWLAND RD	5	6.90	9.12	1	1	0	0	1	1	0	0	1	1	1	2	4	5	BROME_GRASS CAPE_WEED
5010014	BURNS RD	1	0.00	3.12	1	1	1	1	1	1	0	0	1	1	2	2	6	6	CAPE_WEED BROME_GRASS WILD_RADISH
5010014	BURNS RD	2	3.12	4.63	0	0	0	0	0	0	0	0	1	1	2	2	3	3	CAPE_WEED BROME_GRASS
5010014	BURNS RD	3	4.63	5.25	2	2	1	1	1	1	0	0	2	2	2	2	8	8	CAPE_WEED BROME_GRASS
5010014	BURNS RD	4	5.25	6.28	2	2	1	1	1	1	0	0	2	2	2	2	8	8	CAPE_WEED BROME_GRASS WILD_RADISH
5010015	ROSE THOMSON RD	1	0.00	0.80	2	2	1	1	1	2	1	1	1	2	1	1	7	9	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010015	ROSE THOMSON RD	2	0.80	7.40	2	2	2	2	1	2	1	2	1	2	1	0	8	10	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010015	ROSE THOMSON RD	3	7.40	11.30	2	2	2	2	2	2	2	2	2	2	1	0	11	10	BROME_GRASS
5010015	ROSE THOMSON RD	4	11.30	12.20	2	2	1	1	1	1	2	1	1	2	1	2	8	9	BROME_GRASS
5010015	ROSE THOMSON RD	5	12.20	14.60	2	2	2	2	2	2	2	2	1	2	1	2	10	12	BROME_GRASS
5010016	SECOND NORTH RD	1	0.00	5.95	2	2	1	1	2	1	2	2	1	2	2	2	9	9	BROME_GRASS CAPE_WEED
5010017	FIRST NORTH RD	1	0.00	2.25	2	2	1	2	2	2	2	2	1	2	1	0	9	10	BROME_GRASS CAPE_WEED
5010018	BRIMSON RD	1	0.00	3.20	2	2	2	2	2	2	2	2	2	2	2	2	12	12	BROME_GRASS
5010018	BRIMSON RD	2	3.20	4.00	2	2	1	1	1	1	1	2	1	2	2	0	8	8	BROME_GRASS CAPE_WEED
5010020	BACKMAN RD	1	0.00	1.89	2	2	2	1	1	1	2	2	2	2	2	2	11	10	
5010020	BACKMAN RD	2	1.89	2.40	1	0	1	0	1	0	2	2	2	0	2	2	9	4	CAPE_WEED
5010020	BACKMAN RD	3	2.40	3.00	0	0	0	0	0	0	2	2	0	0	2	2	4	4	CAPE_WEED BROME_GRASS
5010020	BACKMAN RD	4	3.00	4.00	1	1	1	1	1	1	2	2	2	2	0	2	7	9	CAPE_WEED
5010020	BACKMAN RD	5	4.00	4.32	2	2	2	2	2	2	2	2	2	2	0	0	10	10	CAPE_WEED
5010021	BACK-INNERING RD NO21	1	0.00	0.60	2	2	1	1	1	1	1	1	2	2	1	2	8	9	AFRICAN_LOVEGRASS
5010021	BACK-INNERING RD NO21	2	0.60	5.80	1	2	1	1	0	0	1	1	1	1	1	1	5	6	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010021	BACK-INNERING RD NO21	3	5.80	8.00	2	2	1	1	1	1	1	1	2	2	1	1	8	8	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010021	BACK-INNERING RD NO21	4	8.00	8.60	2	2	2	2	0	0	2	2	2	2	1	0	9	9	BROME_GRASS
5010022	CAMAC RD	1	0.00	2.50	2	2	1	2	1	2	1	2	1	2	1	1	7	11	AFRICAN_LOVEGRASS WILD_RADISH
5010022	CAMAC RD	2	2.50	3.60	1	1	1	2	0	0	2	2	1	2	1	0	6	7	BROME_GRASS
5010022	CAMAC RD	3	3.60	4.60	2	2	1	1	1	1	1	1	2	1	1	1	8	7	BROME_GRASS AFRICAN_LOVEGRASS
5010023	READING RD	1	0.00	6.60	2	2	1	1	0	0	1	1	2	2	1	1	7	7	BROME_GRASS AFRICAN_LOVEGRASS
5010023	READING RD	2	6.60	11.27	2	2	1	1	1	1	1	1	2	1	1	1	8	7	WILD_RADISH AFRICAN_LOVEGRASS

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																			BROME_GRASS
5010024	MITCHELL RD	1	0.00	5.20	2	2	1	2	1	1	1	2	2	2	1	2	8	11	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010024	MITCHELL RD	2	5.20	5.95	2	2	1	1	1	1	1	1	2	2	1	2	8	9	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010025	FOWLER RD	1	0.00	0.40	1	1	0	0	0	0	0	0	1	1	1	2	3	4	
5010025	FOWLER RD	2	0.40	2.10	2	2	1	1	1	1	0	0	2	2	1	2	7	8	
5010025	FOWLER RD	3	2.10	3.00	1	1	1	1	1	1	0	0	1	1	1	1	5	5	CAPE_WEED BROME_GRASS
5010025	FOWLER RD	4	3.00	3.47	2	2	1	1	1	1	1	1	1	1	2	2	8	8	CAPE_WEED BROME_GRASS
5010025	FOWLER RD	5	3.47	4.40	1	1	1	1	0	0	0	0	1	1	2	2	5	5	WILD_RADISH CAPE_WEED BROME_GRASS
5010025	FOWLER RD	6	4.40	6.12	2	2	1	1	1	1	1	1	2	2	2	2	9	9	WILD_RADISH CAPE_WEED BROME_GRASS
5010026	LAWSON RD	1	0.00	0.50	2	2	1	1	1	1	2	2	2	2	0	0	8	8	BROME_GRASS CAPE_WEED
5010026	LAWSON RD	2	0.50	1.00	2	2	1	1	1	1	1	1	1	1	0	1	6	7	BROME_GRASS CAPE_WEED
5010026	LAWSON RD	3	1.00	1.40	0	0	0	0	0	0	0	0	0	0	2	1	2	1	BROME_GRASS CAPE_WEED
5010026	LAWSON RD	4	1.40	2.22	1	1	1	1	1	1	2	2	1	1	2	1	8	7	BROME_GRASS CAPE_WEED
5010026	LAWSON RD	5	3.95	5.65	2	1	1	1	1	1	1	1	1	1	1	1	7	6	WILD_RADISH BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010026	LAWSON RD	6	5.65	6.95	2	2	1	1	1	1	1	1	2	2	2	1	9	8	WILD_RADISH BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
5010026	LAWSON RD	7	6.95	8.05	1	2	1	1	1	1	1	1	1	2	2	1	7	8	WILD_RADISH AFRICAN_LOVEGRASS CAPE_WEED
5010027	ROBERTSON RD	1	0.00	4.91	2	2	1	1	2	2	1	1	2	2	2	2	10	10	AFRICAN_LOVEGRASS BROME_GRASS WILD_RADISH
5010028	BRADLEY RD	1	0.00	1.43	1	1	0	0	0	0	0	0	0	0	1	1	2	2	BROME_GRASS CAPE_WEED
5010028	BRADLEY RD	2	1.43	3.38	0	0	0	0	0	0	0	0	0	0	0	2	0	2	WILD_RADISH BROME_GRASS CAPE_WEED
5010028	BRADLEY RD	3	3.38	5.62	1	1	0	0	0	0	0	0	0	0	2	2	3	3	WILD_RADISH BROME_GRASS CAPE_WEED
5010028	BRADLEY RD	4	5.62	6.22	1	1	0	0	0	0	0	0	0	0	1	1	2	2	BROME_GRASS CAPE_WEED
5010028	BRADLEY RD	5	6.22	9.09	2	2	1	1	1	1	1	1	1	1	1	1	7	7	BROME_GRASS CAPE_WEED
5010029	PROWAKA RD	1	0.00	8.10	2	1	1	1	1	1	1	1	2	2	1	1	8	7	WILD_RADISH AFRICAN_LOVEGRASS CAPE_WEED
5010029	PROWAKA RD	2	8.10	9.25	2	1	1	1	0	0	1	1	2	2	1	1	7	6	BROME_GRASS WILD_RADISH AFRICAN_LOVEGRASS
5010030	NORTH BOUNDARY RD	1	0.00	0.70	1	1	1	1	1	1	2	2	2	1	1	1	8	7	AFRICAN_LOVEGRASS WILD_RADISH
5010030	NORTH BOUNDARY RD	2	0.70	3.50	2	2	1	1	0	0	1	1	2	2	1	1	7	7	AFRICAN_LOVEGRASS WILD_RADISH
5010030	NORTH BOUNDARY RD	3	3.50	6.70	2	2	1	1	1	1	1	1	2	2	1	1	8	8	WILD_RADISH
5010030	NORTH BOUNDARY RD	4	6.70	9.20	1	1	2	2	0	0	2	2	0	0	1	1	6	6	BROME_GRASS
5010031	CHAPPELL RD	1	0.00	3.10	2	2	1	1	1	1	1	1	2	2	2	2	9	8	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010031	CHAPPELL RD	2	3.10	4.00	2	1	1	1	1	1	1	1	2	1	1	1	8	6	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED

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																			BROME_GRASS
5010033	STARCEVICH RD	1	0.00	1.10	1	1	1	1	1	1	0	0	1	1	2	2	6	6	BROME_GRASS CAPE_WEED
5010033	STARCEVICH RD	2	1.10	1.65	0	0	0	0	0	0	0	0	0	0	2	2	2	2	BROME_GRASS CAPE_WEED
5010033	STARCEVICH RD	3	1.65	2.82	1	1	1	1	1	1	1	1	2	2	2	2	8	8	BROME_GRASS CAPE_WEED
5010033	STARCEVICH RD	4	2.82	3.35	1	1	0	0	0	0	0	0	0	0	2	2	3	3	BROME_GRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	1	0.00	0.90	1	1	1	1	1	1	1	1	1	1	0	0	5	5	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED
5010034	OLD TELEGRAPH RD	2	0.90	3.80	2	2	2	2	1	1	2	2	2	2	1	1	10	10	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	3	3.80	4.60	2	2	1	1	1	1	1	1	2	2	0	0	7	7	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	4	4.60	7.40	1	1	1	1	1	1	1	1	2	2	1	1	7	7	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	5	7.40	9.90	2	2	1	1	1	1	1	1	2	2	2	2	8	8	AFRICAN_LOVEGRASS WILD_RADISH BROME_GRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	6	10.30	10.70	1	2	1	1	1	1	1	1	2	2	0	0	6	7	AFRICAN_LOVEGRASS CAPE_WEED
5010034	OLD TELEGRAPH RD	7	10.70	11.20	2	2	2	2	2	2	2	2	2	2	0	1	10	11	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010034	OLD TELEGRAPH RD	8	11.20	12.00	2	2	1	1	1	1	1	1	2	2	1	1	8	8	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010034	OLD TELEGRAPH RD	9	12.00	12.50	1	2	0	1	0	1	0	1	0	2	1	1	2	8	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED WILD_RADISH
5010034	OLD TELEGRAPH RD	10	12.50	13.30	2	1	1	1	1	0	1	1	1	1	1	1	7	5	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED WILD_RADISH
5010034	OLD TELEGRAPH RD	11	13.30	16.20	2	2	2	2	2	2	2	2	2	2	1	1	11	11	AFRICAN_LOVEGRASS BROME_GRASS WILD_RADISH
5010035	GANGWAY RD	1	0.00	1.00	1	1	0	0	0	0	0	0	0	0	1	1	2	2	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010035	GANGWAY RD	2	1.00	7.72	2	2	1	1	0	0	1	1	2	2	1	1	7	7	AFRICAN_LOVEGRASS CAPE_WEED WILD_RADISH
5010036	GARIBALDI-WILLIS RD	1	0.00	3.55	2	2	2	2	2	2	2	2	2	2	1	0	11	10	BROME_GRASS CAPE_WEED
5010036	GARIBALDI-WILLIS RD	2	3.55	4.70	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS CAPE_WEED
5010036	GARIBALDI-WILLIS RD	3	4.70	5.40	2	2	2	2	2	2	2	2	2	2	0	1	10	11	BROME_GRASS CAPE_WEED
5010036	GARIBALDI-WILLIS RD	4	5.40	10.90	2	2	2	2	2	2	2	2	2	2	1	1	11	11	BROME_GRASS CAPE_WEED
5010036	GARIBALDI-WILLIS RD	5	10.90	11.70	2	2	2	2	2	2	2	2	2	2	1	0	11	10	BROME_GRASS CAPE_WEED
5010036	GARIBALDI-WILLIS RD	6	11.70	13.20	2	2	2	2	2	2	2	2	2	2	1	0	11	10	BROME_GRASS CAPE_WEED
5010037	CHATFIELD-CLARKE RD	1	0.00	11.10	2	2	2	2	2	2	2	2	2	2	1	1	11	11	BROME_GRASS CAPE_WEED AFRICAN_LOVEGRASS
5010037	CHATFIELD-CLARKE RD	2	11.10	11.50	2	2	2	2	2	2	2	2	2	2	1	0	11	10	CAPE_WEED BROME_GRASS
5010037	CHATFIELD-CLARKE RD	3	11.50	12.00	2	2	2	2	2	2	2	2	2	2	2	2	11	11	CAPE_WEED BROME_GRASS

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5010038	TURKEY FLATS RD	1	0.00	5.45	2	2	2	2	2	2	2	2	2	2	2	0	2	10	12	BROME_GRASS
5010038	TURKEY FLATS RD	2	5.45	6.80	2	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS
5010039	BRAND-MUDGE RD	1	0.00	0.65	2	2	2	2	2	2	2	2	2	2	2	2	2	10	10	CAPE_WEED BROME_GRASS
5010039	BRAND-MUDGE RD	2	0.65	3.95	2	2	2	2	1	1	2	2	2	2	1	2	10	11	CAPE_WEED BROME_GRASS	
5010039	BRAND-MUDGE RD	3	3.95	4.32	2	2	2	2	1	1	2	2	2	2	1	2	10	11	CAPE_WEED BROME_GRASS	
5010039	BRAND-MUDGE RD	4	4.32	9.89	2	2	2	2	2	2	2	2	2	2	2	2	12	12	CAPE_WEED BROME_GRASS	
5010039	BRAND-MUDGE RD	5	9.89	12.45	2	2	2	2	2	2	2	2	2	2	0	2	10	12		
5010039	BRAND-MUDGE RD	6	12.45	13.80	2	2	2	2	2	2	2	2	2	2	1	2	11	11		
5010039	BRAND-MUDGE RD	7	13.80	16.09	2	2	2	2	2	2	2	2	2	2	1	0	11	10		
5010040	WINCHESTER SOUTH RD	1	0.00	1.02	2	2	1	1	1	1	1	1	2	2	1	1	8	8	BROME_GRASS	
5010040	WINCHESTER SOUTH RD	2	1.02	3.00	2	2	2	2	2	2	1	1	2	2	1	1	10	10	BROME_GRASS WILD_RADISH	
5010040	WINCHESTER SOUTH RD	3	3.00	4.38	2	2	2	2	2	2	1	1	2	2	2	2	11	11	BROME_GRASS WILD_RADISH	
5010040	WINCHESTER SOUTH RD	4	4.38	4.75	2	2	1	1	1	1	1	1	2	2	2	2	9	9	BROME_GRASS	
5010040	WINCHESTER SOUTH RD	5	4.75	7.30	2	2	2	2	2	2	1	1	2	2	2	2	11	11	BROME_GRASS CAPE_WEED	
5010040	WINCHESTER SOUTH RD	6	7.30	8.30	2	2	2	2	2	2	2	2	2	2	0	2	10	12	BROME_GRASS CAPE_WEED	
5010040	WINCHESTER SOUTH RD	7	8.30	9.30	2	2	1	1	2	2	1	1	2	2	2	2	10	10	BROME_GRASS CAPE_WEED	
5010040	WINCHESTER SOUTH RD	8	9.30	10.55	2	2	2	2	2	2	2	2	2	2	2	2	12	12	BROME_GRASS CAPE_WEED	
5010040	WINCHESTER SOUTH RD	9	10.55	11.10	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS CAPE_WEED	
5010040	WINCHESTER SOUTH RD	10	11.10	14.48	2	2	2	2	1	1	2	2	2	2	2	0	11	9		
5010041	LUCAS-ROKICH RD	1	0.00	1.70	2	2	1	1	1	1	1	1	2	2	1	1	8	8	WILD_RADISH BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	2	1.70	2.22	2	2	1	1	1	1	1	1	2	2	1	0	8	7	WILD_RADISH BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	3	2.22	2.60	2	2	1	1	1	1	1	1	2	2	1	2	8	9	WILD_RADISH BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	4	2.60	3.65	2	1	1	1	1	1	1	1	2	2	1	1	8	7	WILD_RADISH BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	5	3.65	5.15	1	1	1	1	1	1	1	1	2	2	2	2	8	8	WILD_RADISH BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	6	5.15	7.00	2	2	1	2	1	1	2	2	2	2	1	1	9	10	BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	7	7.00	7.40	2	2	1	2	1	1	2	2	0	0	1	0	7	7	BROME_GRASS CAPE_WEED	
5010041	LUCAS-ROKICH RD	8	7.40	8.70	2	2	1	1	1	1	0	0	1	1	1	0	6	5	BROME_GRASS CAPE_WEED	

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5010041	LUCAS-ROKICH RD	9	8.70	9.50	2	2	1	1	1	1	2	2	1	1	1	0	8	7	BROME_GRASS CAPE_WEED
5010041	LUCAS-ROKICH RD	10	9.50	9.80	2	2	1	1	1	1	1	1	2	2	1	0	8	7	BROME_GRASS CAPE_WEED
5010041	LUCAS-ROKICH RD	11	9.80	10.40	2	2	1	2	1	1	2	2	2	2	1	0	9	9	BROME_GRASS CAPE_WEED
5010041	LUCAS-ROKICH RD	12	10.40	12.30	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS CAPE_WEED
5010042	BENTLEY RD	1	0.00	2.10	0	0	0	0	0	0	0	0	1	1	2	2	3	3	WILD_RADISH AFRICAN_LOVEGRASS CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	2	2.10	2.65	1	1	0	1	0	0	0	0	1	1	1	1	3	4	WILD_RADISH CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	3	2.65	3.05	0	0	0	0	0	0	0	0	0	0	1	1	1	1	WILD_RADISH CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	4	3.05	4.65	0	0	0	0	1	1	0	0	0	0	1	1	3	3	WILD_RADISH CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	5	4.65	6.62	1	1	0	0	0	0	0	0	0	0	2	2	3	3	WILD_RADISH AFRICAN_LOVEGRASS CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	6	6.62	7.05	1	0	0	0	0	0	0	0	0	0	2	2	3	2	WILD_RADISH AFRICAN_LOVEGRASS CAPE_WEED BROME_GRASS
5010042	BENTLEY RD	7	7.05	7.25	0	0	0	0	0	0	0	0	0	0	2	2	2	2	CAPE_WEED BROME_GRASS
5010044	PEARCE RD	1	0.00	0.50	1	1	1	1	1	1	2	2	1	1	1	1	7	7	
5010044	PEARCE RD	2	0.50	0.75	1	1	1	1	1	1	1	1	2	2	1	1	7	7	CAPE_WEED BROME_GRASS
5010044	PEARCE RD	3	0.75	1.18	2	2	1	1	1	1	0	0	2	2	1	1	7	7	CAPE_WEED BROME_GRASS
5010045	DAVIES RD	1	0.00	0.70	2	1	0	0	0	0	0	0	0	0	2	2	4	3	CAPE_WEED BROME_GRASS
5010046	WELLINGTON RD	1	0.00	2.90	2	2	1	1	1	1	1	1	2	2	2	1	9	8	CAPE_WEED WILD_RADISH AFRICAN_LOVEGRASS BROME_GRASS
5010048	DAWSON-TOUCHE RD	1	0.00	2.63	2	2	2	2	2	2	2	2	2	2	0	0	10	10	
5010048	DAWSON-TOUCHE RD	2	2.63	5.18	2	2	2	2	2	2	2	2	2	2	0	1	10	11	
5010048	DAWSON-TOUCHE RD	3	5.18	6.13	2	2	2	2	2	2	2	2	2	2	0	0	10	10	
5010048	DAWSON-TOUCHE RD	4	6.13	8.93	2	2	2	2	1	1	2	2	2	2	2	2	11	11	
5010048	DAWSON-TOUCHE RD	5	8.93	10.63	2	2	2	2	2	2	2	2	2	2	2	2	12	12	
5010048	DAWSON-TOUCHE RD	6	10.63	11.43	2	2	2	2	2	2	2	2	2	2	2	0	12	10	
5010049	LAKE RD	1	0.00	1.10	2	2	1	1	1	1	1	1	1	1	2	2	7	8	WILD_RADISH CAPE_WEED BROME_GRASS AFRICAN_LOVEGRASS
5010050	DIAMOND RD	1	0.00	2.00	2	2	1	1	1	1	1	1	2	2	2	1	9	8	CAPE_WEED AFRICAN_LOVEGRASS
5010052	ROCKY SPRING RD	1	1.75	2.75	2	2	2	2	2	2	2	2	2	2	0	0	10	10	AFRICAN_LOVEGRASS BROME_GRASS
5010058	RESERVE RD	1	0.00	3.20	2	2	2	2	2	2	2	2	2	2	0	1	10	11	
5010058	RESERVE RD	2	3.20	7.40	2	2	2	2	2	2	2	2	2	2	1	1	11	11	

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5010086	COOLIMBA-ENEABBA RD	1	0.00	1.15	1	1	2	2	1	1	1	1	2	2	0	0	7	7	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
5010123	CARNAMAH-ENEABBA RD	1	0.00	0.20	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
5010123	CARNAMAH-ENEABBA RD	2	0.20	0.55	0	0	0	0	0	0	1	1	0	0	1	1	2	2	
5010123	CARNAMAH-ENEABBA RD	3	0.55	1.22	0	0	0	0	0	0	0	0	0	0	1	1	1	1	WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	4	1.22	1.90	0	0	0	0	0	0	0	0	0	0	1	2	1	2	WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	5	1.90	4.10	1	1	1	0	0	0	0	0	1	1	0	2	3	4	CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	6	4.10	6.80	0	0	0	0	0	0	0	0	0	0	2	2	2	2	WILD_RADISH PATERSONS_CURSE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	7	6.80	7.10	1	0	0	0	1	0	0	0	0	0	2	2	4	2	WILD_RADISH PATERSONS_CURSE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	8	7.10	8.55	0	0	0	0	0	0	0	0	0	0	2	2	2	2	WILD_RADISH PATERSONS_CURSE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	9	8.55	11.50	1	1	1	1	1	1	1	1	0	0	2	1	6	5	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	10	11.50	12.80	1	1	1	1	0	0	0	0	0	0	1	1	3	3	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	11	12.80	15.10	1	1	1	1	2	2	2	2	2	2	1	1	9	9	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	12	15.10	16.30	1	1	1	1	1	1	1	1	2	2	1	0	7	6	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	13	16.30	16.70	1	1	0	1	0	1	0	0	0	1	1	0	2	4	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	14	16.70	18.00	1	1	1	1	1	1	0	0	1	1	1	0	5	4	AFRICAN_LOVEGRASS WILD_RADISH CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	15	18.00	20.20	1	1	1	1	1	1	1	1	2	2	1	1	7	7	CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	16	20.20	21.20	1	1	1	1	1	1	0	0	1	1	1	1	5	5	SAFFRON_THISTLE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	17	21.20	24.00	0	1	0	1	0	2	0	0	0	2	1	1	1	7	SAFFRON_THISTLE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	18	24.00	24.80	1	1	1	2	1	1	1	1	2	2	1	1	7	8	SAFFRON_THISTLE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	19	24.80	25.95	1	1	1	2	1	2	1	2	2	2	1	1	7	10	SAFFRON_THISTLE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	20	25.95	28.00	1	1	1	1	2	1	2	2	2	2	2	2	10	9	SAFFRON_THISTLE CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	21	28.00	30.10	2	2	1	2	1	2	1	2	2	2	2	0	9	10	CAPE_WEED BROME_GRASS
5010123	CARNAMAH-ENEABBA RD	22	30.10	31.60	2	2	1	2	1	2	1	2	2	2	2	2	9	12	CAPE_WEED BROME_GRASS
5010123	CARNAMAH-	23	31.60	35.70	2	2	1	1	1	2	1	1	2	2	2	2	9	10	WILD_RADISH CAPE_WEED

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	ENEABBA RD																			BROME_GRASS	
5010123	CARNAMAH-ENEABBA RD	24	35.70	38.95	2	2	2	2	2	2	2	2	2	2	2	2	2	2	12	12	
5010123	CARNAMAH-ENEABBA RD	25	38.95	44.60	2	2	2	2	2	2	2	2	2	2	1	0			11	10	
5010123	CARNAMAH-ENEABBA RD	26	44.60	47.00	2	2	2	2	2	2	2	2	2	2	0	0			10	10	
5010123	CARNAMAH-ENEABBA RD	27	47.00	47.50	2	2	2	2	2	2	2	2	2	2	0	0			10	10	
5010123	CARNAMAH-ENEABBA RD	28	47.50	49.40	2	2	2	2	2	2	2	2	2	2	0	0			10	10	
5010123	CARNAMAH-ENEABBA RD	29	49.40	51.70	2	2	2	2	2	2	2	2	2	2	0	1			10	11	
5010123	CARNAMAH-ENEABBA RD	30	51.70	53.20	2	2	2	2	2	2	2	2	2	2	1	1			11	11	
5010123	CARNAMAH-ENEABBA RD	31	53.20	55.00	2	2	2	2	1	2	2	2	2	2	0	1			9	11	AFRICAN_LOVEGRASS
5010123	CARNAMAH-ENEABBA RD	32	55.00	55.60	0	2	0	2	0	2	0	2	0	2	2	2			2	12	AFRICAN_LOVEGRASS
5010123	CARNAMAH-ENEABBA RD	33	55.60	57.60	2	2	2	2	2	2	2	2	2	2	2	2			12	12	AFRICAN_LOVEGRASS WILD_RADISH
5010123	CARNAMAH-ENEABBA RD	34	57.60	58.10	2	2	2	2	2	2	2	2	2	2	2	2			12	12	AFRICAN_LOVEGRASS WILD_RADISH
5010123	CARNAMAH-ENEABBA RD	35	58.10	62.10	2	2	2	2	2	2	2	2	2	2	2	1			12	11	AFRICAN_LOVEGRASS
5010123	CARNAMAH-ENEABBA RD	36	62.10	66.30	2	2	1	1	1	1	1	1	2	2	2	1			9	8	AFRICAN_LOVEGRASS
5010125	ENEABBA THREE SPRINGS RD	1	0.00	6.72	2	2	2	2	2	2	2	2	2	2	1	0			11	10	
5010125	ENEABBA THREE SPRINGS RD	2	6.72	6.95	1	1	1	1	1	0	2	1	2	2	1	1			8	6	BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	3	6.95	7.65	2	1	2	1	2	1	2	0	2	2	1	1			11	6	BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	4	7.65	9.25	2	1	2	1	2	1	2	1	2	2	0	2			10	8	CAPE_WEED BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	5	9.25	10.05	2	2	1	1	1	1	1	1	2	2	2	0			9	7	PATERSONS_CURSE CAPE_WEED BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	6	10.05	12.07	1	1	1	1	1	1	1	1	2	2	2	2			8	8	CAPE_WEED BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	7	12.07	16.75	1	1	2	2	2	2	2	2	2	2	1	1			10	10	BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	8	16.75	19.25	1	1	1	1	1	1	1	1	1	1	1	1			6	6	AFRICAN_LOVEGRASS BROME_GRASS
5010125	ENEABBA THREE SPRINGS RD	9	19.25	20.55	1	1	2	2	1	1	1	1	2	2	1	1			8	8	AFRICAN_LOVEGRASS PATERSONS_CURSE BROME_GRASS CAPE_WEED
5010125	ENEABBA THREE SPRINGS RD	10	20.55	22.40	1	1	1	1	2	1	2	2	2	2	0	1			8	8	AFRICAN_LOVEGRASS PATERSONS_CURSE BROME_GRASS CAPE_WEED
H004	H4 BRAND HWY	1	209.01	214.60	2	2	2	2	2	2	2	2	2	2	2	2			12	12	

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H004	H4 BRAND HWY	2	214.60	218.60	2	2	2	2	1	2	2	2	1	2	0	0	10	12	BROME_GRASS
H004	H4 BRAND HWY	3	218.60	223.90	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS
H004	H4 BRAND HWY	4	223.90	225.40	1	1	0	1	0	0	0	1	0	0	1	1	2	4	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
H004	H4 BRAND HWY	5	225.40	227.30	2	2	1	1	1	1	1	1	1	1	0	0	6	6	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
H004	H4 BRAND HWY	6	227.30	230.00	2	2	0	0	0	0	0	0	0	0	1	1	3	3	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
H004	H4 BRAND HWY	7	230.00	230.20	2	2	1	1	1	1	1	1	2	2	1	0	8	7	BROME_GRASS AFRICAN_LOVEGRASS CAPE_WEED
H004	H4 BRAND HWY	8	230.20	233.50	2	2	2	2	1	2	2	2	2	2	2	2	9	10	BROME_GRASS AFRICAN_LOVEGRASS
M028	MIDLANDS RD	1	123.35	124.68	0	0	0	0	0	0	0	0	0	0	1	2	1	2	WILD_RADISH CAPE_WEED BROME_GRASS AFRICAN_LOVEGRASS
M028	MIDLANDS RD	2	124.68	125.75	2	1	1	0	1	0	1	0	0	0	1	1	6	2	WILD_RADISH CAPE_WEED BROME_GRASS SAFFRON_THISTLE AFRICAN_LOVEGRASS
M028	MIDLANDS RD	3	125.75	126.75	1	1	0	0	1	0	1	1	1	1	1	1	5	4	WILD_RADISH CAPE_WEED BROME_GRASS SAFFRON_THISTLE AFRICAN_LOVEGRASS
M028	MIDLANDS RD	4	126.75	127.95	0	0	0	0	0	0	0	0	0	0	1	1	1	1	WILD_RADISH CAPE_WEED BROME_GRASS PATERSONS_CURSE AFRICAN_LOVEGRASS
M028	MIDLANDS RD	5	127.95	129.75	2	1	1	0	1	0	1	1	2	1	1	1	8	4	WILD_RADISH CAPE_WEED BROME_GRASS AFRICAN_LOVEGRASS
M028	MIDLANDS RD	6	129.75	132.25	0	0	0	0	1	0	0	0	0	0	1	1	2	1	WILD_RADISH CAPE_WEED BROME_GRASS AFRICAN_LOVEGRASS
M028	MIDLANDS RD	7	132.25	135.25	1	1	1	0	1	1	1	1	2	2	1	1	7	6	WILD_RADISH BROME_GRASS AFRICAN_LOVEGRASS
M028	MIDLANDS RD	8	135.25	136.75	1	1	1	1	2	1	0	0	1	1	1	1	6	5	WILD_RADISH BROME_GRASS
M028	MIDLANDS RD	9	136.75	140.60	2	2	1	1	2	1	1	1	2	2	1	1	9	8	WILD_RADISH BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	10	140.60	141.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	WILD_RADISH AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	11	141.45	143.75	0	0	0	1	1	1	0	0	1	1	1	2	4	4	WILD_RADISH AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	12	143.75	146.15	1	1	1	1	1	1	1	1	1	1	1	2	6	7	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	13	146.15	146.75	0	0	0	0	0	0	0	0	0	0	1	2	1	2	WILD_RADISH BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	14	146.75	148.15	2	2	1	1	1	0	1	1	2	2	1	2	8	8	WILD_RADISH BROME_GRASS CAPE_WEED
M028	MIDLANDS RD	15	148.15	153.75	2	2	2	2	1	1	1	1	2	2	1	2	9	10	AFRICAN_LOVEGRASS BROME_GRASS CAPE_WEED
M045	OCEAN ROAD	1	25.68	32.08	2	2	2	2	1	1	2	2	2	2	0	0	9	9	BROME_GRASS CAPE_WEED
M045	OCEAN ROAD	2	32.08	37.28	2	2	2	1	1	1	1	1	2	2	0	0	8	7	BROME_GRASS CAPE_WEED

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M045	OCEAN ROAD	3	37.28	44.38	2	1	2	1	1	1	2	1	2	2	0	0	9	6	BROME_GRASS CAPE_WEED
M045	OCEAN ROAD	4	44.38	45.28	1	1	1	1	1	1	1	1	1	1	1	1	6	6	BROME_GRASS CAPE_WEED
M045	OCEAN ROAD	5	45.28	46.08	2	1	2	1	1	1	1	2	2	1	0	1	9	6	BROME_GRASS
M045	OCEAN ROAD	6	46.08	55.38	2	2	2	2	1	1	2	1	2	2	2	2	9	8	BROME_GRASS
M048	COOLIMBA ENEABBA RD	1	0.00	2.05	2	2	1	1	1	1	1	1	2	2	0	2	7	9	BROME_GRASS AFRICAN_LOVEGRASS
M048	COOLIMBA ENEABBA RD	2	2.05	5.15	1	1	0	1	0	1	0	1	0	1	2	2	2	6	BROME_GRASS AFRICAN_LOVEGRASS
M048	COOLIMBA ENEABBA RD	3	5.15	7.05	2	2	2	2	1	1	2	1	2	2	0	1	9	10	BROME_GRASS AFRICAN_LOVEGRASS
M048	COOLIMBA ENEABBA RD	4	7.05	9.75	2	2	2	2	2	2	2	2	2	2	0	0	10	10	BROME_GRASS
M048	COOLIMBA ENEABBA RD	5	9.75	10.55	2	2	1	1	2	2	2	2	1	2	2	2	10	11	BROME_GRASS
M048	COOLIMBA ENEABBA RD	6	10.55	11.75	2	2	2	2	1	1	2	2	2	2	2	2	9	9	BROME_GRASS
M048	COOLIMBA ENEABBA RD	7	11.75	13.75	2	2	2	2	1	1	2	2	2	2	1	0	10	9	BROME_GRASS
M048	COOLIMBA ENEABBA RD	8	13.75	26.25	2	2	2	2	2	1	2	2	2	2	2	2	10	9	AFRICAN_LOVEGRASS BROME_GRASS
M048	COOLIMBA ENEABBA RD	9	26.25	27.37	2	2	2	1	2	1	1	1	2	2	0	0	9	7	AFRICAN_LOVEGRASS BROME_GRASS

Appendix

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APPENDIX 3

Road names and lengths: Shire of Carnamah (source- Main Roads WA 2004)

Road Number	Road Name	Road Length (km)
5010089	ALLENS RD	1.45
5010021	BACK-INNERING RD NO21	20.76
5010020	BACKMAN RD	4.51
5010059	BEEKEEPERS RD	14.48
5010042	BENTLEY RD	7.25
5010121	BIERMAN PL	0.13
5010006	BILLEROO RD	23.66
5010043	BILLEROO-COOROW RD	2.70
5010010	BODYCOAT RD	5.74
5010065	BOWMAN ST	1.05
5010098	BOWTELLS CROSSING RD	0.08
5010028	BRADLEY RD	9.09
5010039	BRAND-MUDGE RD	16.09
5010018	BRIMSON RD	4.00
5010104	BRIMSON ST	0.43
5010002	BUNJIL-CARNAMAH RD	24.62
5010014	BURNS RD	6.28
5010022	CAMAC RD	9.66
5010123	CARNAMAH-ENEABBA RD	66.30
5010001	CARNAMAH-PERENJORI RD	30.83
5010004	CARON RD	23.98
5010063	CARON ST	0.48
5010088	CEMETERY RD	0.32
5010119	CHAPMAN ST	0.27
5010031	CHAPPELL RD	4.50
5010092	CHAPPELLS CROSSING RD	0.08
5010037	CHATFIELD-CLARKE RD	11.95
5010109	CLARK PL	0.10
5010086	COOLIMBA-ENEABBA RD	1.15
5010115	COOPER ST	0.33
5010069	DAM RD	1.13
5010112	DARLING ST	0.64
5010045	DAVIES RD	0.70
5010101	DAWSON RD	7.86
5010048	DAWSON-TOUCHE RD	11.43
5010107	DEWAR ST	0.30
5010050	DIAMOND RD	2.41
5010068	DONALD ST	0.43
5010105	DRAPER ST NO105	0.10
5010111	ENEABBA DR	2.55
5010008	ERINDOON RD	11.10
5010017	FIRST NORTH RD	2.25
5010078	FORREST ST	0.35
5010118	FORRESTER AVE	0.40
5010025	FOWLER RD	6.12
5010035	GANGWAY RD	7.72
5010036	GARIBALDI-WILLIS RD	13.20
5010103	GOOCH ST	0.28
5010051	GOULD-SIMPSON RD	5.15
5010097	GREENS CROSSING RD	0.08
5010106	GROVER ST	0.10
5010096	HAIGS CROSSING RD	0.08
5010084	HILL ST	0.18
5010007	INERING RD	3.55
5010077	INJA ST	0.26
5010047	JACKSON RD	2.90
5010108	JOHNSON ST	0.59
5010071	KING DR	0.24
5010053	KING RD	4.51
5010102	KING ST	0.70
5010049	LAKE RD	1.00
5010019	LAMPARD TREMLET RD	3.86

A survey of the roadside conservation values in the Shire of Carnamah

5010070	LANG ST	0.40
5010026	LAWSON RD	8.05
5010120	LUCAS DR	0.32
5010041	LUCAS-ROKICH RD	13.92
5010087	LUTZE RD	1.25
5010117	MCGOWAN PL	0.25
5010124	MCPHERSON ST	1.38
5010122	MINERAL SANDS RD	7.00
5010024	MITCHELL RD	5.95
5010113	MORGAN ST	0.46
5010116	NAIRN CT	0.33
5010075	NAIRN ST	0.24
5010110	NEWMAN PL	0.20
5010073	NEWMAN RD	0.19
5010072	NIVEN CR	0.32
5010030	NORTH BOUNDARY RD	9.20
5010091	NORTH WINCHESTER ST	0.08
5010061	OLD GENERATION RD	30.21
5010034	OLD TELEGRAPH RD	16.20
5010076	PARKER ST	0.37
5010044	PEARCE RD	3.08
5010009	POPE RD	6.82
5010029	PROWAKA RD	9.25
5010080	RADHILL RD	0.45
5010064	RAILWAY AVE	1.29
5010094	RAYNERS CROSSING RD	0.08
5010023	READING RD	11.27
5010058	RESERVE RD	7.40
5010027	ROBERTSON RD	4.91
5010062	ROBERTSON ST	0.44
5010052	ROCKY SPRING RD	2.75
5010055	ROKICH RD	2.57
5010015	ROSE THOMSON RD	14.60
5010013	ROWLAND RD	9.12
5010126	SANDPLAIN CLOSE	0.14
5010016	SECOND NORTH RD	5.95
5010083	SHELL RD	0.55
5010074	SLATER ST	0.85
5010093	SOUTH HAIGS CROSSING RD	0.08
5010090	SOUTH WINCHESTER ST	0.08
5010033	STARCEVICH RD	3.35
5010125	THREE SPRINGS-ENEABBA RD	22.40
5010038	TURKEY FLATS RD	6.80
5010012	TURNER RD	10.50
5010011	WATERS RD	13.00
5010046	WELLINGTON RD	2.93
5010054	WEST YARRA RD	9.66
5010067	WHEAT RD	0.30
5010114	WHITE CT	0.33
5010095	WHITES CROSSING RD	0.08
5010085	WILSON ST	0.11
5010005	WINCHESTER EAST RD	19.60
5010040	WINCHESTER SOUTH RD	14.48
5010003	WINCHESTER WEST RD	6.44
5010056	WITTWER RD	2.98

Appendix

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APPENDIX 4

Flora species in the Shire of Carnamah (W.A Herbarium)

Note: not a comprehensive list.

* = Weed species

P = Priority species

R = Rare species

Acacia acanthoclada subsp. *acanthoclada*
Acacia acanthoclada subsp. *glaucescens* ms P3
Acacia aciphylla
Acacia acuarina
Acacia aculeiformis ms
Acacia acuminata subsp. *acuminata* ms
Acacia aestivalis
Acacia alata var. *alata*
Acacia alata var. *tetrantha*
Acacia andrewsii
Acacia anthochaera
Acacia aprica ms R
Acacia ashbyae
Acacia assimilis subsp. *assimilis*
Acacia auronitens
Acacia barbinervis subsp. *borealis* ms
Acacia bidentata
Acacia blakelyi
Acacia cavealis ms
Acacia chapmanii subsp. *chapmanii* ms P2
Acacia comans
Acacia congesta subsp. *cliftoniana* ms P1
Acacia cyclops
Acacia daviesioides
Acacia dilatata
Acacia dissona var. *dissona*
Acacia drewiana subsp. *drewiana*
Acacia drummondii subsp. *drummondii*
Acacia enervia subsp. *explicata*
Acacia epacantha P3
Acacia eremaea
Acacia ericifolia
Acacia ericksoniae ms
Acacia erinacea
Acacia fagonioides
Acacia filifolia P3
Acacia flabellifolia P1
Acacia fragilis
Acacia hemiteles
Acacia idiomorpha
Acacia incrassata
Acacia isoneura subsp. *isoneura* ms P3
Acacia isoneura subsp. *nimia* ms P3
Acacia jacksonioides
Acacia lanceolata ms P1
Acacia lasiocalyx
Acacia lasiocarpa var. *lasiocarpa*
Acacia lasiocarpa var. *sedifolia*
Acacia latipes
Acacia latipes subsp. *latipes* ms
Acacia latipes subsp. *licina* ms P3
Acacia leptospermoides subsp. *leptospermoides*
Acacia ligulata
Acacia ligustrina
Acacia lineolata subsp. *lineolata*
Acacia lirellata subsp. *lirellata* ms
Acacia littorea
Acacia longiphylloidea
Acacia mackeyana
Acacia microbotrya
Acacia moirii subsp. *recurvistipula*
Acacia multispicata
Acacia neurophylla subsp. *erugata*
Acacia neurophylla subsp. *neurophylla*
Acacia nodiflora P1
Acacia nyssophylla
Acacia pulchella var. *glaberrima*
Acacia pulchella var. *reflexa*
Acacia puncticulata ms
Acacia quadrisulcata
Acacia ramulosa
Acacia recurvata ms R
Acacia restiacea
Acacia retrorsa P2
Acacia rostellifera
Acacia saligna
Acacia saxatilis
Acacia scirpifolia
Acacia sessilis
Acacia sibina
Acacia signata
Acacia spathulifolia
Acacia sphacelata subsp. *sphacelata* ms
Acacia stenoptera
Acacia stereophylla var. *stereophylla*
Acacia telmica P2
Acacia tetragonophylla
Acacia trigonophylla
Acacia truncata
Acacia ulicina
Acacia vittata ms P1
Acacia willdenowiana
Acacia wilsonii ms P2
Acacia xanthina
Acanthocarpus canaliculatus
Acanthocarpus preissii
Actinobole condensatum
Actinostrobos acuminatus
Actinostrobos arenarius
Actinostrobos pyramidalis
Actinotus leucocephalus
Adenanthos cygnorum subsp. *cygnorum*
Adenanthos cygnorum subsp. *cygnorum*
Adenanthos drummondii
Adenanthos stictus
Adriana quadripartita
Agave americana
Agonis flexuosa var. *flexuosa*
Agrostis avenacea
Alexgeorgea nitens
Alexgeorgea subterranea
Allocauarina acuarina
Allocauarina campestris
Allocauarina drummondiana
Allocauarina grevilleoides P3
Allocauarina humilis
Allocauarina lehmanniana subsp. *lehmanniana*
Allocauarina microstachya
Allocauarina thuyoides
Alyogyne hakeifolia
Alyogyne huegelii var. *huegelii* ms
Alyogyne huegelii var. *wrayae* ms
Alyxia buxifolia
Amaranthus albus
Amphibolis antarctica
Amphibolis griffithii

Amphipogon strictus
Amphipogon turbinatus
Amyema fitzgeraldii
Amyema linophylla subsp. *linophylla*
Amyema miquelii
Amyema miraculosa subsp. *miraculosa*
Amyema preissii
Anagallis arvensis
Anagallis arvensis var. "unsorted"
Anarthria laevis
Anarthria polyphylla
Andersonia heterophylla
Andersonia lehmanniana
Angianthus milnei
Angianthus tomentosus
Anigozanthos humilis subsp. *humilis*
Anigozanthos manglesii subsp. *quadrans*
Anigozanthos pulcherrimus
Anthobolus foveolatus
Anthocercis genistoides
Anthocercis ilicifolia subsp. *ilicifolia*
Anthocercis littorea
Anthotroche pannosa
Aphanopetalum clematideum
Aphelia cyperoides
Apium annuum
Arctotheca calendula
Aristida holathera var. *holathera*
Arnocrinum drummondii P3
Arnocrinum gracillimum P1
Arnocrinum preissii
Asteridea pulverulenta
Astroloma ? microdonta
Astroloma epacridis
Astroloma glaucescens
Astroloma microcalyx
Astroloma microdonta
Astroloma pedicellatum ms P2
Astroloma serratifolium
Astroloma sp. Cataby(E.A.Griffin 1022) P4
Astroloma stomarrhena
Astroloma xerophyllum
Atriplex amnicola
Atriplex bunburyana
Atriplex cinerea
Atriplex codonocarpa
Atriplex holocarpa
Atriplex paludosa subsp. *baudinii*
Atriplex semibaccata
Atriplex suberecta
Atriplex vesicaria subsp. *incompta*
Austrodanthonia caespitosa
Austrostipa compressa
Austrostipa macalpinei
Austrostipa scabra
Austrostipa tenuifolia
Austrostipa variabilis
Avena sterilis
Baeckea camphorosmae
Baeckea crispiflora
Baeckea grandiflora
Baeckea grandis
Baeckea megaflorea ms
Baeckea ochropetala
Baeckea pentagonantha
Baeckea sp. Bunjil(B.R.Maslin 5067) P1
Baeckea sp. Three Springs(M.E.Trudgen 5368) P2
Baeckea staminosa
Banksia ashbyi
Banksia attenuata
Banksia burdettii
Banksia candolleana
Banksia chamaephyton P4
Banksia elegans P4
Banksia grossa
Banksia hookeriana
Banksia incana
Banksia lanata
Banksia leptophylla
Banksia leptophylla var. *leptophylla*
Banksia menziesii
Banksia micrantha P3
Banksia prionotes
Banksia scabrella P3
Banksia sphaerocarpa
Banksia sphaerocarpa subsp. *sphaerocarpa*
Banksia sphaerocarpa var. *sphaerocarpa*
Baumea arthropphylla
Baumea juncea
Beaufortia aestiva ms
Beaufortia bicolor P3
Beaufortia bracteosa
Beaufortia elegans
Beaufortia squarrosa
Beyeria cinerea
Beyeria cygnorum P2
Beyeria similis P3
Beyeria viscosa
Billardiera bicolor
Blancoa canescens
Boronia busselliana
Boronia coerulescens
Boronia coerulescens subsp. *spicata*
Boronia coerulescens subsp. *spinescens*
Boronia crassifolia
Boronia crenulata
Boronia crenulata subsp. *viminea* ms
Boronia cymosa
Boronia purdieana subsp. *purdieana*
Boronia ramosa
Boronia ramosa subsp. *anethifolia*
Boronia scabra subsp. *scabra* ms
Boronia ternata var. *foliosa*
Borya laciniata
Borya scirpoidea
Borya sphaerocephala
Bossiaea eriocarpa
Brachyloma preissii
Brachyscome halophila
Brachyscome iberidifolia
Brachyscome perpusilla
Brassica rapa
Brassica tournefortii
Briza maxima
Briza minor
Bulbine semibarbata
Burchardia bairdiae
Burchardia congesta
Bursaria occidentalis
Byblis gigantea
Caesia alfordii ms
Caladenia crebra
Caladenia denticulata
Caladenia douchiae
Caladenia flava subsp. *flava* ms
Caladenia flava subsp. *maculata* ms
Caladenia footeana ms
Caladenia latifolia
Caladenia longicauda subsp. *borealis* ms
Caladenia radialis
Caladenia roei
Caladenia vulgata ms
Calandrinia calyprata
Calandrinia corrigioloides

Calandrinia granulifera
Calandrinia primuliflora
Calectasia arnoldii ms R
Calectasia cyanea
Calothamnus brevifolius P3
Calothamnus glaber ms
Calothamnus hirsutus
Calothamnus longissimus
Calothamnus quadrifidus
Calothamnus quadrifidus var. "unsorted"
Calothamnus sanguineus
Calothamnus sp. Lesueur (E.A. Griffin 2490)
Calothamnus torulosus
Calothamnus villosus
Calotis erinacea
Calotis multicaulis
Calythropsis aurea
Calytrix acutifolia
Calytrix angulata
Calytrix aurea
Calytrix chrysantha P2
Calytrix depressa
Calytrix drummondii P2
Calytrix ecalycata
Calytrix eneabbensis P2
Calytrix flavescens
Calytrix fraseri
Calytrix glutinosa
Calytrix gracilis
Calytrix leschenaultii
Calytrix oldfieldii
Calytrix platycheiridia P2
Calytrix sapphirina
Calytrix strigosa
Calytrix superba P2
Capsella bursa-pastoris
Carpobrotus modestus
Carpobrotus virescens
Cassytha aurea var. *aurea*
Cassytha aurea var. *hirta*
Cassytha flava
Cassytha glabella
Cassytha glabella forma *bicallosa*
Cassytha glabella forma *glabella*
Cassytha pomiformis
Cassytha racemosa
Cassytha racemosa forma *pilosa*
Cassytha racemosa forma *racemosa*
Casuarina obesa
Caustis dioica
Cenchrus ciliaris
Cenchrus echinatus
Centaurea melitensis
Centrolepis aristata
Centrolepis humillima
Centrolepis pilosa
Centrolepis polygyna
Cephalopterum drummondii
Cephalosorus carpesioides
Chaetanthus aristatus ms
Chamaescilla corymbosa var. *corymbosa*
Chamaescilla corymbosa var. *latifolia*
Chamaexeros serra
Chamelaucium conostigmum ms P3
Chamelaucium drummondii
Chamelaucium drummondii subsp. *drummondii* ms
Chamelaucium drummondii subsp. *hallii* ms
Chamelaucium halophilum ms
Chamelaucium uncinatum
Cheiranthra filifolia var. *filifolia*
Cheiranthra preissiana var. *preissiana*
Chenopodium melanocarpum
Chloris pumilio
Chloris truncata
Chondrilla juncea
Chordifex microcodon ms
Choretrum pritzelii
Chorizandra enodis
Chorizema aciculare subsp. *laxum*
Chorizema aciculare subsp. *laxum* ms
Chorizema humile R
Chorizema racemosum
Chorizema racemosum ms
Chorizema rynchotropis
Chrysocephalum apiculatum
Chrysocoryne drummondii
Clematicissus angustissima
Clematis linearifolia
Comesperma acerosum P3
Comesperma calymega
Comesperma confertum
Comesperma drummondii
Comesperma griffinii ms P2
Comesperma integerrimum
Comesperma rhadinocarpum P2
Comesperma scoparium
Comesperma volubile
Commersonia pulchella
Commersonia pulchella
Conospermum acerosum
Conospermum acerosum subsp. *acerosum*
Conospermum boreale
Conospermum boreale subsp. *ascendens* ms
Conospermum boreale subsp. *boreale* ms
Conospermum boreale subsp. *coriaceum* ms
Conospermum boreale subsp. *velutinum* ms
Conospermum brachyphyllum
Conospermum canaliculatum
Conospermum canaliculatum subsp. *canaliculatum*
Conospermum crassinervium
Conospermum glumaceum
Conospermum incurvum
Conospermum nervosum
Conospermum stoechadis
Conospermum stoechadis subsp. *sclerophyllum* ms
Conospermum stoechadis subsp. *stoechadis*
Conospermum unilaterale
Conospermum unilaterale ms
Conospermum wycherleyi
Conospermum wycherleyi ms
Conospermum wycherleyi subsp. *glabrum*
Conospermum wycherleyi subsp. *glabrum* ms
Conospermum wycherleyi subsp. *wycherleyi* ms
Conostephium pendulum
Conostephium preissii
Conostylis aculeata subsp. *aculeata*
Conostylis aculeata subsp. *breviflora*
Conostylis aculeata subsp. *bromelioides*
Conostylis androstemma
Conostylis aurea
Conostylis candicans
Conostylis candicans
Conostylis candicans subsp. *calcicola*
Conostylis candicans subsp. *candicans*
Conostylis canteriata
Conostylis crassinervia
Conostylis crassinervia subsp. *absens*
Conostylis crassinervia subsp. *crassinervia*
Conostylis dielsii
Conostylis dielsii subsp. *dielsii*
Conostylis hiemalis
Conostylis neocymosa
Conostylis prolifera
Conostylis resinosa

Conostylis seminuda
Conostylis setigera
Conostylis teretifolia
Conostylis teretifolia subsp. *teretifolia*
Conostylis teretiuscula
Conostylis tomentosa
Conothamnus trinervis
Corynanthera flava
Corynotheca micrantha var. *micrantha*
Cotula bipinnata
Cotula coronopifolia
Cotula cotuloides
Crassula colorata var. *acuminata*
Crassula exserta
Crassula helmsii P2
Crassula natans
Crassula natans var. *minus*
Croninia kingiana ms
Cryptandra grandiflora
Cryptandra mutila
Cryptandra myriantha
Cryptandra pungens
Cryptandra spyridioides
Cryptandra wichurae
Cullen cinereum
Cyanicula deformis ms
Cyanicula gemmata ms
Cyanostegia corifolia
Cynosurus echinatus
Cyperus gymnocaulos
Dactyloctenium radulans
Dampiera altissima
Dampiera carinata
Dampiera juncea
Dampiera lavandulacea
Dampiera lindleyi
Dampiera linearis
Dampiera oligophylla
Dampiera salahae
Dampiera spicigera
Dampiera tenuicaulis var. *tenuicaulis*
Dampiera teres
Darwinia aff. *helichrysoides*
Darwinia chapmaniana ms R
Darwinia helichrysoides
Darwinia neildiana
Darwinia purpurea
Darwinia sanguinea P4
Darwinia sp. Carnamah (J. Coleby-Williams 148) R
Darwinia speciosa
Dasypogon obliquifolius
Daviesia angulata
Daviesia benthamii subsp. *benthamii*
Daviesia bursarioides R
Daviesia chapmanii P4
Daviesia daphnoides
Daviesia debilior
Daviesia debilior subsp. *debilior* P2
Daviesia decurrens
Daviesia dielsii P2
Daviesia divaricata
Daviesia incrassata subsp. *teres*
Daviesia incrassata subsp. *teres* ms
Daviesia longifolia
Daviesia nematophylla
Daviesia nudiflora subsp. *nudiflora*
Daviesia oxyclada
Daviesia oxyclada ms
Daviesia pedunculata
Daviesia physodes
Daviesia podophylla
Daviesia pteroclada P1
Daviesia quadrilatera
Daviesia speciosa R
Daviesia triflora
Desmocladius elongatus ms P3
Desmocladius parthenicus ms
Desmocladius semiplanus ms P1
Dianella revoluta var. *divaricata*
Didymanthus roei
Diplolaena angustifolia
Diplolaena eneabbensis ms
Diplolaena ferruginea
Diplolaena leemaniana
Diplolaena leemaniana ms
Diplolaena velutina
Diplopeltis huegelii
Diplopeltis huegelii var. *lehmanii* ms
Diplopeltis huegelii var. *subintegra*
Dischisma capitatum
Dithyrostegia amplexicaulis
Dittrichia graveolens
Diuris corymbosa
Diuris laxiflora
Diuris magnifica
Dodonaea aptera
Dodonaea ceratocarpa
Dodonaea ericoides
Dodonaea inaequifolia
Dodonaea larreoides
Dodonaea pinifolia
Dodonaea viscosa
Dodonaea viscosa subsp. *angustissima*
Drakaea glyptodon
Drakonorchis drakeoides ms R
Drosera barbiger
Drosera bulbosa subsp. *bulbosa*
Drosera echinoblastus
Drosera eneabba
Drosera erythrorhiza subsp. *magna*
Drosera gigantea
Drosera gigantea subsp. *gigantea*
Drosera glanduligera
Drosera heterophylla
Drosera leucoblata
Drosera macrantha subsp. *macrantha*
Drosera menziesii
Drosera menziesii subsp. *menziesii*
Drosera menziesii subsp. *penicillaris*
Drosera menziesii subsp. *thysanosepala*
Drosera neesii subsp. *borealis*
Drosera nivea
Drosera paleacea
Drosera parvula
Drosera ramellosa
Drosera pilos
Drosera stolonifera subsp. *humilis*
Drosera stolonifera subsp. *porrecta*
Drosera stricticaulis
Drosera subhirtella subsp. *subhirtella*
Drummondita hassellii
Dryandra bipinnatifida subsp. *multifida*
Dryandra borealis subsp. *elatior* P1
Dryandra carlinoides
Dryandra cypholoba P2
Dryandra fraseri var. *fraseri*
Dryandra fraseri var. *oxycedra* P3
Dryandra glauca
Dryandra glauca ms
Dryandra hewardiana
Dryandra kippistiana
Dryandra kippistiana var. *kippistiana*
Dryandra kippistiana var. *paenpeccata* P1
Dryandra kippistiana var. *paenpeccata* ms

Dryandra lindleyana subsp. *media*
Dryandra nana
Dryandra nivea
Dryandra nivea subsp. *nivea* ms
Dryandra nobilis subsp. *fragrans* P3
Dryandra platycarpa P3
Dryandra purdieana
Dryandra serratuloides subsp. *serratuloides* R
Dryandra sessilis var. *cygnorum*
Dryandra sessilis var. *flabellifolia*
Dryandra shuttleworthiana
Dryandra sp.23(A.S.George 16788)
Dryandra speciosa subsp. *macrocarpa* P3
Dryandra stricta P3
Dryandra subulata P3
Dryandra tortifolia P3
Dryandra tridentata
Dryandra trifontinalis P3
Dryandra vestita
Duboisia hopwoodii
Ecdeiocolea monostachya
Echium plantagineum
Elatine gratioides
Elythranthera brunonis
Emblingia calceoliflora
Enchylaena tomentosa
Enchylaena tomentosa var. *tomentosa*
Epitriche demissus P2
Eragrostis australasica
Eragrostis dielsii
Eremaea asterocarpa subsp. *asterocarpa*
Eremaea asterocarpa subsp. *histoclada*
Eremaea atala
Eremaea beaufortioides
Eremaea beaufortioides subsp. *beaufortioides*
Eremaea beaufortioides subsp. *microphylla*
Eremaea beaufortioides var. *beaufortioides*
Eremaea beaufortioides var. *lachnosanthe*
Eremaea beaufortioides var. *microphylla*
Eremaea brevifolia
Eremaea ebracteata var. *ebracteata*
Eremaea ectadioclada
Eremaea fimbriata
Eremaea hadra
Eremaea pauciflora
Eremaea pauciflora var. *calyptra*
Eremaea pauciflora var. *lonchophylla*
Eremaea violacea
Eremaea violacea subsp. *raphiophylla*
Eremaea violacea subsp. *violacea*
Eremaea violacea var. *violacea*
Eremaea x codonocarpa
Eremaea x phoenicea
Eremophila decipiens subsp. *decipiens* ms
Eremophila deserti
Eremophila drummondii
Eremophila glabra
Eremophila glabra subsp. *albicans*
Eremophila glabra subsp. *carnosa* ms
Eremophila glabra subsp. *tomentosa* ms
Eremophila lehmanniana
Eremophila microtheca R
Eremophila nivea R
Eremophila oldfieldii
Eremophila oldfieldii subsp. *oldfieldii*
Eremophila oppositifolia var. *angustifolia* ms
Eremophila sargentii P2
Eriochilus dilatatus subsp. *dilatatus* ms
Eriostemon brucei subsp. *brucei*
Eriostemon pinoides
Eriostemon spicatus
Erodium cicutarium
Erymophyllum glossanthus
Erymophyllum ramosum subsp. *involutatum*
Erymophyllum ramosum subsp. *ramosum*
Erymophyllum tenellum
Eryngium pinnatifidum subsp. *palustre* ms P2
Eryngium pinnatifidum subsp. *pinnatifidum* ms
Eucalyptus abdita P2
Eucalyptus accedens
Eucalyptus albida
Eucalyptus arachnaea
Eucalyptus arachnaea subsp. *arachnaea*
Eucalyptus baudiniana
Eucalyptus brachycorys
Eucalyptus camaldulensis
Eucalyptus celastroides subsp. *virella*
Eucalyptus conveniens ms
Eucalyptus crispata R
Eucalyptus decipiens subsp. *chalara*
Eucalyptus diminuta ms P2
Eucalyptus dongarraensis
Eucalyptus drummondii
Eucalyptus ebbanoensis subsp. *ebbanoensis*
Eucalyptus erythrocorys
Eucalyptus eudesmioides
Eucalyptus eudesmioides subsp. *eudesmioides*
Eucalyptus falcata
Eucalyptus flocktoniae
Eucalyptus foecunda
Eucalyptus foecunda subsp. *Coolimba*(M.I.H.Brooker 9556) P3
Eucalyptus gittinsii
Eucalyptus hypochlamydea
Eucalyptus hypochlamydea subsp. *ecdysiastes* ms
Eucalyptus hypochlamydea subsp. *hypochlamydea* ms
Eucalyptus impensa R
Eucalyptus incrassata
Eucalyptus johnsoniana R
Eucalyptus jucunda
Eucalyptus kochii
Eucalyptus kochii subsp. *kochii*
Eucalyptus leptophylla
Eucalyptus loxophleba subsp. *loxophleba*
Eucalyptus loxophleba subsp. *supraevis*
Eucalyptus loxophleba x *wandoo* P1
Eucalyptus macrocarpa subsp. *elachantha* P4
Eucalyptus macrocarpa x *pyriformis* P1
Eucalyptus myriadena subsp. *myriadena*
Eucalyptus obtusa ms
Eucalyptus obtusiflora
Eucalyptus oldfieldii
Eucalyptus oraria
Eucalyptus pendens P4
Eucalyptus petraea
Eucalyptus phaenophylla subsp. *phaenophylla*
Eucalyptus pleurocarpa
Eucalyptus pluricaulis subsp. *pluricaulis*
Eucalyptus pruiniramis R
Eucalyptus pyriformis
Eucalyptus redunca
Eucalyptus rhodantha var. *rhodantha* R
Eucalyptus rigidula
Eucalyptus rudis
Eucalyptus sargentii subsp. *sargentii*
Eucalyptus semivestita ms
Eucalyptus sheathiana
Eucalyptus stowardii
Eucalyptus subangusta
Eucalyptus subangusta subsp. *subangusta*
Eucalyptus suberea R
Eucalyptus tenera
Eucalyptus tetragona
Eucalyptus todtiana

Eucalyptus wandoo subsp. *pulverea*
Eucalyptus zopherophloia P4
Euphorbia drummondii
Euphorbia terracina
Eutaxia microphylla
Exocarpos aphyllus
Exocarpos sparteus
Frankenia pauciflora
Gahnia australis
Gahnia drummondii
Gahnia lanigera
Gahnia trifida
Galium murale
Gastrolobium appressum R
Gastrolobium bidens
Gastrolobium callistachys P4
Gastrolobium oxylobioides
Gastrolobium parviflorum
Gastrolobium polystachyum
Gastrolobium rotundifolium P1
Gastrolobium spinosum var. *spinosum*
Geleznovia verrucosa P3
Georgiella hexandra ms P4
Gilberta tenuifolia
Glischrocaryon aureum var. *angustifolium*
Glischrocaryon aureum var. *aureum*
Glischrocaryon flavescens
Glossostigma diandrum
Glycine clandestina
Gnephosis acicularis
Gnephosis angianthoides
Gnephosis drummondii
Gnephosis tenuissima
Gnephosis trifida
Gnephosis uniflora
Gompholobium aff. *knightianum*
Gompholobium confertum
Gompholobium knightianum
Gompholobium preissii
Gompholobium shuttleworthii
Gompholobium sp. *Eneabba*(E.A.Griffin 5560)
Gompholobium sp. *Marchagee*(B.R.Maslin 1427) P2
Gompholobium tomentosum
Gompholobium viscidulum
Gonocarpus pithyoides
Goodenia berardiana
Goodenia caerulea
Goodenia convexa
Goodenia dyeri
Goodenia glareicola
Goodenia hassallii
Goodenia micrantha
Goodenia pinnatifida
Goodenia pulchella
Goodenia trichophylla P2
Grevillea adpressa
Grevillea althoferorum R
Grevillea amplexans
Grevillea argyrophylla
Grevillea biformis subsp. *biformis*
Grevillea biformis subsp. *cymbiformis* P2
Grevillea biternata
Grevillea candelabroides
Grevillea curviloba subsp. *incurva* P1
Grevillea didymobotrya subsp. *didymobotrya*
Grevillea didymobotrya subsp. *involuta*
Grevillea dielsiana
Grevillea erinacea P3
Grevillea eriostachya
Grevillea exposita
Grevillea granulosa P3
Grevillea hakeoides subsp. *hakeoides*
Grevillea hakeoides subsp. *stenophylla*
Grevillea hookeriana
Grevillea integrifolia
Grevillea integrifolia subsp. *shuttleworthiana*
Grevillea leptopoda P3
Grevillea leucopteris
Grevillea levis
Grevillea makinsonii P2
Grevillea murex R
Grevillea obliquistigma subsp. *funicularis*
Grevillea olivacea P4
Grevillea paniculata
Grevillea paradoxa
Grevillea petrophiloides
Grevillea pinaster
Grevillea pinifolia P1
Grevillea polybotrya
Grevillea preissii subsp. *glabrilimba*
Grevillea preissii subsp. *preissii*
Grevillea rogersoniana P2
Grevillea rudis P4
Grevillea shuttleworthiana subsp. *obovata*
Grevillea shuttleworthiana subsp. *shuttleworthiana*
Grevillea synapheae subsp. *pachyphylla*
Grevillea thelemanniana subsp. *obtusifolia*
Grevillea thyrsoides subsp. *pustulata* P3
Grevillea umbellulata
Grevillea umbellulata subsp. *acerosa*
Grevillea umbellulata subsp. *umbellulata*
Grevillea uncinulata subsp. *uncinulata*
Grevillea uniformis P3
Grevillea zygoloba
Guichenotia alba P3
Guichenotia ledifolia
Guichenotia macrantha
Guichenotia micrantha
Guichenotia quasicalva ms P2
Guichenotia sarotes
Gunniopsis quadrifida
Gyrostemon racemiger
Gyrostemon ramulosus
Gyrostemon subnudus
Haemodorum brevisepalum
Haemodorum discolor
Haemodorum loratum P3
Haemodorum simplex
Haemodorum simulans
Haemodorum spicatum
Haemodorum venosum
Hakea auriculata
Hakea brownii
Hakea candolleana
Hakea conchifolia
Hakea costata
Hakea cygna subsp. *cygna*
Hakea gilbertii
Hakea incrassata
Hakea invaginata
Hakea marginata subsp. *leptocarpa* ms
Hakea meisneriana
Hakea obliqua subsp. *obliqua*
Hakea platysperma
Hakea polyanthema
Hakea preissii
Hakea prostrata
Hakea psilorrhyncha
Hakea smilacifolia
Hakea spathulata P3
Hakea sulcata
Halgania anagalloides var. *anagalloides* ms
Halgania sericiflora
Halgania wonganensis ms

Haloragis foliosa P1
Halosarcia doleiiformis
Halosarcia fimbriata
Halosarcia halocnemoides
Halosarcia indica subsp. *bidens*
Halosarcia indica subsp. *leiostachya*
Halosarcia koobabbiensis ms P1
Halosarcia lepidosperma
Halosarcia leptoclada subsp. *inclusa*
Halosarcia lylei
Halosarcia peltata
Halosarcia pergranulata subsp. *pergranulata*
Halosarcia syncarpa
Halosarcia undulata
Hardenbergia comptoniana
Harperia lateriflora
Hemiandra ? rutilans
Hemiandra aff. pungens
Hemiandra coccinea P3
Hemiandra gardneri R
Hemiandra glabra subsp. *glabra*
Hemiandra hancocksiana ms R
Hemiandra pungens
Hemiandra rubriflora
Hemiandra rutilans R
Hemichroa diandra
Hemigenia diplanthera
Hemigenia drummondii
Hemigenia pimelifolia P3
Hemigenia westringioides
Hensmania chapmanii R
Hensmania stoniella P2
Hensmania turbinata
Hexaglottis lewisiae
Hibbertia acerosa
Hibbertia aff. aurea
Hibbertia aff. hypericoides
Hibbertia aurea
Hibbertia conspicua
Hibbertia crassifolia
Hibbertia desmophylla
Hibbertia exasperata
Hibbertia glomerosa
Hibbertia huegelii
Hibbertia hypericoides
Hibbertia polystachya
Hibbertia racemosa
Hibbertia rostellata
Hibbertia rupicola
Hibbertia spicata
Hibbertia subvaginata
Homalocalyx chapmanii P1
Homalosciadium homalocarpum
Hopkinsia anoetocolea P3
Hovea pungens
Hovea stricta
Hyalochlamys globifera
Hyalosperma cotula
Hyalosperma glutinosum subsp. *glutinosum*
Hyalosperma glutinosum subsp. *venustum*
Hybanthus calycinus
Hybanthus floribundus subsp. *floribundus*
Hydrocotyle alata
Hydrocotyle coorowensis ms P1
Hydrocotyle tetragonocarpa
Hydrocotyle vigintimilia ms P1
Hypericum japonicum
Hypocalymma angustifolium
Hypocalymma linifolium
Hypocalymma xanthopetalum
Hypocalymma xanthopetalum var. "unsorted"
Hypocalymma xanthopetalum var. *linearifolium* ms P2

Hypochaeris glabra
Hypolaena exsulca
Hypoxis occidentalis var. *occidentalis*
Isolepis congrua
Isolepis marginata
Isolepis setiformis
Isolepis stellata
Isopogon adenanthoides
Isopogon divergens
Isopogon dubius
Isopogon inconspicuus
Isopogon linearis
Isopogon sp. Watheroo (D. Foreman 477)
Isopogon tridens P3
Isotoma hypocrateriformis
Isotoma pusilla
Isotoma scapigera
Isotropis cuneifolia
Isotropis juncea
Jacksonia acicularis ms
Jacksonia angulata
Jacksonia anthoclada ms P3
Jacksonia calcicola ms
Jacksonia condensata
Jacksonia densiflora
Jacksonia eremodendron
Jacksonia fasciculata
Jacksonia floribunda
Jacksonia foliosa
Jacksonia hakeoides
Jacksonia lehmannii
Jacksonia macrocalyx
Jacksonia nutans ms
Jacksonia pungens ms R
Jacksonia restioides
Jacksonia rhadinoclada
Jacksonia sternbergiana
Johnsonia pubescens
Juncus bufonius
Juncus kraussii subsp. *australiensis*
Juncus pallidus
Juncus radula
Kennedia coccinea
Kennedia prostrata
Keraudrenia hermanniifolia
Labichea lanceolata lanceolata
Labichea lanceolata subsp. *lanceolata*
Lablab purpureus
Lachnostachys eriobotrya
Lambertia multiflora
Lambertia multiflora var. *multiflora*
Lasiopetalum angustifolium
Lasiopetalum bracteatum P4
Lasiopetalum drummondii
Lasiopetalum erectifolium ms
Lasiopetalum ogilvieanum P1
Lasiopetalum oldfieldii subsp. *biloculatum* ms P4
Lavatera plebeia var. *tomentosa*
Lawrencella davenportii
Lawrencella rosea
Lawrencia chrysoderma
Lawrencia squamata
Lawrencia viridigrisea
Laxmannia omnifertilis
Laxmannia sessiliflora subsp. *australis*
Laxmannia sessiliflora subsp. *drummondii*
Lechenaultia biloba
Lechenaultia floribunda
Lechenaultia formosa
Lechenaultia hirsuta
Lechenaultia juncea P1
Lechenaultia linarioides

Lechenaultia stenosepala
Lepidium bonariense
Lepidobolus chaetocephalus
Lepidobolus densus ms P3
Lepidobolus preissianus
Lepidobolus quadratus ms P3
Lepidosperma aff. *resinosum*
Lepidosperma aff. *tenuis*
Lepidosperma angustatum
Lepidosperma costale
Lepidosperma gladiatum
Lepidosperma pubisquamum
Lepidosperma scabrum
Lepidosperma sp. P1 small head (M.D. Tindale 166A)
Lepidosperma tenue
Lepilaena preissii
Leptocarpus canus
Leptoceras menziesii
Leptomeria empetriformis
Leptomeria pauciflora
Leptomeria preissiana
Leptorhynchus scaber
Leptosema aphyllum ms
Leptosema daviesioides
Leptospermum erubescens
Leptospermum oligandrum
Leptospermum spinescens
Leucopogon aff. *conostephioides*
Leucopogon aff. *striatus*
Leucopogon aff. *tamminensis*
Leucopogon allittii
Leucopogon cochlearifolius
Leucopogon conostephioides
Leucopogon crassiflorus
Leucopogon hamulosus
Leucopogon hispidus
Leucopogon insularis
Leucopogon leptanthus
Leucopogon obtectus R
Leucopogon oldfieldii
Leucopogon oxycedrus
Leucopogon parviflorus
Leucopogon phyllostachys
Leucopogon polymorphus
Leucopogon racemosus
Leucopogon sprengelioides
Levenhookia dubia
Levenhookia leptantha
Levenhookia preissii
Limonium companyonis
Limonium sinuatum
Limosella australis
Lobelia alata
Lobelia heterophylla
Logania flaviflora
Logania spermacocea
Logania vaginalis
Lomandra caespitosa
Lomandra collina
Lomandra effusa
Lomandra hastilis
Lomandra preissii
Lomandra sericea
Loxocarya biformis ms
Loxocarya gigas ms P3
Lupinus angustifolius
Lycium ferocissimum
Lyginia barbata
Lysiana casuarinae
Lysinema ciliatum
Lysinema ciliatum forma *Central wheatbelt* (S. Paust 898)

Lysinema ciliatum forma N of Perth (N. Sammy s.n. 15/8/1985)
Lysinema ciliatum forma Perth limestone (W. Ives s.n. 9/8/1960)
Lysiosepalum rugosum
Macarthuria apetala
Macarthuria australis
Macropidia fuliginosa
Maireana aff. *amoena*
Maireana amoena
Maireana brevifolia
Malleostemon hursthousei
Malleostemon roseus
Mallophora globiflora
Marianthus erubescens
Marianthus ringens
Marsilea hirsuta
Marsilea mutica
Melaleuca ? *pentagona*
Melaleuca acerosa
Melaleuca adnata
Melaleuca aff. *acerosa*
Melaleuca aff. *cordata*
Melaleuca aff. *scabra*
Melaleuca aff. *trichophylla*
Melaleuca aff. *urceolaris*
Melaleuca aspalathoides
Melaleuca brevifolia
Melaleuca cardiophylla
Melaleuca carrii ms
Melaleuca conothamnoides
Melaleuca cordata
Melaleuca coroncarpa
Melaleuca eleuterostachya
Melaleuca fulgens subsp. *steedmanii*
Melaleuca hamulosa
Melaleuca holosericea
Melaleuca huegelii subsp. *huegelii*
Melaleuca lanceolata
Melaleuca lanceolata subsp. *occidentalis*
Melaleuca lateriflora subsp. *acutifolia* ms
Melaleuca longistaminea subsp. *longistaminea* ms
Melaleuca nematophylla
Melaleuca nesophila
Melaleuca oldfieldii
Melaleuca preissiana
Melaleuca radula
Melaleuca raphiophylla
Melaleuca scabra
Melaleuca sclerophylla P3
Melaleuca seriata
Melaleuca strobophylla
Melaleuca thyoides
Melaleuca trichophylla
Melaleuca uncinata
Melaleuca urceolaris
Melaleuca viminea
Melaleuca viminea subsp. *viminea*
Melaleuca virgata ms
Melinis repens
Mesomelaena preissii
Mesomelaena pseudostygia
Mesomelaena stygia subsp. *deflexa* P2
Mesomelaena tetragona
Micromyrtus flaviflora
Micromyrtus sp. *Three Springs* (R.J. Cranfield 7885)
Microtis media
Microtis orbicularis
Millotia myosotidifolia
Mirbelia aff. *multicaulis*
Mirbelia depressa
Mirbelia floribunda

Mirbelia microphylla
Mirbelia ramulosa
Mirbelia spinosa
Mirbelia trichocalyx
Monachather paradoxus
Monopsis debilis
Monotaxis grandiflora
Monotaxis lurida
Muehlenbeckia polybotrya
Myoporum caprarioides
Myoporum tetrandrum
Myriocephalus appendiculatus P3
Myriocephalus occidentalis
Nemcia aff. hookeri
Nemcia obovata
Nemcia pauciflora
Nemcia reticulata
Nemcia spathulata
Neosciadium glochidiatum
Neurachne alopecuroidea
Nicotiana occidentalis subsp. hesperis
Nitraria billardierei
Nuytsia floribunda
Olax aurantia
Olax benthamiana
Olax scalariformis P3
Olearia conspicua ms
Olearia dampieri subsp. dampieri ms
Olearia dampieri subsp. eremicola ms
Olearia homolepis
Olearia rudis
Omphalolappula concava
Opercularia spermacocea
Opercularia vaginata
Ophioglossum gramineum
Ornithopus pinnatus
Orobanche minor
Orthrosanthus aff. laxus
Orthrosanthus laxus var. gramineus
Orthrosanthus laxus var. laxus
Osteospermum clandestinum
Paracaleana dixonii ms R
Paractaenum novae-hollandiae
Parietaria cardiostegia
Paspalidium basicladum
Patersonia argyrea P3
Patersonia drummondii subsp. borealis ms
Patersonia drummondii subsp. drummondii ms
Patersonia graminea
Patersonia juncea
Patersonia occidentalis
Pentaschistis airoides
Persoonia acicularis
Persoonia angustiflora
Persoonia chapmaniana P2
Persoonia comata
Persoonia coriacea
Persoonia filiformis P2
Persoonia pungens P3
Persoonia rudis P3
Persoonia rufiflora
Persoonia saundersiana
Persoonia stricta
Petrophile aculeata
Petrophile aculeata ms
Petrophile biternata P3
Petrophile brevifolia
Petrophile chrysantha
Petrophile conifera
Petrophile drummondii
Petrophile ericifolia subsp. subpubescens ms
Petrophile linearis
Petrophile macrostachya
Petrophile megalostegia
Petrophile scabriuscula
Petrophile seminuda
Petrophile serruriae
Petrophile shuttleworthiana
Petrophile striata
Philydrella pygmaea
Philydrella pygmaea subsp. pygmaea
Phlebocarya filifolia
Phlebocarya pilosissima subsp. pilosissima P3
Phlebocarya pilosissima subsp. teretifolia P1
Phyllanthus calycinus
Phyllanthus scaber
Phymatocarpus porphyrocephalus
Physopsis spicata
Pileanthus filifolius
Pileanthus peduncularis
Pilostyles hamiltonii
Pimelea aeruginosa
Pimelea angustifolia
Pimelea argentea
Pimelea avonensis
Pimelea ferruginea
Pimelea floribunda
Pimelea gilgiana
Pimelea imbricata var. piligera
Pimelea imbricata var. simulans
Pimelea leucantha
Pimelea sulphurea
Pimelea villifera
Pithocarpa pulchella
Pittosporum phylliraeoides var. phylliraeoides
Pityrodia bartlingii
Pityrodia dilatata
Pityrodia hemigenioides
Pityrodia lepidota
Pityrodia loxocarpa
Pityrodia verbascina
Pityrodia viscida P1
Plantago coronopus subsp. commutata
Platysace cirrosa
Platysace juncea
Platysace trachymenioides
Platysace xerophila
Poa poiformis
Poa serpentum
Podolepis canescens
Podolepis capillaris
Podolepis lessonii
Podotheca angustifolia
Podotheca chrysantha
Podotheca gnaphalioides
Podotheca uniseta P2
Pogonolepis stricta
Poranthera microphylla
Posidonia sinuosa
Prasophyllum cyphochilum
Prasophyllum giganteum
Prasophyllum gracile
Prasophyllum macrostachyum
Prasophyllum plumiforme
Prasophyllum sargentii
Pterochaeta paniculata
Ptilotus caespitosus P1
Ptilotus divaricatus var. divaricatus
Ptilotus drummondii var. drummondii
Ptilotus drummondii var. minor
Ptilotus exaltatus var. exaltatus
Ptilotus humilis subsp. humilis
Ptilotus obovatus var. obovatus
Ptilotus polystachyus var. "unsorted"

Ptilotus spathulatus forma spathulatus
Pyrorchis nigricans
Quinetia urvillei
Rapistrum rugosum
Regelia inops
Reichardia tingitana
Rhagodia drummondii
Rhagodia latifolia subsp. recta
Rhagodia preissii subsp. preissii
Rhodanthe ? corymbosa
Rhodanthe chlorocephala subsp. rosea
Rhodanthe citrina
Rhodanthe manglesii
Rhodanthe spicata
Rhyncharhena linearis
Roycea spinescens
Rulingia densiflora
Rulingia kempeana
Rulingia luteiflora
Ruppia megacarpa
Ruppia polycarpa
Salsola kali
Samolus repens
Santalum acuminatum
Scaevola canescens
Scaevola crassifolia
Scaevola eneabba P1
Scaevola glandulifera
Scaevola globosa P3
Scaevola globulifera
Scaevola humifusa
Scaevola lanceolata
Scaevola phlebopetala
Scaevola porocarya
Scaevola repens var. angustifolia
Scaevola repens var. erecta ms
Scaevola sericophylla
Scaevola spinescens
Scaevola thesioides
Scaevola thesioides subsp. thesioides
Scaevola virgata
Schismus barbatus
Schoenus andrewsii
Schoenus curvifolius
Schoenus grandiflorus
Schoenus griffinianus P2
Schoenus humilis
Schoenus insolitus
Schoenus lanatus
Schoenus minutulus
Schoenus nitens
Schoenus pedicellatus
Schoenus plumosus
Schoenus rigens
Schoenus sesquispiculus
Schoenus sp.G Broad Sheath(K.L.Wilson 2633)
Schoenus sp.smooth culms(K.R.Newbey 7823)
Schoenus subfascicularis
Schoenus subflavus subflavus
Schoenus subflavus subsp. subflavus
Scholtzia involucrata
Scholtzia laxiflora
Scholtzia oligandra
Scholtzia parviflora
Scholtzia sp.Eneabba(S.Maley 8)
Scholtzia teretifolia
Scholtzia umbellifera
Sclerolaena diacantha
Sclerolaena eurotioides
Sclerolaena uniflora
Sclerostegia disarticulata
Selaginella gracillima
Senecio glossanthus
Senecio lautus
Senna cardiosperma subsp. flexuosa
Senna glutinosa subsp. charlesiana
Senna glutinosa subsp. chatelainiana
Setaria verticillata
Silene gallica var. gallica
Siloxerus filifolius
Siloxerus multiflorus
Solanum hoplopetalum
Solanum lasiophyllum
Solanum oldfieldii
Solanum orbiculatum subsp. orbiculatum
Solanum symonii
Sonchus hydrophilus
Sonchus tenerrimus
Sowerbaea laxiflora
Spergularia diandra
Spergularia marina
Sphaerolobium drummondii
Sphaerolobium gracile
Sphaerolobium linophyllum
Sphaerolobium linophyllum var. "unsorted"
Sphaerolobium macranthum
Sphaerolobium macranthum var. "unsorted"
Sphaerolobium pulchellum
Sporobolus virginicus
Spyridium globulosum
Stachystemon axillaris P4
Stackhousia dielsii
Stackhousia monogyna
Stawellia dimorphantha R
Stemodia florulenta
Stenanthemum grandiflorum ms P2
Stenanthemum humile
Stenanthemum notiale subsp. notiale
Stenanthemum pomaderroides
Stirlingia abrotanoides
Stirlingia latifolia
Stirlingia simplex
Strangea cynanchocarpa
Stylidium adpressum
Stylidium adpressum var. patens
Stylidium aff. bulbiferum
Stylidium aff. leptophyllum
Stylidium aff. pubigerum
Stylidium aff. repens
Stylidium aff. striatum
Stylidium bulbiferum
Stylidium bulbiferum subsp. bulbiferum
Stylidium burbidgeanum
Stylidium calcaratum
Stylidium caricifolium
Stylidium confluens
Stylidium crassifolium subsp. elongatum
Stylidium crossocephalum
Stylidium dichotomum
Stylidium diuroides subsp. paucifolium P2
Stylidium inundatum
Stylidium inversiflorum P4
Stylidium junceum
Stylidium junceum subsp. brevius
Stylidium junceum subsp. junceum
Stylidium leptocalyx
Stylidium leptophyllum
Stylidium macrocarpum
Stylidium maitlandianum
Stylidium miniatum
Stylidium nonscandens P2
Stylidium obtusatum
Stylidium perpusillum
Stylidium petiolare

Stylidium piliferum
Stylidium pseudocaespitosum P1
Stylidium pubigerum
Stylidium repens
Stylidium repens var. *repens*
Stylidium torticarpum P2
Stylobasium australe
Stypandra glauca
Synaphea aephynsa P3
Synaphea oulopha P1
Synaphea sparsiflora P1
Synaphea spinulosa
Synaphea spinulosa subsp. *spinulosa*
Templetonia biloba
Templetonia sulcata
Tersonia cyathiflora
Tetragonia decumbens
Tetralia microcarpa
Tetralia octandra
Tetralia confertifolia
Tetralia paucifolia
Thelymitra antennifera
Thelymitra campanulata
Thelymitra stellata R
Thomasia formosa P1
Thomasia grandiflora
Thomasia rulingioides
Thomasia tenuivestita P1
Threlkeldia diffusa
Thryptomene australis
Thryptomene cuspidata
Thryptomene denticulata
Thryptomene hyporhysis
Thryptomene prolifera
Thryptomene racemulosa
Thryptomene sp. *Lancelin* (M.E. Trudgen 14000) P2
Thysanotus arenarius
Thysanotus asper
Thysanotus brittanii ms
Thysanotus dichotomus
Thysanotus manglesianus
Thysanotus patersonii
Thysanotus rectantherus
Thysanotus sparteus
Thysanotus speckii
Thysanotus spiniger
Thysanotus teretifolius
Thysanotus thyrsoides
Thysanotus triandrus
Thysanotus vernalis P1
Trachyandra divaricata
Trachymene coerulea
Trachymene coerulea var. *leucopetala*
Trachymene cyanopetala
Trachymene ornata
Trachymene pilosa
Tribonanthes australis
Tribonanthes violacea
Trichanthodium skirrophorum
Tricoryne arenicola ms P2
Tricoryne elatior
Tricoryne robusta ms P2
Trifolium angustifolium var. *angustifolium*
Trifolium arvense var. *arvense*
Trifolium glomeratum
Trifolium hirtum
Trifolium subterraneum
Trifolium tomentosum
Triglochin aff. *minutissimum*
Triglochin calcitrapum subsp. *incurvum* ms
Triglochin centrocarpum
Triglochin minutissimum
Triglochin mucronatum
Triglochin sp. A Perth Flora (A.S. George 4100)
Triodia danthonioides
Triodia longipalea
Triodia scariosa
Tripterococcus brunonis
Triticum aestivum
Trymalium floribundum subsp. *floribundum*
Trymalium ledifolium
Trymalium ledifolium var. *ledifolium*
Typha domingensis
Urodon capitatus
Ursinia anthemoides
Utricularia multifida
Utricularia tenella
Vaccaria hispanica
Velleia trinervis
Vellereophyton dealbatum
Verreauxia reinwardtii
Verticordia acerosa var. *preissii*
Verticordia albida
Verticordia albida R
Verticordia amphigia P3
Verticordia argentea P1
Verticordia aurea P4
Verticordia auriculata
Verticordia blepharophylla P2
Verticordia brachypoda
Verticordia centipeda
Verticordia chrysantha
Verticordia chrysanthella
Verticordia comosa P1
Verticordia dasystylis subsp. *oestopoa* P1
Verticordia densiflora var. *cespitosa*
Verticordia densiflora var. *densiflora*
Verticordia densiflora var. *roseostella* P3
Verticordia drummondii
Verticordia endlicheriana var. *manicula*
Verticordia eriocephala
Verticordia fragrans P1
Verticordia grandis
Verticordia halophila
Verticordia huegelii var. *huegelii*
Verticordia insignis subsp. *eomagis* P3
Verticordia laciniata
Verticordia luteola
Verticordia luteola var. *luteola* P3
Verticordia luteola var. *rosea* P1
Verticordia monadelpha var. *monadelpha*
Verticordia muelleriana subsp. *muelleriana* P3
Verticordia nobilis
Verticordia ovalifolia
Verticordia patens
Verticordia penicillaris P4
Verticordia pennigera
Verticordia pennigera '
Verticordia picta
Verticordia plumosa var. *brachyphylla*
Verticordia rutilastra P3
Verticordia serrata var. *ciliata*
Verticordia spicata subsp. *spicata*
Verticordia spicata subsp. *squamosa* R
Verticordia venusta P3
Villarsia capitata
Villarsia congestiflora P3
Viminaria juncea
Vittadinia gracilis
Wahlenbergia capensis
Wahlenbergia preissii
Waitzia acuminata
Waitzia acuminata var. *albicans*
Waitzia nitida

Waitzia podolepis
Walteranthus erectus P3
Wilsonia humilis
Wilsonia rotundifolia
Wurmbea densiflora
Wurmbea dioica subsp. *alba*
Wurmbea drummondii P4
Xanthorrhoea acanthostachya
Xanthorrhoea aff. *drummondii*
Xanthorrhoea aff. *preissii*
Xanthorrhoea brunonis subsp. *semibarbata*
Xanthorrhoea drummondii
Xanthosia fruticulosa
Xanthosia huegelii subsp. *aurea* ms
Xanthosia tomentosa P4
Xylomelum angustifolium
Zaluzianskya divaricata
Zygophyllum fruticosum
Zygophyllum iodocarpum
Zygophyllum tetrapterum

Appendix

5

APPENDIX 5

Fauna species in the Shire of Carnamah (source- W.A Museum)

Information provided by Western Australian Museum, Fauna Base, latitude/longitude coordinates

-29.5000, 114.9166 and -30.0000, 116.2500.

Note- not a comprehensive list.

BIRD SPECIES

Acanthizidae

Acanthiza chrysorrhoa
Aphelocephala leucopsis castaneiventris
Calamanthus campestris
Pyrrholaemus brunneus
Sericornis frontalis maculatus

Accipitridae

Accipiter cirrocephalus cirrocephalus
Aquila morphnoides morphnoides
Circus assimilis
Elanus caeruleus axillaris
Hamirostra isura

Aegothelidae

Aegotheles cristatus cristatus

Anatidae

Biziura lobata
Dendrocygna eytoni
Malacorhynchus membranaceus
Stictonetta naevosa
Tadorna variegata

Ardeidae

Nycticorax caledonicus hilli

Campephagidae

Coracina maxima

Casuariidae

Dromaius novaehollandiae

Charadriidae

Charadrius bicinctus bicinctus
Charadrius rubricollis
Peltohyas australis

Climacteridae

Climacteris rufa

Columbidae

Phaps elegans

Corvidae

Corvus coronoides perplexus

Cracticidae

Cracticus nigrogularis
Cracticus tibicen dorsalis

Halcyonidae

Dacelo novaeguineae

Laridae

Anous tenuirostris

Maluridae

Malurus lamberti

Malurus lamberti assimilis

Malurus leucopterus

Malurus leucopterus leuconotus

Malurus pulcherrimus

Malurus splendens

Megapodiidae

Leipoa ocellata

Meliphagidae

Acanthagenys rufogularis

Lichenostomus ornatus

Lichenostomus plumulus

Lichenostomus virescens

Manorina flavigula

Manorina melanocephala

Melithreptus brevirostris leucogenys

Phylidonyris albifrons

Phylidonyris melanops

Meropidae

Merops ornatus

Pachycephalidae

Oreoica gutturalis

Pardalotidae

Pardalotus striatus

Petroicidae

Eopsaltria georgiana

Petroica goodenovii

Psittacidae

Cacatua leadbeateri

Cacatua pastinator butleri

Cacatua roseicapilla assimilis

Cacatua sanguinea westralensis

Calyptorhynchus banksii

Calyptorhynchus banksii samueli

Calyptorhynchus latirostris

PSITTACIDAE

Calyptorhynchus latirostris

Calyptorhynchus spp

Psittacidae

Neophema elegans

Platycercus zonarius

Polytelis anthopeplus anthopeplus

Recurvirostridae

Cladorhynchus leucocephalus

Scolopacidae

Tringa hypoleucos

Strigidae

Ninox novaeseelandiae

Turnicidae

Turnix varia varia

Turnix velox

Tytonidae

Tyto alba

Tyto alba delicatula

MAMMAL SPECIES

Canidae

Canis lupus familiaris

Dasyuridae

Sminthopsis crassicaudata

Sminthopsis dolichura

Sminthopsis granulipes

Macropodidae

Macropus eugenii derbianus

Macropus fuliginosus

Macropus robustus erubescens

Macropus sp

Molossidae

Tadarida australis

Muridae

Mus musculus

Pseudomys albocinereus

Rattus fuscipes

Tachyglossidae

Tachyglossus aculeatus

Tarsipedidae

Tarsipes rostratus

Vespertilionidae

Chalinolobus gouldii

Chalinolobus morio

Nyctophilus geoffroyi

Vespadelus regulus

REPTILE SPECIES

Agamidae

Ctenophorus maculatus

Ctenophorus maculatus griseus

Ctenophorus maculatus maculatus

Ctenophorus nuchalis

Ctenophorus reticulatus

Moloch horridus

Pogona minor minor

Rankinia adelaidensi

Rankinia adelaidensis adelaidensis

Boidae

Antaresia stimsoni stimsoni
Aspidites ramsayi

Elapidae

Brachyuropsis fasciolata fasciolata
Demansia psammophis reticulata
Echiopsis curta
Hydrophis elegans
Neelaps bimaculatus
Parasuta gouldii
Parasuta monachus
Pseudechis australis
Pseudonaja modesta
Pseudonaja nuchalis
Simoselaps bertholdi
Simoselaps littoralis
Suta fasciata

Gekkonidae

Diplodactylus alboguttatus
Diplodactylus granariensis granariensis
Diplodactylus ornatus
Diplodactylus polyophthalmus
Diplodactylus pulcher
Gehyra variegata
Strophurus michaelsoni
Strophurus spinigerus
Strophurus spinigerus spinigerus
Underwoodisaurus milii

Pygopodidae

Aclys concinna concinna
Aprasia repens
Delma fraseri fraseri
Delma grayii
Lialis burtonis
Pletholax gracilis gracilis
Pygopus lepidopodus
Pygopus nigriceps

Scincidae

Cryptoblepharus plagiocephalus
Ctenotus australis
Ctenotus fallens
Ctenotus impar
Ctenotus mimetes
Ctenotus pantherinus pantherinus
Ctenotus schomburgkii
Cyclodomorphus celatus
Egernia depressa
Egernia kingii
Egernia multiscutata bos
Egernia stokesii badia
Hemiergis quadrilineata
Lerista christinae
Lerista elegans
Lerista gerrardii
Lerista lineopunctulata
Lerista planiventralis decora
Lerista praepedita
Menetia greyii
Morethia lineocellata

Morethia obscura
Tiliqua occipitalis
Tiliqua rugosa rugosa

Typhlopidae
Ramphotyphlops australis
Ramphotyphlops hamatus
Ramphotyphlops waitii

Varanidae
Varanus gouldii

AMPHIBIA SPECIES

Hylidae
Litoria moorei

Myobatrachidae
Crinia pseudinsignifera
Crinia sp
Heleioporus albopunctatus
Heleioporus eyrei
Heleioporus psammophilus
Limnodynastes dorsalis
Neobatrachus kunapalari
Neobatrachus pelobatoides
Pseudophryne guentheri

Appendix

6



ROADSIDE CONSERVATION COMMITTEE

GUIDELINES FOR MANAGING THE HARVESTING OF NATIVE FLOWERS, SEED AND TIMBER FROM ROADSIDES

Preamble

The diversity of values associated with roadside vegetation is well documented and acknowledged. In landscapes that have been extensively cleared, roadside vegetation provides essential wildlife corridors and habitat for local flora and fauna, including a number of threatened species. Hence it is highly desirable that this asset is managed in such a way as to ensure its conservation and sustainability.

The control and management of roadside vegetation is the responsibility of the road manager. Local government authorities, as road managers, are often approached for 'permission' to take various flora products from the roadside. These requests are mainly for wildflowers, native seed and firewood. Other products which may be sought includes material for making didgeridoos, other types of craftwood, and stakes or poles for various purposes.

Although road managers are primarily concerned about the maintenance of the running surface itself, through the implementation of these simple guidelines for the removal of flora and timber material from the roadsides, the vegetated roadside reserve should be maintained for its biodiversity values, and the benefit of the community and road users.

In some instances the Roadside Conservation Committee (RCC) is supportive of the sustainable harvesting of flora, such as salvage (removal of dead material that is not significant wildlife habitat or is material to be destroyed by road works), or the selective collection of seed for revegetation. However, each case should be viewed on its merits and any decision to facilitate harvesting from roadsides should be referred to the Department of Conservation and Land Management (CALM) and/or the RCC for advice. Licences allowing the taking of roadside flora may be issued by CALM when supported by the road managing authority.

Legislation

All Western Australian native flora is protected under the *Wildlife Conservation Act 1950*. Native flora includes all parts of a native plant, including its flowers, seed, and timber. Protection of native flora under the Act has the effect of requiring a person to only take (cut or remove) native flora from Crown land under a licence.

Road and rail reserves are Crown land, and hence a licence is required to cut or remove any native flora from a roadside or rail line. There is, however, a legal provision by which the road manager or their agent (contractor) does not require a licence whilst undertaking legitimate road management activities. This provision does not extend to other persons who wish to take protected flora from roadsides.

There are two types of licences that apply to the taking of protected flora from Crown land - Commercial Purposes Licences where the flora is being taken for any commercial purpose, and Scientific or Other Prescribed Purposes Licences where the protected flora is being taken for specific non-commercial purposes.

These licences are issued by CALM. In issuing a licence, CALM is required to be assured that the activity will not compromise the conservation of the flora. In determining this, CALM will seek advice from the land manager for which the application relates to determine the potential impact of the activity, and how the activity relates to the management objectives being applied to that land.

A licence application may be refused if the activity is either a conservation concern, or does not fit in with the management objectives of the road manager. Once issued with a licence, a licensee must comply with the conditions of the licence that are designed to ensure the activity does not adversely impact on the conservation of the flora or the natural environment in which it occurs.

Commercial Wildflower Harvesting

Western Australia is referred to as the '*Wildflower State*', and its wildflowers attract a significant number of tourists each year. Roadside vegetation provides the most accessible, and hence the most commonly viewed, array of wildflowers, and as such are an important feature of regional tourism and can provide a significant financial boost to local economies.

The RCC considers that the flora on roadsides is reserved and maintained for public benefit. It is therefore seen as a contradiction of purpose to allow wildflowers on roadsides to be harvested, particularly for private gain, and this activity should not be permitted.

Wildflower harvesting in many instances detracts from the biodiversity and tourism values of the roadside. It is often the case that flora is harvested from roadsides because of the convenience of access, and harvesters should be directed to find alternative locations.

There are situations where some harvesting may be considered, such as in very wide road reserves where the activity can be screened from road users, but mostly road managers have been discouraged from supporting or allowing such harvesting to occur. If harvesting is to be approved, then the points provided at the end of these guidelines should be considered.

Seed Collection

Throughout much of the south west, revegetation of the native flora is being undertaken to redress the problems that historic clearing has created. Increasingly, this revegetation is aimed at using local native flora so as to recreate the native vegetation to support biodiversity objectives. The paradox is that in many areas the native vegetation has been

cleared to such an extent that adequate sources of native seed cannot be found for undertaking this work. Roadside vegetation may be a source of such seed.

Native seed is an important component of remnant vegetation. It is critical for the regeneration of certain species, called re-seeder species, when plants are either killed by an event, such as fire, storm damage, or die as part of their natural cycle. The maintenance of adequate seed of these species is necessary as a precaution to ensure the sustainability of the flora biodiversity.

Native seed is also an important food source for native fauna living in roadside vegetation, from ants to birds and mammals. The maintenance of this fauna is important for the continuing survival of the vegetation, especially where the fauna is required to pollinate the flora.

When seed is needed for *bona fide* revegetation projects within the local community, and no other source of local seed is available, then the controlling authority may consider giving permission for collection of seed from roadsides. Such collection must be under the appropriate licence issued by CALM and the harvesting should be done in a way that does not endanger the long-term survival of the roadside vegetation.

Where seed collection is to be authorised on roadsides, the road manager should consider the points listed at the end of these guidelines. Specific consideration should be given to the methods that are approved for harvesting the seed, the quantity of seed that may be taken, and the species from which the seed is to be sourced.

Timber Harvesting from Roadsides.

Timber is harvested for a range of reasons, including saw logs, firewood and craftwood. Due to the ease of access, timber harvesters may wish to source timber from roadside vegetation for these purposes.

The RCC seeks to encourage roadside managers to retain timber on roadsides as an important component of the natural habitat, which fulfils ecological, aesthetic and land management functions. The value of fallen logs and branches within the roadside is often not realised, but this material forms an important habitat for many species of insects, reptiles, mammals and birds, thus enhancing the roadside biodiversity. Insects and reptiles that live in fallen timber are also important elements of the food chain, and are very important to the functioning of natural systems, and the survival of many other native animals.

The RCC believes that harvesting of timber from roadsides should not be permitted except in defined road safety, fence line or service clearance zones, or where a tree has fallen, or appears likely to fall into clearance zones.

Where timber removal is to be allowed, consideration should be given to the points raised at the end of these guidelines, especially in relation to safety issues related to timber cutting. Permission to remove timber should be specific to certain sections of roadsides where the removal is necessary for other planned road management purposes.

Guidelines For Harvesting On Roadsides

- ✓ In all cases the permission of the managing authority, i.e. Main Roads WA, Local Government or CALM, must be sought before native flora is removed from a roadside.
- ✓ Flora removal should be from only designated roads, which have wider vegetated road verges i.e. vegetation width > 3metres
- ✓ The number of operators authorised to remove flora from a roadside should be strictly limited to that which can be sustained and managed. The determination of this is at the judgement of the managing authority, but consideration should be taken of the type of flora being harvested and an evaluation of monitoring of the impact of the harvest activity. Advice may be sought from CALM.
- ✓ Approval for flora harvesting should be for a set period, with a review of the impact and operation before renewal.
- ✓ Approval should also stipulate approved methods of harvesting, the species which may be harvested, and the quantity of material to be taken. Advice on harvest conditions may be obtained from CALM.
- ✓ Any flora removed should not affect the viability of the residual seed bank. It is recommended that no more than 20% of the flowers or seed on a plant should be taken, unless it is in an area that is scheduled to be cleared as part of road management.
- ✓ Methods of harvesting flora should not jeopardise the survival of the plant/tree, unless it is in an area that is scheduled to be cleared as part of road management.
- ✓ The removal of whole plants should be restricted to areas that are scheduled to be cleared as part of road management. Note, some species of flora such as zamia palms and grass trees can not be removed for commercial purposes without a special endorsement on the Commercial Purposes Licence issued by CALM.
- ✓ No flora of special conservation concern (Declared Rare Flora or Priority Flora) should be removed without special authorisation through CALM.
- ✓ No commercial harvesting of any plant product should be allowed for any reason between the markers that delineate a Special Environmental Area.
- ✓ Flora harvesting should be prohibited from designated Flora Roads.
- ✓ Care should be taken that access to Dieback infected areas is limited to the drier months of the year, and vehicular access disallowed.
- ✓ Safety should always be of prime concern and every effort should be made to ensure that personal safety is a key consideration in any harvesting operation.
- ✓ Flora harvesters should not operate from the road side in areas where the vegetation is close to the road, where vehicles can not be safely parked off the road, or where there is poor driver visibility.

Appendix

7



ROADSIDE CONSERVATION COMMITTEE

Guidelines for the Nomination and Management of Flora Roads

Introduction

The Flora Roads program began as an initiative of the Roadside Conservation Committee (RCC), as a means of encouraging road managers to protect and conserve roadside vegetation of high conservation value. Flora Roads also highlight areas of high conservation flora as a tourist asset to local communities and are easily identified to passing travellers as areas worthy of an inspection to view the local flora.

The Roadside Conservation Committee has defined Flora Roads as "those roads which have conservation value owing to the vegetation growing within the reserve".



Principle Conservation Values of Flora Roads:

- The roadside must contain a significant population of native vegetation. Introduced trees and grasses are not important for conservation.
- The native vegetation must be in as near to its natural condition as possible. In undisturbed vegetation, several layers of plants occur - trees, shrubs and herbs are present in woodlands, for example. If one or more of the expected layers are missing, the conservation value is reduced.
- The roadside may be the only remaining example of original vegetation within a cleared area. It thus:
 - Assists in vegetation mapping and distribution studies
 - Provides a benchmark for study of soil change during agricultural development
 - Provides a source of local seed for revegetation projects
 - Acts as a wildlife habitat for the protection of fauna.
 - Rare or endangered plants may occur on the roadside.
 - May provide nest sites and refuges for native animals.
 - May act as a biological corridor.

Identification and Nomination of Flora Roads

The RCC has been coordinating a volunteer roadside survey program since 1989, which provides a list of high conservation value roads within many Shires in the agricultural areas of this state. These roadsides can be investigated further to see if they warrant declaration as a Flora Road. Nevertheless, roadsides that have not been surveyed may still be nominated.

Any person may suggest to the managing authority or to the RCC that a road, or a section of road fits the criteria of a Flora Road. However, only the managing authority in whom care, control and management of the road is vested can officially declare it a Flora Road.

A road may be nominated as a Flora Road by submitting a written request to the RCC.

The RCC requires the following information:

- Endorsement from the managing authority;
- Name of the road, LGA, and the road manager (MRWA, Local Government or DCLM);
- Distance of the proposed Flora Road; and
- Width of the road reserve.

The following information would also be useful:

A survey of the roadside conservation values in the Shire of Carnamah

- Photograph(s) of the road;
- A list of the dominant plant species;
- Threats (weeds, disturbances, etc).

This information will be stored in the RCC Flora Roads Register, a database which is maintained by the RCC Technical Officer (Mapping).

Establishment of a Flora Road

Given that only the managing authority can officially declare a road, or section of road as a Flora Road, it is important to have the support of the road manager.

The RCC will provide two Flora Road signs to the managing authority. The signs are in the tourist sign colours of white letters and symbols on a leaf brown background. It is the responsibility of the managing authority to erect the signs, and to provide signposts, auxiliary signs and carry out maintenance. One sign may be placed at each approach to the area.

Management Implications

A standard sign was developed by Main Roads WA in the late 1980's, a policy for the erection of Flora Road signage was developed shortly afterwards. See Appendix 1

Part 16 of the RCC *Roadside Manual* details the establishment and management of Flora Roads. The RCC's *Guidelines for Managing Special Environment Areas in Transport Corridors* and the *Roadside Handbook* also provide information on Flora Road establishment.

The aim of all management should be to minimise any disturbance to the roadside flora, consistent with the provision of a safe and efficient roadway.

The managing authority will be expected to take into consideration the high conservation values present, and take special care when working within the Flora Road road reserve and the surrounding area. More specifically though;

- Council may choose to adopt a policy on Roadside Conservation.
- Environmental assessments (pre-construction checklists) should be completed prior to any upgrade work, to assist with planning for flora preservation.
- Fire Management should be undertaken in such a way so as to take into account the ecological needs of the flora.
- Where rehabilitation is contemplated, local native species should be used.

Tourism Implications

Declared Flora Roads will, by their very nature, be attractive to tourists, and would often be suitable as part of a tourist drive network. Consideration should be given to:

- Promoting the road by means of a small brochure or booklet;
- Eventually showing all Flora Roads on a map of the region or State;
- Using specially designed signs to delineate the Flora Road section; and
- Constructing roadside flora rest areas where people can get out and enjoy the flora. Walk trails could be made from these, and information brochures produced;

Flora Road Register

To ensure that knowledge of Flora Roads sites does not get lost, due perhaps to staff changes, the RCC has established a Flora Roads Register. Information pertaining to each Flora Road (i.e. road name, location, length, etc) will be stored in the Flora Roads database, and updated as necessary.

In order to plan roadworks so that these important areas of roadside vegetation are not disturbed, road managers should also know of these areas. Therefore, it is suggested that the Managing Authority (Shire, MRWA, DCLM) establish a *Register of Roads Important for Conservation* also. This register should be consulted prior to any works being initiated in the area.



Flora Roads highlight the value of the roadside vegetation present, alerting both travellers and those working in the road reserve of the high conservation values present.

Photo D. Lamont