

Roadside Vegetation and Conservation Values in the Shire of Wyalkatchem



Photos by Tracey Scott

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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 Wyalkatchem. Primarily providing detailed results of the roadside survey, with accompanying management recommendations, it also briefly describes the natural environment in Wyalkatchem.

Aware of the need to conserve roadside remnants, the Shire of Wyalkatchem, local community members and the Wyalkatchem LCDC liaised with the RCC in 2003 and 2004 to survey roadsides in their Shire. Surveys to assess the conservation values of roadside remnants were conducted between October 2003 and October 2004. The majority (87%) of the Shire's 782.3 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 only 25% of the roadsides surveyed in the Shire, with medium-high conservation value roadsides accounting for 29%. Medium-low and low conservation value roadsides occupied 35% and 11%, respectively. A more detailed analysis of results is presented in this report.

It is envisaged that the primary purpose 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 in assisting with;

- 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;
- re-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 Wyalkatchem to utilise the roadside conservation value map into many facets of its Landcare, tourism, road maintenance operations and Natural Resource Management (NRM) 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.



The Western Spiny-tailed Skink (*Egernia stokesii badia*) has been recorded in the Shire of Wyalkatchem.

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



Flora Roads are high conservation value roadside remnants.

Photo D. Lamont.

- 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.

2.0 What are the Threats?

2.1 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.

2.2 Roadside Clearing

Western Australia's 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.

2.3 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

2.4 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 WA Herbarium records 25 weed species in the Shire of Wyalkatchem, see Appendix 4. The roadside survey recorded populations of four significant weeds, and their locations were mapped by the RCC onto clear overlays. The four nominated weed groups were:

- Cape Tulip,
- Paterson's curse,
- Soursob and,
- Exotic Grasses

Further information on the presence of these four nominated weeds is presented in Part C of this report.

Roadside populations of these weeds can be observed on the weed overlays provided with the Wyalkatchem Roadside Conservation Value map (2005). The Roadside Conservation Value map and weed overlays will assist the Shire and community in coordinating strategic weed control projects.



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>.



Moraea flaccida Photos: R. Knox & K.C. Richardson

Cape Tulip has become a major pastoral weed and is unpalatable to stock. Locating and destroying new plants in the Shire (before they become established) is vital for its control.

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



Oxalis pes-caprae Photos: R. Knox & Anon

Soursob is an introduced weed from South Africa. It forms dense mats, which inhibits germination and competes with native plants for space, light and nutrients.

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

2.5 Salinity

Salinity is one of the greatest environmental threats facing Western Australia's agricultural areas, with approximately 1.8 million hectares in the south-west agricultural region already affected to some degree. Dryland salinity has occurred as a consequence of the heavy clearing undertaken in the past, namely, the removal of perennial deep-rooted native vegetation and replacement by shallow rooted annual crop vegetation, and the subsequent rising of the water table. The large amount of salt stored within the soil column in these areas of Western Australia is dissolved by the rising water and carried to the surface. Once at the surface, the water evaporates, leaving a white film of salt over the landscape, making it unproductive for current agricultural practices, and severely impacting upon the remaining native vegetation. Without significant changes to the current land use, it has been estimated that approximately 3 million hectares will be affected by salinity by 2010-2015, and 6 million hectares, or 30% of the region, affected by the time a new groundwater equilibrium is reached (Department of Agriculture WA, 2004).

The effect of salinity has not only been restricted to agriculture, but is also having a serious effect on rural townships and the road network. The National Land and Resources Audit (2002) warned that, across Australia, some 19,800km of roads, 1,600km of railways and 306 towns are all at a high risk from dryland salinity (Department of Environment and Heritage and the Department of Agriculture, Fisheries and Forestry Australia, 2003). It has also been estimated that more than 4,000km (or 5%) of roads in the south west land division of Western Australia are at threat of being degraded by the effects of rising water tables and salinity.

Based on figures supplied by the Department of Agriculture WA for the *Salinity Investment Framework Interim Report* (2003), Table 1 shows that approximately 4.67%, or 36.63 km of roads in the Shire of Wyalkatchem may be under threat from salinity.

Shire	Total Road Length (kms)	Roads Potentially Affected by Salinity – Length in kms					
		Highways	Local Roads	Main Roads	Other Roads	Total Affected	% of Total Potentially Affected
Koorda	908.40		53.30		14.90	68.20	7.51
Mukinbudin	878.51		1.28		2.70	3.98	0.45
Nungarin	491.25		20.48	0.53	5.90	26.90	5.48
Trayning	775.97		34.60	0.28	6.58	41.45	5.34
Westonia	877.07	1.78	12.03		3.30	17.10	1.95
Wyalkatchem	784.11		24.43	0.23	11.98	36.63	4.67

Table 1. Road lengths potentially affected by salinity in the Shires of Koorda, Mukinbudin, Nungarin, Trayning, Westonia and Wyalkatchem.

Adapted from material produced by the Department of Agriculture WA for Department of Environment 2003, *Salinity Investment Framework Interim Report - Phase 1, 2003, Department of Environment, Salinity and Land Use Impacts Series No. SLUI 32*

Aware of the threat salinity poses to the Shire, the 2003-2004 Wyalkatchem roadside survey was designed so that roadside surveyors could record the presence of salt affected roadsides as an additional attribute. The location of salt affected roadsides appears as a clear overlay accompanying the Shire of Wyalkatchem roadside conservation value map (2005). The data relating to occurrence of salt affected roadsides in Wyalkatchem is also presented in Figure 8; see Part C of this report.

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

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 Works 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.



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

Photo by CALM

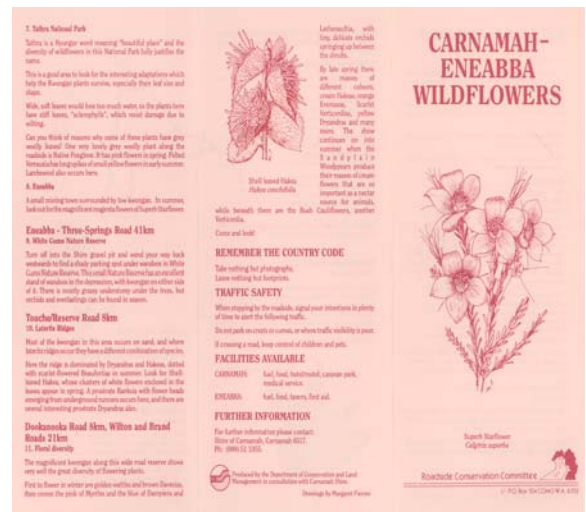
Although presently there are no Flora Roads designated within the Shire of Wyalkatchem, the roadside survey and the roadside conservation value (RCV) map highlighted a number of roadsides that have the potential to be declared as Flora Roads. These, and other roads may be investigated further to see if they warrant a declaration as a Flora Road, see Part C of this report.

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 Wyalkatchem

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 560 species of plants present in the Shire of Wyalkatchem. The most prolific genus are Acacia 65 spp, Melaleuca 28 spp, Eucalyptus 25 spp, Grevillea 22 spp, Halosarcia 10 spp, and Verticordia 10 spp. The complete list of recorded flora can be seen in Appendix 4 of this report.

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 two weeks in advance.



Declared Rare Flora (DRF) sites should be clearly marked with these yellow posts.

Photo K. Jackson.



Grevillea teretifolia

Photos: H. Adamson & M. Kealley

Round leaf Grevillea (*Grevillea teretifolia*), a native plant of the roadside flora in the Shire of Wyalkatchem.

Photography by H. Adamson, and M Kealley. Photo used with the permission of the WA Herbarium, CALM <http://florabase.calm.wa.gov.au/help/photos#reuse>

3.0 Fauna

The Western Australian Museum records approximately 84 species of native fauna from the Wyalkatchem area, these are 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 Wyalkatchem area, there were 26 bird, 10 amphibia, 11 mammal, and 37 reptile species.

A number of the fauna species recorded from Wyalkatchem are classified as endemic to the wheatbelt region of Western Australia, or smaller regions within the State. For example, the Clawless Gecko (*Crenadactylus ocellatus ocellatus*) occurs only within Western Australia's semiarid south-western interior, including the Shire of Wyalkatchem.



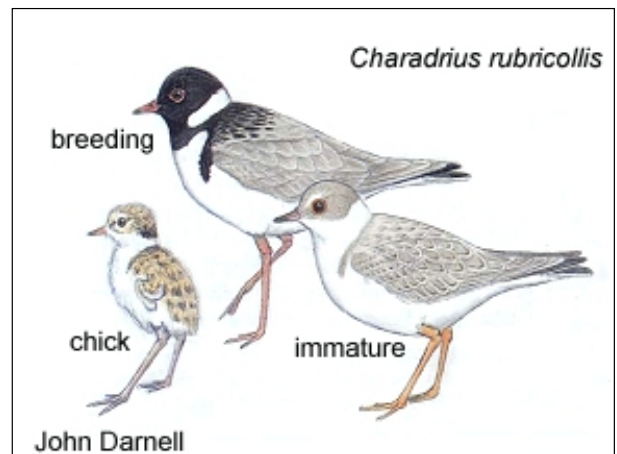
The Clawless gecko (*Crenadactylus ocellatus ocellatus*), an endemic species, is found in the Shire of Wyalkatchem.

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

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 Wyalkatchem, and these are listed below.

- Hooded Plover (*Charadrius rubricollis*);
- Crested Bellbird (southern) (*Oreoica gutturalis gutturalis*); and
- White-browed Babbler (western) (*Pomatostomus superciliosus ashbyi*).
- Western Spiny-tailed Skink (*Egernia stokesii badia*);
- Tree-stem Trapdoor Spider (*Aganippe castellum*);
- Shield-backed Trapdoor Spider (*Idiosoma nigrum*);
- Minnivale Trapdoor Spider (*Teyl* sp);
- Parartemia contracta (*Parartemia contracta*);

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.



The Hooded Plover (above) is a threatened species generally occurring near salt lakes. It has been recorded in the Shire of Wyalkatchem.

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

4.0 Remnant Vegetation Cover

Only 4.9 per cent of the original native vegetation remains in the Shire of Wyalkatchem. This is considerably lower than most other NEWROC Shires, and even the remaining remnants can be depleted if proactive measures are not taken to manage this priceless resource.

Shire	Total Area (ha)	Area inside Clearing Line (ha)	% Vegetation Cover Remaining (inside clearing line)
Koorda	283,746	266,057	8.1%
Mt Marshall	1,019,574	444,185	10.6%
Mukinbudin	342,575	278,129	14.0%
Nungarin	117,004	117,004	15.2%
Trayning	164,255	164,255	8.4%
Westonia	329,601	269,088	21.5%
Wyalkatchem	158,004	158,004	4.9%

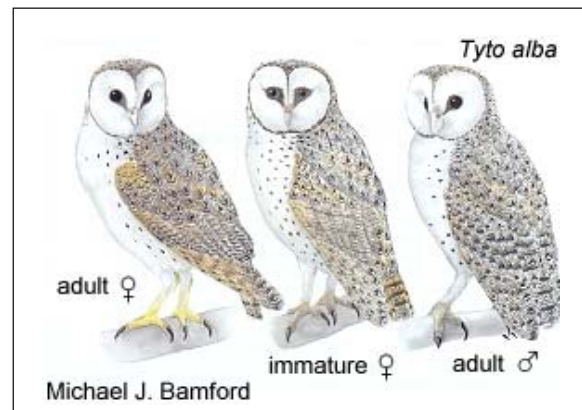
Table 2. Remnant vegetation remaining in agricultural areas of the NEWROC Shires (Shepherd, Beeston and Hopkins, 2001).

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.

Photo by L. McMahon, Birds Australia



The Barn Owl (*Tyto alba*) occurs in the Wyalkatchem 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
WYALKATCHEM**

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 (680.3 km, or 87%) of the Shire of Wyalkatchem's 782.30 km of roads were surveyed and then assessed to determine the conservation status of the road reserves. Fieldwork was carried out throughout the months of October and November 2003 and February, March, May, September and October 2004. The enthusiastic efforts of the volunteer roadside surveyors and the support provided by Council and Shire staff ensured that this project was successfully completed. The roadside surveyors were:

- Sharon Lewis,
- Phil Lewis,
- Justin Collins,
- Lisa Leaver,
- Jan Trenorden,
- Hugh Trenorden,
- Eddie Garner,
- Vera Garner,
- Leonie Stratford,
- Joy Robinson, and
- Teagen Smith.

1.1 Methods




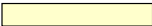
Roadside surveys were undertaken in a vehicle, with two or three people per vehicle. The passenger recorded all the roadside survey data using the RCC's standard paper survey sheet shown in Appendix 1. At the end of the survey, the survey sheets were sent to the RCC for analysis and mapping.

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 6 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;
- presence of 4 nominated weeds; and
- presence of salt affected roadside.

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 Wyalkatchem. 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 Wyalkatchem. 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.



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

Photo K. Jackson.

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



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.

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.

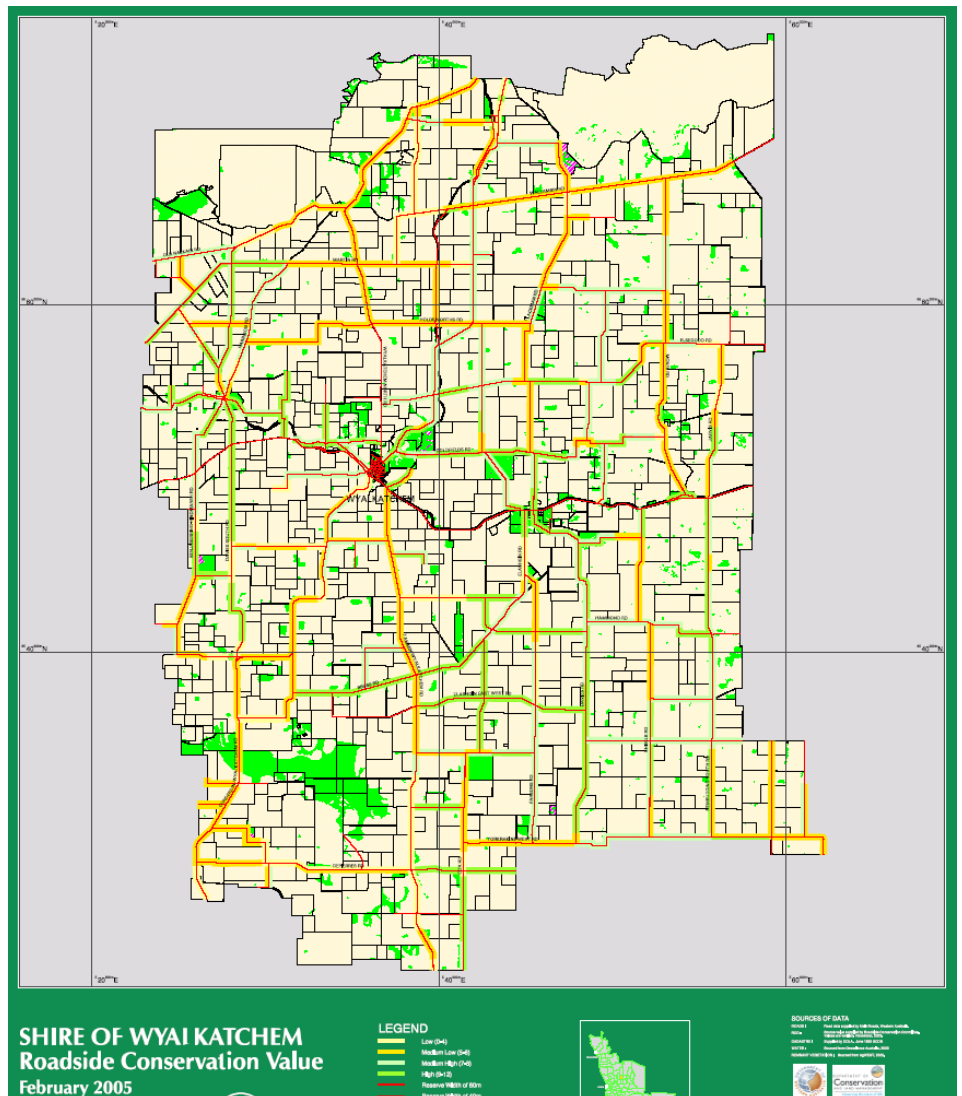
Photo by K. Jackson.

2.0 USING THE RCV MAP

The RCV map initially provides an inventory of the condition of the roadside vegetation. This is important as the quality of roadside vegetation has far reaching implications for sustaining biodiversity, tourism and Landcare values.

Moreover, the data and map can be incorporated as a management and planning tool for managing the roadsides, as it enables the condition of roadside vegetation to be easily assessed. This information can then be used to identify environmentally sensitive areas, high conservation roadsides or strategically important areas, and thus ensure their conservation. Conversely, it enables degraded areas to be identified as areas important for strategic rehabilitation or in need of specific management techniques and weed control programs.

The map can also be used as a reference to overlay transparencies of other information relevant to roadside conservation. This enables the roadside vegetation to be assessed in the context of its importance to the shire's overall conservation network. Other overlays, such as the degree of weed infestation, or the location of environmentally sensitive areas or future planned developments, could also be produced as an aid to roadside management.



The RCV map depicts roadside conservation values in the Shire of Wyalkatchem.

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; and
- 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 CALM

3.0 RESULTS

Using the information collected by the roadside survey, totals of the 6 attributes used to calculate roadside conservation values in the Shire of Wyalkatchem is presented in Table 3. 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 Wyalkatchem 2003-04					
Length of roadsides surveyed: 1,360.5 km (680.3 km of road)					
<u>Conservation Status</u>			<u>Native Vegetation in Roadsides</u>		
	Total (km)	%		Total (km)	%
High (9-12)	337.7	24.8	2-3 vegetation layers	1133.8	83.3
Medium-high (7-8)	397.6	29.2	1 vegetation layer	184.7	13.6
Medium-low (5-6)	482.3	35.5	0 vegetation layers	42.0	3.1
Low (0-4)	142.9	10.5			
Total	1360.5	100.0	Total	1360.5	100.0
<u>Number of Native Plant Species</u>			<u>Extent of Native Vegetation</u>		
	Total (km)	%		Total (km)	%
Over 20 species	95.6	7.0	Over 80%	123.3	9.1
6 to 19 species	813.8	59.8	20% to 80%	870.2	64.0
0 to 5 species	451.1	33.2	Less than 20%	367.0	27.0
Total	1360.5	100.0	Total	1360.5	100.0
<u>Weed Infestation</u>			<u>Value as a Biological Corridor</u>		
	Total (km)	%		Total (km)	%
Light <20% weeds	275.0	20.2	High	446.4	32.8
Medium 20-80% weeds	410.7	30.2	Medium	452.5	33.3
Heavy >80% weeds	674.8	49.6	Low	461.6	33.9
Total	1360.5	100.0	Total	1360.5	100.0
<u>Width of Vegetated Roadside</u>			<u>Predominant Adjoining Land Use</u>		
	Total (km)	%		Total (km)	%
1 to 5 m	988.1	72.6	Agricultural: completely cleared	1202.3	88.4
5 to 20 m	288.3	21.2	Agricultural: scattered vegetation	52.5	3.9
Over 20 m	83.6	6.1	Uncleared native vegetation	72.8	5.3
Unknown	0.6	0.1	Drain	2.5	0.2
Total	1360.5	100.0	Plantation of non-natives	0.0	0.0
			Railway	16.3	1.2
			Urban or Industrial	0.0	0.0
			Other	14.2	1.0
			Total	1360.6	100.0

Roadside surveys were carried out in Wyalkatchem Shire from October 2003 to October 2004

Table 3: Summary of results from the roadside survey in the Shire of Wyalkatchem.

Width of Road Reserve			Width of Vegetated Roadside		
	Total (km)	%		Total (km)	%
20m	268.3	39.4	1 to 5 m	988.1	72.6
40m	19.1	2.8	5 to 20 m	288.3	21.2
60m	5.5	0.8	Over 20 m	83.6	6.1
Unknown	387.4	57	Unknown	0.6	0.1
Total	680.25	100.0	Total	1,360.5	100.0

Table 4: Width of road reserves and width of vegetation on roadsides in the Shire of Wyalkatchem.

Width of Road Reserve

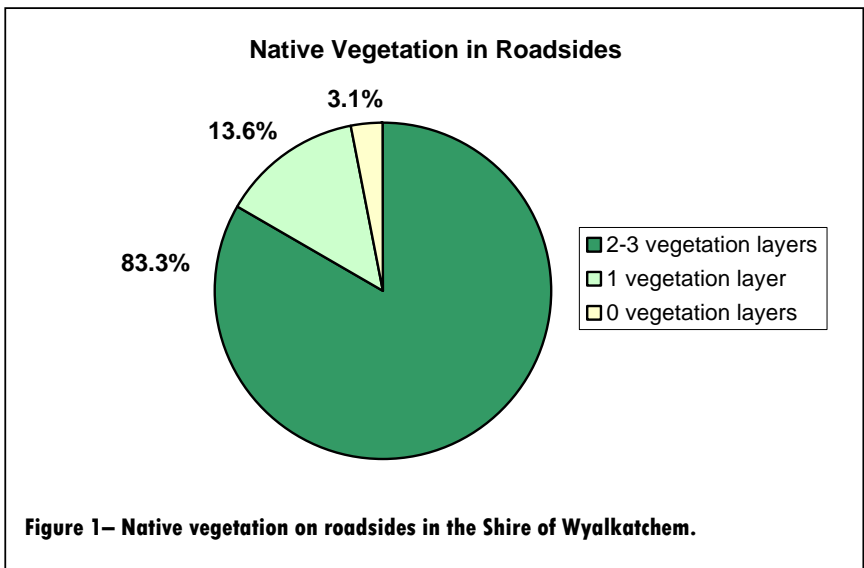
The width of road reserves in the Shire of Wyalkatchem was recorded throughout the roadside survey in increments of 20 metres, as shown in Table 4. The majority of road reserves were 20 metres in width, with 268.3 km, or 39.4% of roads falling into this category. Of the remaining roads, 19.1 km, or 2.8%, were 40 metres in width, 5.5 km, or 0.8% were 60m wide, and the width of roadside vegetation for 387.4 km, or 57% of roads surveyed, were unknown.

Width of Vegetated Road Reserve

The width of vegetated roadside was recorded by selecting one of three categories, 1-5 metres, 5-20 metres or over 20 metres in width. The left and right hand sides were recorded independently, and then combined to establish the total figures shown in Table 4. The majority of roadside vegetation (988.1 km or 72.6%) was between 1 to 5 metres in width, followed by 288.3 km (21.2%) of roadsides where the vegetation fell between 5 to 20 metres in width. Roadside vegetation over 20 metres in width spanned 83.6 km, or 6.1% of the roadsides surveyed, whilst no data was recorded for 0.6 km or 0.1% of the roadsides surveyed.

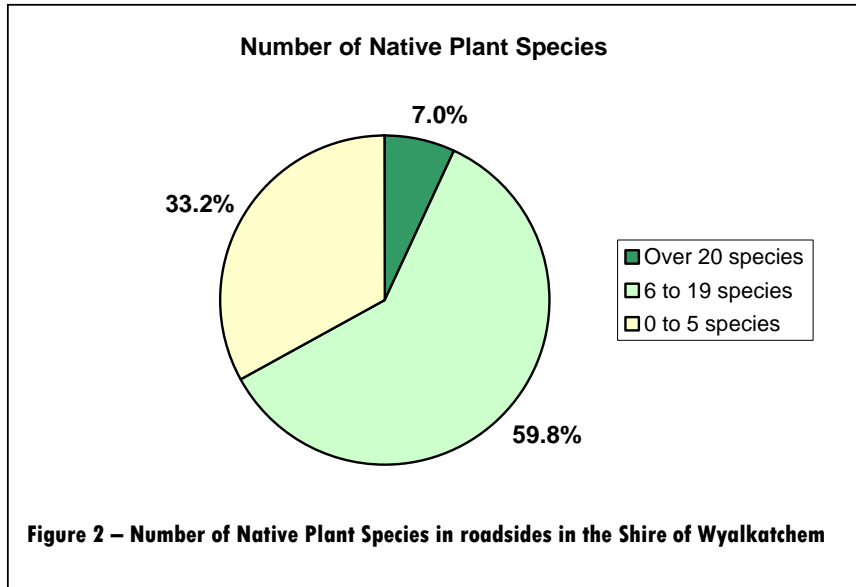
Native Vegetation in Roadsides

The number of native vegetation layers present, either the tree, shrub or ground layers determined the ‘native vegetation on roadside’ value. Sections with two to three layers of native vegetation covered 83.3% of roadsides (1133.8 km), 13.6% had only one layer (184.7 km) and 3.1% had no layers of native vegetation (42.0 km), refer to Table 3 and Figure 1.



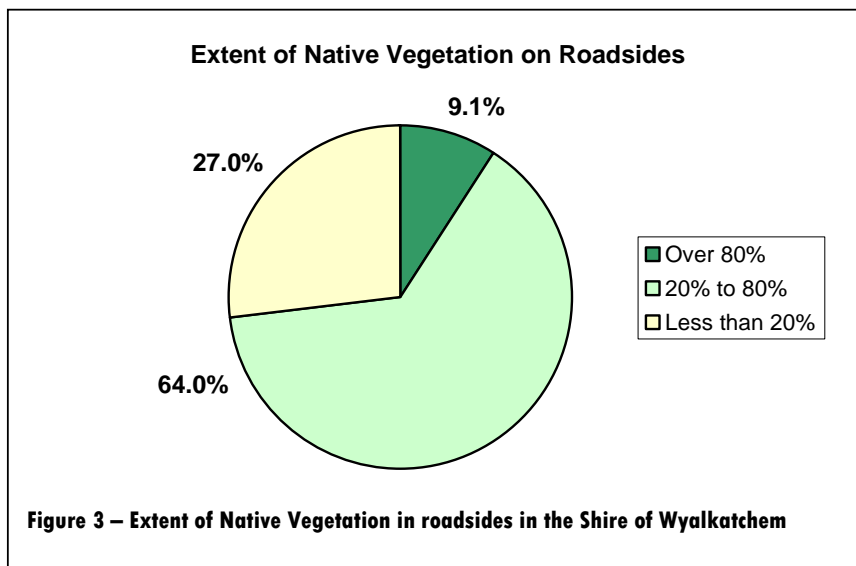
Number of Native Plant Species

The 'number of native plant species' score provided a measure of the diversity of the roadside vegetation. Survey sections with more than 20 plant species spanned 7% (95.7 km) of the roadsides surveyed. Roadside sections with 6 to 19 plant species accounted for 59.8% (813.8 km) of the roadside. The remaining 33.2% (451.1 km) contained less than 5 plant species, refer to Table 3 and Figure 2.



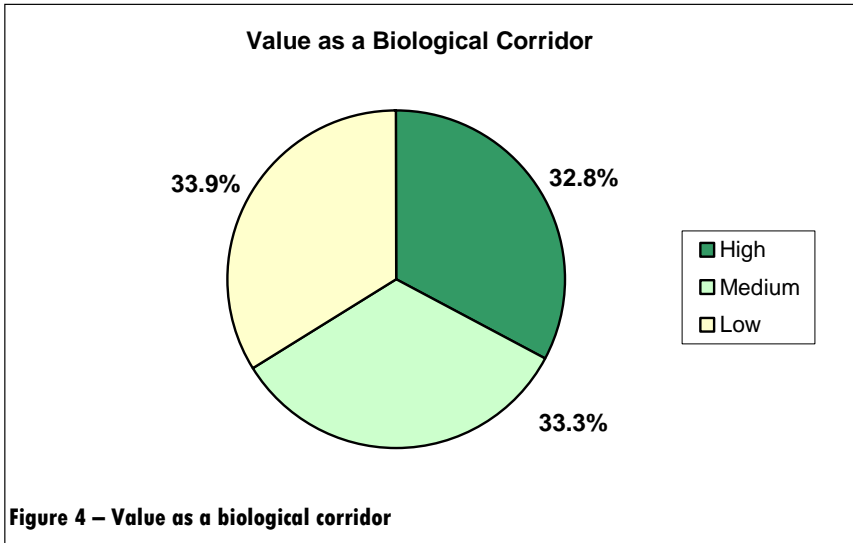
Extent of Native Vegetation

The 'extent of native vegetation' cover refers to the continuity of the roadside vegetation and takes into account the presence of disturbances such as weeds. Roadsides with extensive vegetation cover, i.e. greater than 80%, occurred along 9.1% of the roadsides surveyed (123.3 km). Survey sections with 20% to 80% vegetation cover accounted for 64.0% of the roadsides (870.2 km). The remaining 27.0% had less than 20% native vegetation (367.0 km), and therefore, a low 'extent of native vegetation' value, refer to Table 3 and Figure 3.



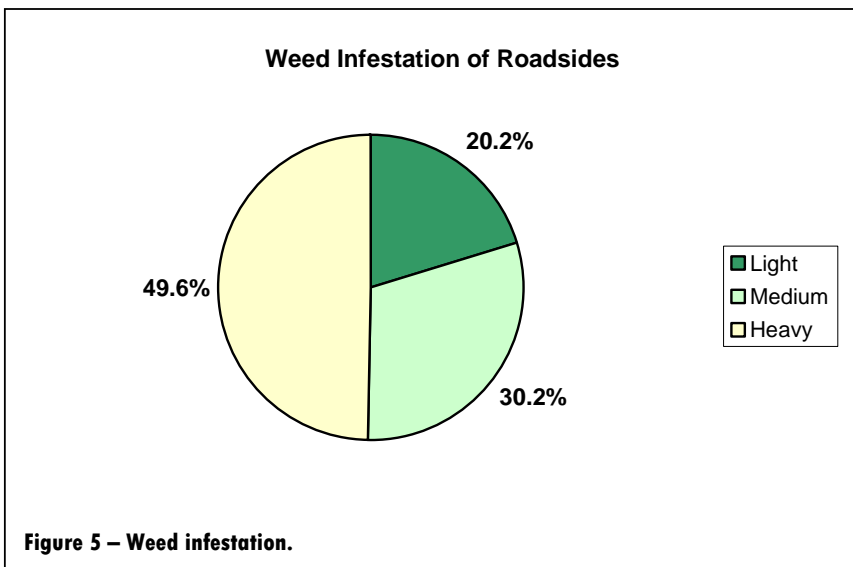
Value as a Biological Corridor

This characteristic considered the presence of four attributes- connection to uncleared areas; presence of flowering shrubs; large trees with hollows and hollow logs. Roadsides determined to have high value as biological corridors were present along 32.8% (446.4 km) of the roadsides surveyed. Roadsides with medium value as biological corridors made up 33.3% (452.6 km), and roadsides with low value as a biological corridor occurred along 33.9% (461.6 km) of the roadsides surveyed, refer to Table 3 and Figure 4.



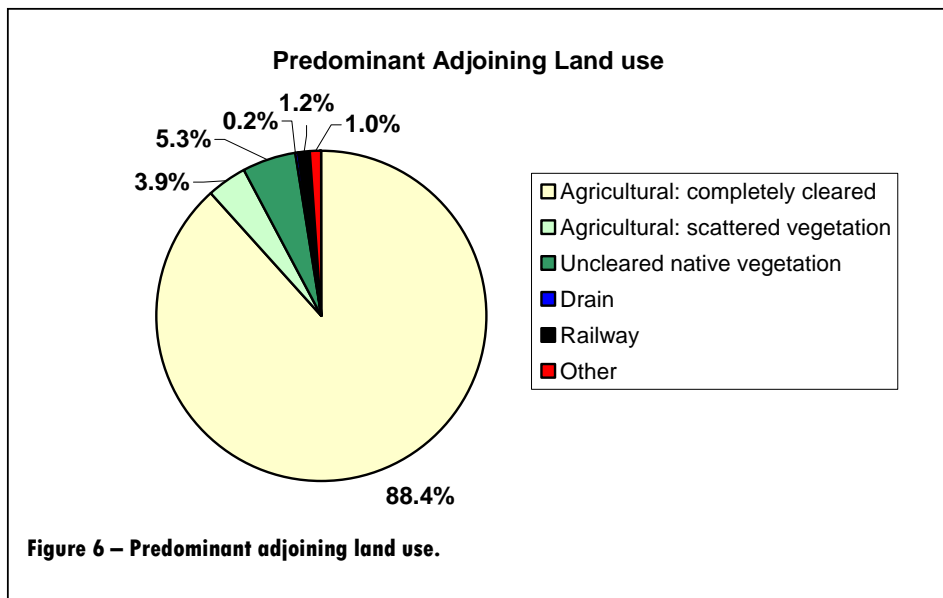
Weed Infestation.

Light levels of weed infestation (weeds less than 20% of total plants), were recorded on 20.2% (275.0 km) of the roadsides surveyed, medium level weed infestation (weeds 20-80% of the total plants) occurred on 30.2% (410.7 km) of the roadsides and 49.6% of roadsides (674.8 km) were heavily infested with weeds (weeds more than 80% of the total plants), refer to Table 3 and Figure 5.



Predominant Adjoining Land Use

Uncleared native vegetation was present on 5.3% (72.8 km) of the land adjoining roadsides, whilst 88.4% (1,202.3 km) of roadsides adjoined land that had been completely cleared for agriculture. 3.9% (52.5 km) of the roadsides bordered land cleared for agriculture, but contained a scattered distribution of native vegetation. Drains were the predominant adjoining landuse for 0.2% (2.5 km) of the roadsides surveyed, railways adjoined 1.2% (16.3 km) of the roadsides, and 'other' landuses adjoined 1.0% (14.2 km) of the roadsides surveyed, see Table 3 and Figure 6.

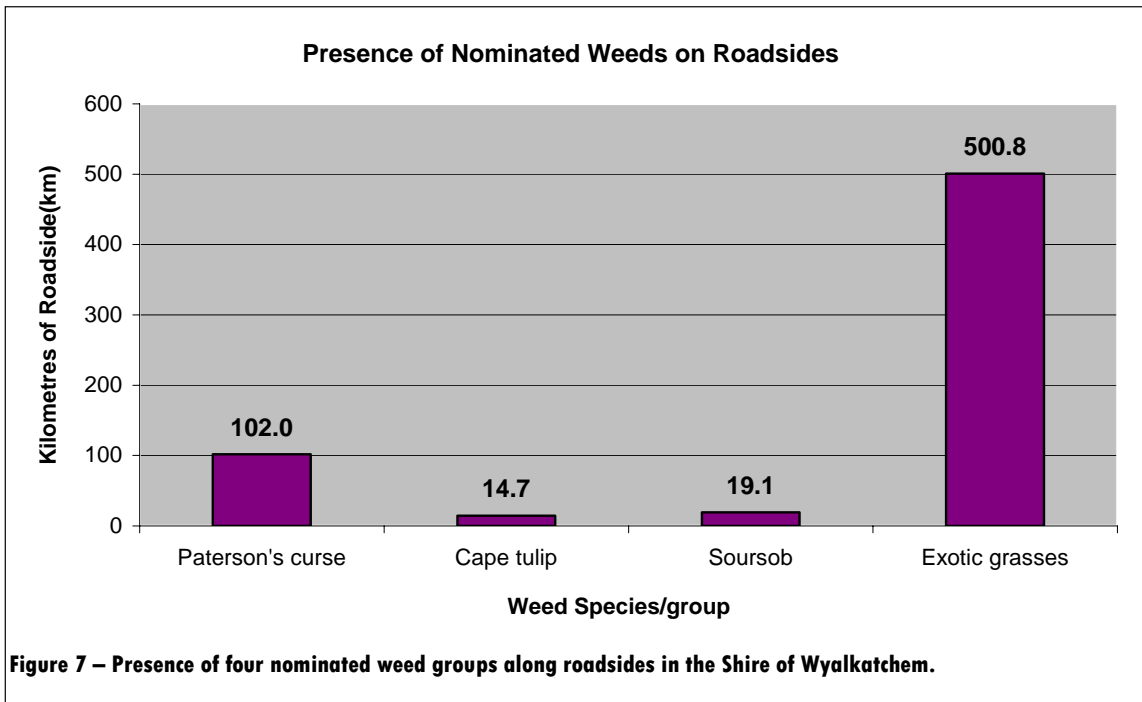


Nominated Weeds

The following weeds/ weed groups are depicted on clear overlays accompanying the 2005 RCV map:

- Paterson's Curse (*Echium plantagineum*);
- Cape Tulip (*Moraea flaccida*);
- Soursob (*Oxalis pes-caprae*); and
- Exotic Grasses.

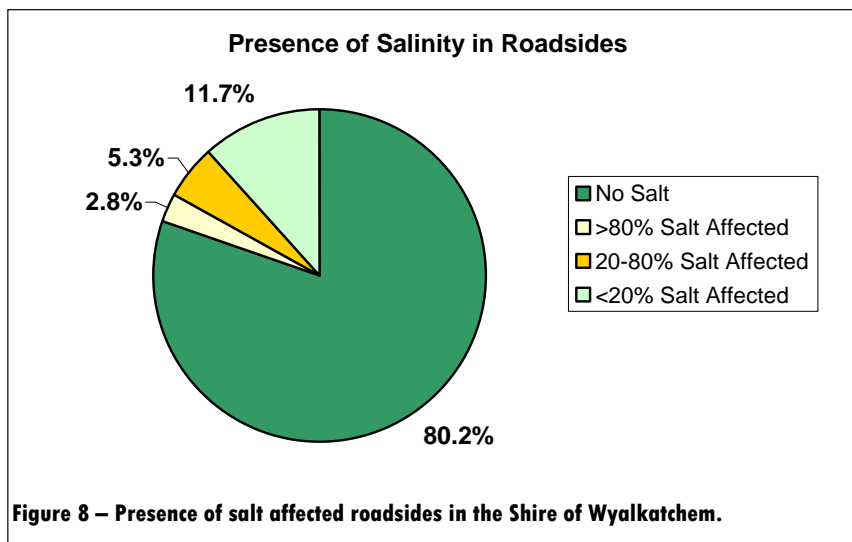
Of the four nominated weeds species, the Exotic grasses were the most prevalent, and were recorded along 500.8 km (or 73.62%) of roadsides surveyed. Paterson's curse was also quite prevalent, recorded along 101.99 km (or 14.99%) of roadsides. Soursob was the next most commonly recorded weed, occurring along 19.14 km (or 2.81%) of roadsides, closely followed by Cape Tulip, which was recorded along 2.16 km (or 14.66%). Refer to Figure 7.



Salinity

The presence of salinity in roadsides was recorded throughout the survey and these locations are depicted on a separate clear overlay accompanying the 2005 RCV map. The surveyors determined the level of salt damage occurring in roadsides, and there were 4 categories to choose from:

- No salt damage (0% of roadside salt affected),
- Minor salt damage (<20% of roadside salt affected),
- Moderate salt damage (20-80% of roadside salt affected), or
- Major salt damage (>80% of roadside salt affected).

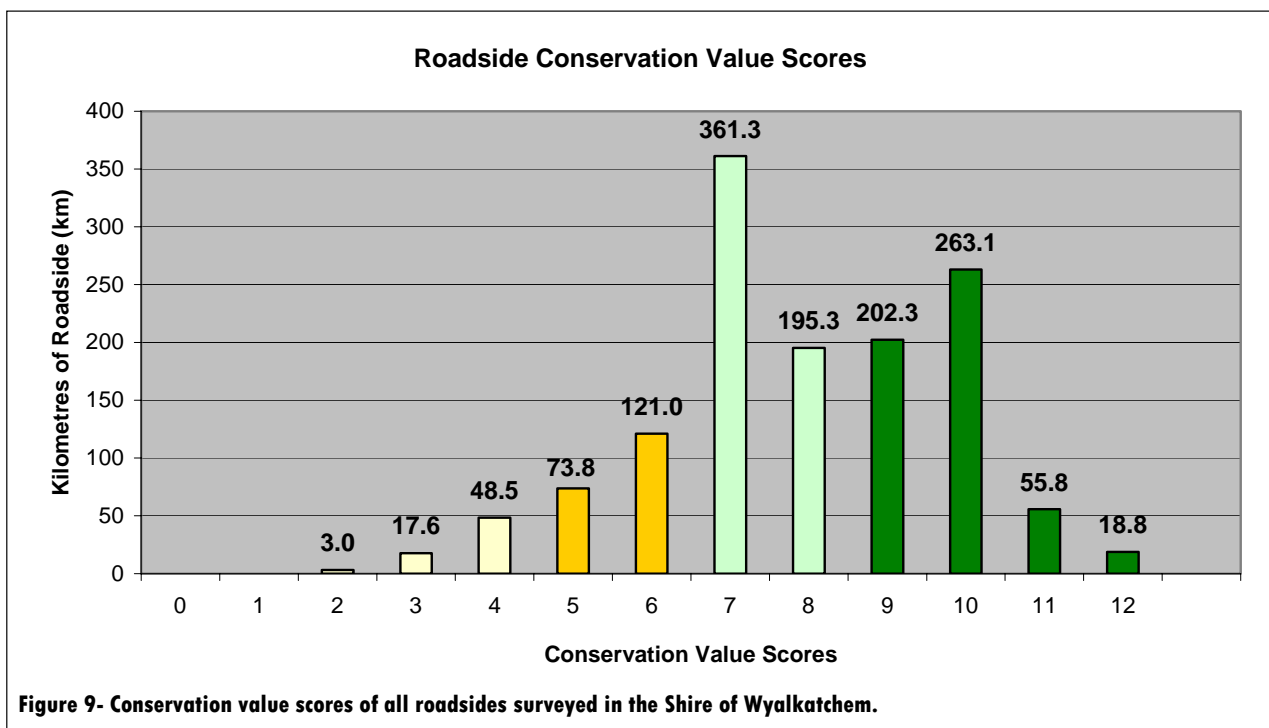


Of the 1,360.5km of roadsides surveyed, 270.6km (19.8%) recorded some level of salt damage. Of this, 38.6km (2.8%) of roadsides were heavily affected by salt (>80% salt affected), 72.3km (5.3%) had 20-80%

salt affected, and 159.7 km, or 11.7%, of roadsides were lightly affected by saline conditions (<20% salt affected). Refer to Figure 8.

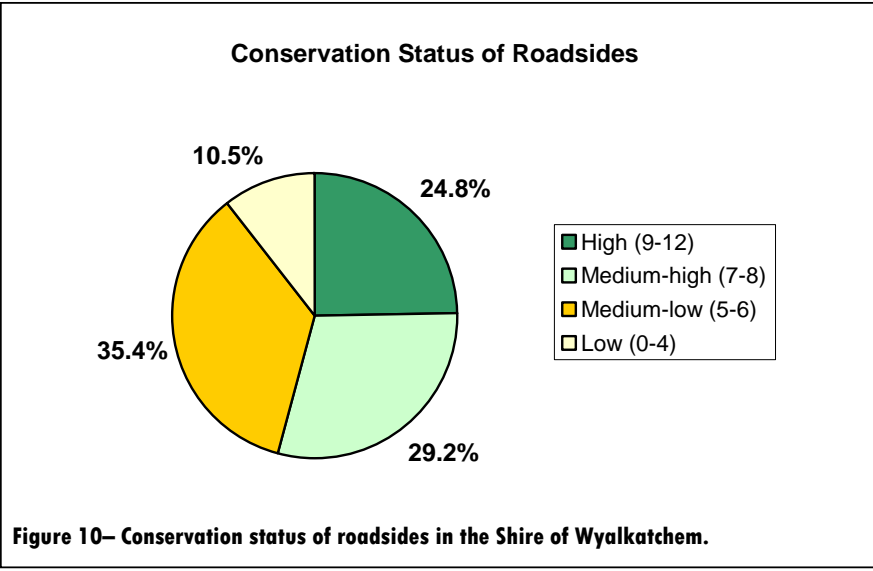
Conservation Value Scores

Conservation value scores were calculated for each section of roadside surveyed. Scores range from 0 to 12, from lowest to highest conservation value respectively, these are shown in Figure 9. The most occurring roadside conservation values were between 7 and 10, with a score of 7 being the highest with 361.3 km of roadside, followed by 10 (263.1 km), then 9 (202.3 km) and then the score of 8 (195.3 km). Roadsides with a conservation value score of 6 covered 121.0 km of roadsides, scores of 5 covered 73.8 km, and a score of 11 spanned 55.8 km of roadside. 48.5 km of roadsides scored 4, 18.8 km of roadsides scored 12, 17.6 km of roadsides scored 3, 3 km of roadsides scored 2 and 0 km of roadsides scored 1.



Conservation Status

The conservation status category indicated the combined conservation value of roadsides surveyed in the Shire of Wyalkatchem. Roadside sections of high conservation value covered 24.8% (337.73 km) of the length of roadsides surveyed. Medium-high conservation value roadsides accounted for 29.2% of the total surveyed (397.61 km), medium-low conservation roadside covered 35.5% (482.29 km) of the total surveyed. Roadsides of low conservation value occupied 10.5% (142.87 km) of the roadsides surveyed; refer to Table 3 and Figure 10.



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 Wyalkatchem, 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 Wyalkatchem include:

- Benjaberring South Rd
- Bruse Rd
- Carter Rd
- Cox Rd
- Davies Rd
- Davies South Rd
- Elashgin East West Rd
- Elashgin Rd
- Goldfields Rd
- Hardwick Rd
- McKay Rd
- Tammin-Wyalkatchem Rd



Flora Road nominations are assessed by the RCC.
Photo D Lamont.

PART D

**ROADSIDE
MANAGEMENT
RECOMMENDATIONS**

1.0 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,*
- *Guidelines for Managing Special Environmental Areas in Transport Corridors,* and
- *Handbook of Environmental Practice for Road Construction and Maintenance Works.*

1.1 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.

1.2. 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.

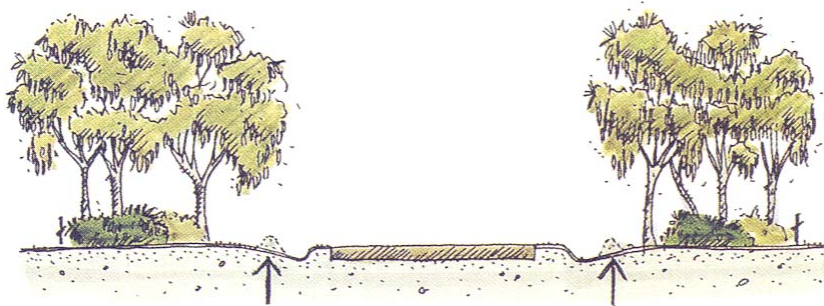
1.3 Improve roadside sections of medium to low conservation value by:

- 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.

2.0 Minimising Disturbance

Minimal disturbance can be achieved by:

- 2.1 Adopting a road design that occupies the minimum space;
- 2.2 Diverting the line of a table drain to avoid disturbing valuable flora;
- 2.3 Pruning branches, rather than removing the whole tree or shrub;
- 2.4 Not dumping spoil on areas of native flora;
- 2.5 Applying the *Fire Threat Assessment* (see 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;
- 2.6 Encouraging adjacent landholders to set back fences to allow roadside vegetation to proliferate;
- 2.7 Encouraging adjacent landholders to plant windbreaks or farm tree lots adjacent to roadside vegetation to create a denser windbreak or shelterbelt;
- 2.8 Encouraging revegetation projects by adjacent landholders.

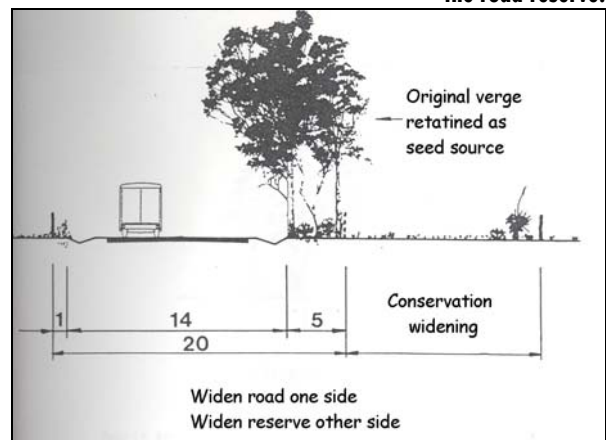


Avoid windrowing drain material into vegetation

Below right: Widening a road to one side only so that a wider section of roadside vegetation is retained on the other side of the road reserve.



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 undeveloped road reserve.



3.0 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.

4.0 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

SURVEY TO DETERMINE THE CONSERVATION VALUE OF ROADSIDES IN THE SHIRE OF _____		Roadside Conservation Committee C/- Locked Bag 104 Bentley Delivery Centre WA 6983	Phone: (08) 9334 0423 Fax: (08) 9334 0199
Date _____ Observer(s) _____ Road Name _____ Shire _____ Nearest named place _____ Direction of travel (N,S,E,W) _____ Section No. _____ Starting Point _____ Odometer reading _____ Ending Point _____ Odometer reading _____ Length of section _____		<u>No. OF DIFFERENT NATIVE SPECIES</u> 0 – 5 <input type="checkbox"/> <input type="checkbox"/> 6 – 19 <input type="checkbox"/> <input type="checkbox"/> Over 20 <input type="checkbox"/> <input type="checkbox"/> <u>FAUNA OBSERVED</u> _____ <u>VALUE AS A BIOLOGICAL CORRIDOR</u> Connects uncleared areas <input type="checkbox"/> <input type="checkbox"/> Flowering shrubs <input type="checkbox"/> <input type="checkbox"/> Large trees with hollows <input type="checkbox"/> <input type="checkbox"/> Hollow logs <input type="checkbox"/> <input type="checkbox"/> <u>PREDOMINANT ADJOINING LANDUSE</u> Agricultural crop or pasture: - Completely cleared <input type="checkbox"/> <input type="checkbox"/> - Scattered <input type="checkbox"/> <input type="checkbox"/> Uncleared land <input type="checkbox"/> <input type="checkbox"/> Plantation of non-native trees <input type="checkbox"/> <input type="checkbox"/> Urban or industrial <input type="checkbox"/> <input type="checkbox"/> Railway Reserve parallel to road <input type="checkbox"/> <input type="checkbox"/> Drain Reserve parallel to road <input type="checkbox"/> <input type="checkbox"/> Other: _____ <u>UTILITIES / DISTURBANCES</u> Disturbances continuous <input type="checkbox"/> <input type="checkbox"/> Disturbances isolated <input type="checkbox"/> <input type="checkbox"/> Disturbances absent <input type="checkbox"/> <input type="checkbox"/> Type: _____ <u>GENERAL WEEDS</u> Few weeds (<20% total plants) <input type="checkbox"/> <input type="checkbox"/> Half weeds (20 - 80% total) <input type="checkbox"/> <input type="checkbox"/> Mostly weeds (>80% total) <input type="checkbox"/> <input type="checkbox"/> Ground layer totally weeds <input type="checkbox"/> <input type="checkbox"/>	<u>NOMINATED WEEDS</u> _____ < 20% total weeds <input type="checkbox"/> <input type="checkbox"/> 20 – 80% total weeds <input type="checkbox"/> <input type="checkbox"/> > 80% total weeds <input type="checkbox"/> <input type="checkbox"/> _____ < 20% total weeds <input type="checkbox"/> <input type="checkbox"/> 20 – 80% total weeds <input type="checkbox"/> <input type="checkbox"/> > 80% total weeds <input type="checkbox"/> <input type="checkbox"/> _____ < 20% total weeds <input type="checkbox"/> <input type="checkbox"/> 20 – 80% total weeds <input type="checkbox"/> <input type="checkbox"/> > 80% total weeds <input type="checkbox"/> <input type="checkbox"/> _____ < 20% total weeds <input type="checkbox"/> <input type="checkbox"/> 20 – 80% total weeds <input type="checkbox"/> <input type="checkbox"/> > 80% total weeds <input type="checkbox"/> <input type="checkbox"/> _____ < 20% total weeds <input type="checkbox"/> <input type="checkbox"/> 20 – 80% total weeds <input type="checkbox"/> <input type="checkbox"/> 80% total weeds <input type="checkbox"/> <input type="checkbox"/> <u>GENERAL COMMENTS</u> _____ <u>OFFICE USE ONLY</u> Conservation value score <input type="checkbox"/> <input type="checkbox"/>
<u>WIDTH OF ROAD RESERVE (m)</u> _____ Side of the road Left Right <u>WIDTH OF VEGETATED ROADSIDE</u> 1 – 5 m <input type="checkbox"/> <input type="checkbox"/> 5 – 20 m <input type="checkbox"/> <input type="checkbox"/> Over 20 m <input type="checkbox"/> <input type="checkbox"/> <u>NATIVE VEGETATION ON ROADSIDE</u> Tree layer <input type="checkbox"/> <input type="checkbox"/> Shrub layer <input type="checkbox"/> <input type="checkbox"/> Ground layer <input type="checkbox"/> <input type="checkbox"/> <u>EXTENT OF NATIVE VEGETATION ON ROADSIDE</u> Less than 20% <input type="checkbox"/> <input type="checkbox"/> 20 – 80% <input type="checkbox"/> <input type="checkbox"/> Over 80% <input type="checkbox"/> <input type="checkbox"/>			

Appendix

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ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310001	1	0.00	3.50	3.50	DIVERS RD	S	1/11/2003	SHARON PHIL	20	0	0	0	0	0	0	1	1	2	2	0	0	3	3
4310001	2	3.50	5.50	2.00	DIVERS RD	S	1/11/2003	SHARON PHIL	20	2	2	1	1	0	0	0	0	2	2	1	1	6	6
4310001	3	5.50	6.09	0.59	DIVERS RD	S	1/11/2003	SHARON PHIL	20	2	2	0	0	0	0	1	1	1	1	0	0	4	4
4310002	1	7.02	13.84	6.82	WYALKATCHEM NORTH RD	N	9/02/2004	JUSTIN		2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310002	2	13.84	17.34	3.50	WYALKATCHEM NORTH RD	N	15/10/2003	JUSTIN	20	2	2	1	1	1	1	1	1	1	0	0	1	6	6
4310002	3	17.34	20.34	3.00	WYALKATCHEM NORTH RD	N	15/10/2003	JUSTIN	20	2	2	1	1	0	0	0	0	2	2	1	1	6	6
4310002	4	20.34	21.42	1.08	WYALKATCHEM NORTH RD	N	15/10/2003	JUSTIN		2	2	0	1	0	1	0	1	0	0	0	1	2	6
4310002	5	21.42	25.45	4.03	WYALKATCHEM NORTH RD	N	15/10/2003	JUSTIN		2	2	1	1	0	0	0	0	2	2	0	0	5	5
4310003	1	0.00	2.00	2.00	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	1	1	2	2	2	2	9	9
4310003	2	2.00	4.60	2.60	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	0	0	2	2	2	2	8	8
4310003	3	4.60	5.30	0.70	ELSEGOOD RD	E	21/05/2004	LISA	20	1	1	0	0	0	0	0	0	2	2	2	2	5	5
4310003	4	5.30	5.60	0.30	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	2	2	2	2	2	0	1	1	2	2	11	9
4310003	5	5.60	8.40	2.80	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	1	1	2	2	2	2	9	9
4310003	6	8.40	8.90	0.50	ELSEGOOD RD	E	21/05/2004	LISA	20	1	1	0	0	0	0	0	0	1	2	2	2	4	5
4310003	7	8.90	10.50	1.60	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	0	0	2	2	1	1	7	7
4310003	8	10.50	12.30	1.80	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	1	1	2	2	2	2	9	9
4310003	9	12.30	13.70	1.40	ELSEGOOD RD	E	21/05/2004	LISA	40	1	1	0	0	0	0	0	0	2	2	2	2	5	5
4310003	10	13.70	14.60	0.90	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	0	1	0	1	0	2	1	2	2	9	5
4310003	11	14.60	15.10	0.50	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	2	2	0	0	1	2	1	1	7	8
4310003	12	15.10	16.60	1.50	ELSEGOOD RD	E	21/05/2004	LISA	20	2	2	1	1	1	1	0	0	2	1	2	2	8	7
4310003	13	16.60	17.90	1.30	ELSEGOOD RD	E	21/05/2004	LISA	20	1	1	0	0	0	0	0	0	2	2	1	1	4	4
4310004	1	0.00	6.40	6.40	YORKRAKINE WEST RD	E	2/11/2003	SHARON PHIL	20	2	2	1	1	0	0	1	1	2	2	0	0	6	6
4310004	2	6.40	14.60	8.20	YORKRAKINE WEST RD	E	21/03/2004	JAN HUGH TRENORDEN		2	2	1	1	1	1	0	0	2	2	1	1	7	7
4310004	3	14.60	18.30	3.70	YORKRAKINE WEST RD	E	21/03/2004	JAN HUGH TRENORDEN		2	0	1	0	1	1	1	1	2	2	2	2	9	6
4310005	1	0.00	1.40	1.40	ELASHGIN RD	S	4/11/2003	E V GARNER		2	2	2	2	2	2	1	1	0	0	2	2	9	9
4310005	2	1.40	3.70	2.30	ELASHGIN RD	S	4/11/2003	E V GARNER		1	1	0	0	0	0	0	0	2	2	0	0	3	3
4310005	3	3.70	4.80	1.10	ELASHGIN RD	S	4/11/2003	E V GARNER		2	2	1	1	2	0	1	0	0	2	2	0	8	5
4310005	4	4.80	8.30	3.50	ELASHGIN RD	S	4/11/2003	E V GARNER		2	2	1	1	1	0	2	2	0	0	2	2	8	7
4310005	5	8.30	14.94	6.64	ELASHGIN RD	S	4/11/2003	E V GARNER		2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310006	1	0.00	0.40	0.40	DAVIES STH RD	N	20/10/2003	LEONIE JOY	20	2	2	2	2	1	1	1	1	2	2	2	2	10	10
4310006	2	0.40	1.30	0.90	DAVIES STH RD	N	20/10/2003	LEONIE JOY	20	0	0	0	0	0	0	0	0	1	1	0	0	1	1

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score		
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
4310006	3	1.30	5.20	3.90	DAVIES STH RD	N	20/10/2003	LEONIE JOY	20	2	2	2	2	1	1	1	2	2	2	2	2	2	10	11
4310006	4	5.20	6.60	1.40	DAVIES STH RD	N	20/10/2003	LEONIE JOY	20	1	1	0	0	0	0	0	0	2	2	0	0	3	3	
4310006	5	6.60	7.60	1.00	DAVIES STH RD	N	20/10/2003	LEONIE JOY	20	0	2	0	0	0	0	0	0	2	2	0	0	2	4	
4310006	6	7.60	13.25	5.65	DAVIES STH RD	N	20/10/2004	LEONIE JOY	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9	
4310007	1	0.00	0.50	0.50	PARSONS RD	S	4/11/2003	E V GARNER		2	2	2	2	2	2	2	2	0	0	2	2	10	10	
4310007	2	0.50	4.50	4.00	PARSONS RD	S	4/11/2003	E V GARNER		2	2	0	1	0	1	2	0	2	2	0	0	6	6	
4310007	3	4.50	8.10	3.60	PARSONS RD	S	4/11/2003	E V GARNER		1	2	0	1	0	0	0	2	2	2	0	0	3	7	
4310007	4	8.10	16.18	8.08	PARSONS RD	S	4/11/2003	E V GARNER		2	2	1	1	0	1	2	1	2	2	1	1	8	8	
4310008	1	0.00	3.24	3.24	NEMBUDDING STH RD	S	21/03/2004	JAN HUGH TRENORDEN		1	2	1	1	0	1	1	1	2	2	2	2	7	9	
4310008	2	3.24	4.24	1.00	NEMBUDDING STH RD	S	21/03/2004	JAN HUGH TRENORDEN		1	2	0	1	0	1	1	1	2	2	2	2	6	9	
4310008	3	4.24	9.04	4.80	NEMBUDDING STH RD	S	21/03/2004	JAN HUGH TRENORDEN		1	2	1	1	1	1	1	1	2	2	2	2	8	9	
4310008	4	9.04	14.54	5.50	NEMBUDDING STH RD	S	21/03/2004	JAN HUGH TRENORDEN		1	1	1	1	1	1	1	1	2	2	2	2	8	8	
4310008	5	14.54	19.64	5.10	NEMBUDDING STH RD	S	21/03/2004	JAN HUGH TRENORDEN		1	1	0	1	0	1	1	2	2	2	2	2	6	9	
4310009	1	0.00	0.30	0.30	MCNEE RD	N	4/11/2003	E V GARNER		2	2	2	2	2	2	1	1	0	0	2	2	9	9	
4310009	2	0.30	4.60	4.30	MCNEE RD	N	4/11/2003	E V GARNER		2	2	1	1	0	0	0	0	2	2	1	1	6	6	
4310009	3	4.60	5.70	1.10	MCNEE RD	N	4/11/2003	E V GARNER		2	2	0	2	2	2	0	1	2	0	0	2	6	9	
4310009	4	5.70	9.80	4.10	MCNEE RD	N	4/11/2003	E V GARNER		2	2	1	1	1	0	0	1	2	2	0	0	6	6	
4310009	5	9.80	12.32	2.52	MCNEE RD	N	4/11/2003	E V GARNER		2	2	1	1	0	0	0	0	2	2	1	1	6	6	
4310009	6	12.32	15.47	3.15	MCNEE RD	N	9/02/2004	JUSTIN	20	2	2	2	2	1	1	0	0	2	2	1	1	8	8	
4310009	7	15.47	18.77	3.30	MCNEE RD	N	9/02/2004	JUSTIN	20	2	2	0	0	1	1	0	0	2	2	0	0	5	5	
4310010	1	0.00	1.24	1.24	WALLAMBIN RD	E	15/10/2003	JUSTIN	20	1	1	0	0	0	0	0	0	2	2	0	0	3	3	
4310010	2	1.24	2.66	1.42	WALLAMBIN RD	E	15/10/2003	JUSTIN	20	1	1	0	1	0	0	0	0	2	2	0	0	3	4	
4310010	3	2.66	3.58	0.92	WALLAMBIN RD	E	15/10/2003	JUSTIN	20	2	2	1	2	0	2	0	1	2	1	0	2	5	10	
4310010	4	3.58	4.39	0.81	WALLAMBIN RD	E	15/10/2003	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6	
4310010	5	4.39	19.71	15.32	WALLAMBIN RD	E	15/10/2003	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6	
4310011	1	0.00	1.70	1.70	DAVIES RD	S	11/10/2003	SHARON PHIL	20	2	2	2	2	2	2	2	2	0	0	2	2	10	10	
4310011	2	1.70	12.00	10.30	DAVIES RD	S	11/10/2004	SHARON PHIL	20	2	2	1	1	1	1	2	1	2	2	1	1	9	8	
4310011	3	12.00	13.00	1.00	DAVIES RD	S	11/10/2003	SHARON PHIL	20	2	2	2	1	1	1	2	2	0	2	2	1	9	9	
4310011	4	13.00	20.80	7.80	DAVIES RD	S	11/10/2003	SHARON PHIL	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9	
4310011	5	20.80	21.36	0.56	DAVIES RD	S	11/10/2003	SHARON PHIL	20	2	2	0	0	0	0	1	1	2	2	0	0	5	5	
4310012	1	0.00	0.60	0.60	AMERY BENJABBERRING RD	W	20/10/2003	JOY LEONIE		2	2	2	0	1	0	0	0	0	1	2	1	7	4	
4310012	2	0.60	1.30	0.70	AMERY BENJABBERRING	W	20/10/2003	JOY LEONIE		2	2	2	2	0	0	1	1	2	1	2	2	9	8	

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
					RD																		
4310012	3	1.30	3.00	1.70	AMERY BENJABBERRING RD	W	20/10/2003	JOY LEONIE		2	2	1	1	1	1	2	2	2	1	2	2	10	9
4310012	4	3.00	5.13	2.13	AMERY BENJABBERRING RD	W	20/10/2003	JOY LEONIE	20	2	2	0	0	1	1	1	1	2	2	1	1	7	7
4310013	1	0.00	7.11	7.11	LEWIS RD	N	20/10/2003	JOY LEONIE	20	2	2	1	2	1	1	2	2	2	2	0	0	8	9
4310014	1	0.00	3.20	3.20	MARTIN RD	E	20/10/2003	JOY LEONIE	40	2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310014	2	3.20	9.50	6.30	MARTIN RD	E	9/02/2004	JUSTIN	20	2	2	0	0	1	1	0	0	2	2	0	0	5	5
4310014	3	9.50	12.70	3.20	MARTIN RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310014	4	12.70	13.80	1.10	MARTIN RD	E	9/02/2004	JUSTIN	20	2	2	0	0	0	0	0	0	2	2	0	0	4	4
4310015	1	0.00	0.30	0.30	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	0	0	2	2	8	8
4310015	2	0.30	0.70	0.40	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	1	1	2	2	9	9
4310015	3	0.70	1.30	0.60	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	0	0	2	2	8	8
4310015	4	1.30	2.40	1.10	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	0	2	2	2	8	10
4310015	5	2.40	5.50	3.10	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310015	6	5.50	7.50	2.00	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	2	2	1	1	2	9	9
4310015	7	7.50	10.00	2.50	GOLDFIELDS RD	E	1/10/2003	KEN SHARON		2	2	1	1	1	1	2	1	2	2	1	2	9	9
4310015	8	10.00	11.10	1.10	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	1	1	2	1	0	2	1	1	7	8
4310015	9	11.10	12.60	1.50	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	0	0	0	0	2	2	1	1	6	6
4310015	10	12.60	14.70	2.10	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	2	2	1	1	1	1	2	2	2	2	10	10
4310015	11	14.70	16.40	1.70	GOLDFIELDS RD	E	1/10/2003	KEN SHARON	40	2	2	1	1	0	0	1	1	2	2	1	1	7	7
4310015	12	16.40	16.95	0.55	GOLDFIELDS RD	E	1/10/2004	KEN SHARON	40	1	1	0	0	0	0	0	0	2	2	0	0	3	3
4310016	1	0.00	0.41	0.41	NORTH KORRELOCKING RD	N	1/10/2003	KEN SHARON	20	2	2	2	2	1	1	2	1	0	2	2	2	9	10
4310016	2	0.41	1.31	0.90	NORTH KORRELOCKING RD	N	1/10/2003	KEN SHARON	20	2	2	2	2	1	1	2	2	2	2	2	2	11	11
4310016	3	1.31	3.31	2.00	NORTH KORRELOCKING RD	N	1/10/2003	KEN SHARON	20	2	2	1	1	0	1	1	2	2	2	1	2	7	10
4310017	1	0.00	0.40	0.40	LAWRENCE RD	N	20/10/2003	JOY LEONIE		2	2	2	2	2	2	2	2	0	0	2	2	10	10
4310017	2	0.40	1.40	1.00	LAWRENCE RD	N	20/10/2003	JOY LEONIE	20	2	2	0	0	0	0	1	1	2	2	0	0	5	5
4310017	3	1.40	3.50	2.10	LAWRENCE RD	N	20/10/2003	JOY LEONIE	20	2	2	2	2	1	1	1	1	2	2	2	2	10	10
4310017	4	3.50	4.00	0.50	LAWRENCE RD	N	20/10/2003	JOY LEONIE	20	0	0	0	0	0	0	0	0	2	2	0	0	2	2
4310017	5	4.00	4.80	0.80	LAWRENCE RD	N	20/10/2003	JOY LEONIE	20	2	2	1	1	0	0	2	1	2	2	1	1	8	7
4310017	6	4.80	5.90	1.10	LAWRENCE RD	N	20/10/2003	JOY LEONIE	20	1	0	0	0	0	0	0	0	2	2	0	0	3	2
4310018	1	0.00	2.39	2.39	BYRNE RD	S	12/05/2004	GARNERS		2	2	0	0	1	1	0	1	2	2	0	0	5	6
4310019	1	0.00	1.70	1.70	ALLAN RD	S	21/03/2004	JAN HUGH TRENORDEN		2	2	1	1	1	1	2	1	2	2	1	1	9	8
4310019	2	1.70	6.63	4.93	ALLAN RD	S	21/03/2004	JAN HUGH		2	2	0	0	0	0	1	1	2	2	0	0	5	5

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score		
		(m)	Left						Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	
		(km)	(km)	(km)				TRENORDEN																
4310020	1	0.00	1.58	1.58	HOLDSWORTH RD	E	9/02/2004	JUSTIN		2	2	1	1	1	1	0	2	2	0	0	0	0	6	6
4310020	2	1.58	8.19	6.61	HOLDSWORTH RD	E	9/02/2004	JUSTIN		2	2	1	1	1	1	0	0	2	2	0	0	0	6	6
4310020	3	8.19	11.82	3.63	HOLDSWORTH RD	E	9/02/2004	JUSTIN		2	2	1	1	1	1	0	0	2	2	0	0	0	6	6
4310020	4	11.82	13.94	2.12	HOLDSWORTH RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	0	6	6
4310020	5	13.94	17.49	3.55	HOLDSWORTH RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	0	6	6
4310021	1	0.00	3.80	3.80	RIFLE RANGE RD	E	4/11/2003	E V GARNER		2	2	0	0	0	0	0	0	2	2	0	0	0	4	4
4310021	2	3.80	6.86	3.06	RIFLE RANGE RD	E	4/11/2003	E V GARNER		2	2	1	1	1	1	1	1	2	2	2	2	9	9	
4310022	1	0.00	6.90	6.90	DEPIERRES RD	W	12/05/2004	GARNERS		2	2	0	0	1	1	1	0	2	1	0	0	0	6	4
4310022	2	6.90	8.52	1.62	DEPIERRES RD	W	12/05/2004	GARNERS		0	1	1	1	0	0	0	0	2	2	0	0	3	4	
4310022	4	8.52	9.92	1.40	DEPIERRES RD	N	12/05/2004	GARNERS		2	2	0	0	1	1	0	0	1	1	0	0	4	4	
4310022	5	9.92	11.32	1.40	DEPIERRES RD	N	12/05/2004	GARNERS		1	1	2	2	0	0	0	0	0	0	2	2	5	5	
4310022	6	11.32	13.32	2.00	DEPIERRES RD	W	12/05/2004	GARNERS		2	2	1	1	0	1	0	0	2	2	0	0	5	6	
4310023	1	0.00	3.44	3.44	GREAVES RD	N	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	1	2	2	0	0	7	6	
4310024	1	0.00	2.30	2.30	TILLBROOK RD	E	21/03/2004	JAN HUGH TRENORDEN		1	1	1	1	1	1	1	1	2	2	2	2	8	8	
4310024	2	2.30	9.10	6.80	TILLBROOK RD	E	21/03/2004	JAN HUGH TRENORDEN		1	1	1	1	0	0	1	1	2	2	2	2	7	7	
4310026	1	0.00	1.10	1.10	ROSS RD	W	20/05/2004	LISA	20	1	1	0	0	0	0	0	0	2	2	0	0	3	3	
4310026	2	1.10	4.00	2.90	ROSS RD	W	20/05/2004	LISA	20	2	1	0	0	1	0	0	0	2	2	1	1	6	4	
4310026	3	4.00	5.43	1.43	ROSS RD	W	20/05/2004	LISA	20	2	2	1	1	1	0	1	0	2	2	1	1	8	6	
4310027	1	0.00	0.60	0.60	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE		2	2	2	2	1	1	1	1	0	0	2	2	8	8	
4310027	2	0.60	2.50	1.90	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	2	2	2	2	1	1	2	2	2	2	2	2	11	11	
4310027	3	2.50	7.50	5.00	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	2	2	1	1	0	0	2	2	2	2	0	0	7	7	
4310027	4	7.50	8.50	1.00	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	0	1	0	0	0	0	0	1	2	2	0	0	2	4	
4310027	5	8.50	9.60	1.10	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9	
4310027	6	9.60	11.30	1.70	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE		2	2	2	2	2	2	2	2	0	0	2	2	10	10	
4310027	7	11.30	14.10	2.80	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	2	2	0	0	0	0	1	1	2	2	0	0	5	5	
4310027	8	14.10	15.69	1.59	BENJABERRING HINDMARSH RD	S	20/10/2003	JOY LEONIE	20	2	2	0	0	1	1	1	2	2	2	0	0	6	7	
4310028	1	0.00	0.65	0.65	COWCOWING WEST RD	E	15/10/2003		20	2	2	1	1	1	1	1	0	0	2	2	2	7	8	

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310028	2	0.65	2.20	1.55	COWCOWING WEST RD	E	15/10/2003		20	2	2	1	1	1	1	0	0	2	2	2	2	8	8
4310028	3	2.20	4.50	2.30	COWCOWING WEST RD	E	15/10/2003		20	2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310028	4	4.50	4.96	0.46	COWCOWING WEST RD	E	18/10/2003			2	2	2	0	2	0	2	0	1	1	2	0	11	3
4310029	1	0.00	1.70	1.70	CEMETARY RD	W	16/09/2004	TEAGAN LEONIE		2	2	1	1	1	1	2	1	1	2	0	0	7	7
4310029	2	1.70	3.10	1.40	CEMETARY RD	W	16/09/2004	TEAGAN LEONIE		2	2	1	2	2	2	2	2	1	0	1	1	9	9
4310029	3	3.10	3.90	0.80	CEMETARY RD	W	16/09/2004	TEAGAN LEONIE		2	2	1	1	1	1	2	2	2	2	1	0	9	8
4310029	4	3.90	5.09	1.19	CEMETARY RD	W	16/09/2004	TEAGAN LEONIE		2	2	2	1	2	1	2	2	1	2	1	0	10	8
4310030	1	0.00	0.90	0.90	WHITE DAM RD	W	16/09/2004	TEAGAN LEONIE		2	2	1	0	1	1	2	2	2	2	1	1	9	8
4310030	2	0.90	1.90	1.00	WHITE DAM RD	W	16/09/2004	TEAGAN LEONIE		2	2	0	1	1	2	1	2	2	0	2	2	8	9
4310030	3	1.90	2.53	0.63	WHITE DAM RD	W	16/09/2004	TEAGAN LEONIE		2	2	2	2	1	1	0	1	0	0	2	2	7	8
4310031	1	0.00	1.00	1.00	HENNESSEY RD	W	20/10/2003	JOY LEONIE		2	2	2	2	1	1	1	1	0	2	2	2	8	10
4310031	2	1.00	2.10	1.10	HENNESSEY RD	W	20/10/2003	JOY LEONIE		2	2	2	2	2	2	1	1	2	0	2	2	11	9
4310032	1	0.00	3.41	3.41	HODGSON RD	S	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	2	2	2	0	0	7	7
4310033	1	0.00	1.10	1.10	HARRISON RD	N	20/10/2003	JOY LEONIE		2	2	1	0	0	0	2	1	2	2	1	1	8	6
4310033	2	1.10	2.40	1.30	HARRISON RD	N	20/10/2003	JOY LEONIE	20	1	1	0	0	0	0	0	0	2	2	0	0	3	3
4310033	3	2.40	8.95	6.55	HARRISON RD	N	20/10/2003	JOY LEONIE	20	2	2	1	1	1	1	2	2	2	2	0	0	8	8
4310034	1	0.00	7.52	7.52	HARDWICK RD	E	4/11/2003	E V GARNER		2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310035	1	0.00	5.50	5.50	HAMMOND RD	E	21/03/2004	JAN HUGH TRENORDEN		2	2	1	1	0	0	1	1	2	2	2	1	8	7
4310035	2	5.50	7.90	2.40	HAMMOND RD	E	21/03/2004	JAN HUGH TRENORDEN		2	2	1	1	1	1	1	1	2	2	2	2	9	9
4310036	1	0.00	5.36	5.36	CHILLMAN RD	N	15/10/2003	JUSTIN		2	2	0	0	0	0	0	0	2	2	0	0	4	4
4310036	2	5.36	5.70	0.34	CHILLMAN RD	N	15/10/2003	JUSTIN		2	2	1	1	1	1	1	0	0	2	2	2	7	8
4310036	3	5.70	6.22	0.52	CHILLMAN RD	N	15/10/2003	JUSTIN	20	2	2	1	1	1	1	1	0	0	2	1	0	6	6
4310037	1	0.00	2.74	2.74	GAMBLE RD	N	15/10/2003		20	2	2	1	1	0	0	0	0	1	1	0	0	4	4
4310038	1	0.00	4.90	4.90	GARN RD	W	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	2	2	2	0	0	7	7
4310038	2	4.90	6.24	1.34	GARN RD	W	16/09/2004	TEAGAN LEONIE		0	0	0	0	0	0	0	0	2	2	0	0	2	2
4310039	1	0.00	4.64	4.64	BROOKS RD	W	4/11/2003	E V GARNER		2	2	1	1	1	1	1	1	2	2	0	0	7	7
4310040	1	0.00	2.06	2.06	MCKAY RD	w	20/10/2003	JOY LEONIE	20	2	2	1	0	1	1	2	2	2	2	1	0	9	7
4310040	2	2.06	2.46	0.40	MCKAY RD	w	20/10/2003	JOY LEONIE		2	2	1	1	1	2	1	2	2	1	1	2	8	10

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310040	3	2.46	3.66	1.20	MCKAY RD	w	20/10/2003	JOY LEONIE		2	2	2	2	2	2	2	2	0	1	2	2	10	11
4310041	1	0.00	3.53	3.53	LEWIS EAST WEST RD	W	20/10/2003	JOY LEONIE	20	2	2	0	0	0	0	2	2	2	2	0	0	6	6
4310042	1	0.00	1.71	1.71	REMNANT RD	S	15/05/2004	GARNERS		2	2	0	0	1	1	0	1	2	2	0	0	5	6
4310042	2	1.71	4.31	2.60	REMNANT RD	W	12/05/2004	GARNERS		1	1	1	1	0	0	0	0	2	2	0	0	4	4
4310043	1	0.00	0.80	0.80	BORGWARD RD	W	20/10/2003	JOY LEONIE	20	2	2	2	2	1	1	2	2	2	2	2	2	11	11
4310043	2	0.80	2.00	1.20	BORGWARD RD	W	20/10/2003	JOY LEONIE	20	0	0	0	0	0	0	0	0	2	2	0	0	2	2
4310043	3	2.00	3.79	1.79	BORGWARD RD	W	20/10/2003	JOY LEONIE	20	2	2	0	0	0	0	1	1	2	2	0	0	5	5
4310044	1	0.00	1.59	1.59	BLAKISTON RD	S	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	2	2	2	0	0	7	7
4310045	1	0.00	5.60	5.60	RYAN RD	S	21/03/2004	JAN HUGH TRENORDEN		1	1	0	0	0	0	1	1	2	2	1	1	5	5
4310046	1	0.00	0.95	0.95	TURNER RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	1	0	0	6	5
4310046	2	0.95	7.16	6.21	TURNER RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	1	1	7	7
4310047	1	0.00	11.99	11.99	BRUSE RD	S	4/11/2003	E V GARNER		2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310048	1	0.00	10.00	10.00	ELASHGIN EAST WEST RD	W	4/11/2003	E V GARNER		2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310049	1	0.00	2.17	2.17	MACPHERSON RD	W	12/05/2004	GARNERS		2	2	1	1	0	0	1	1	2	2	0	0	6	6
4310050	1	0.00	1.84	1.84	PULFORD RD	W	12/05/2004	GARNERS		2	2	1	1	0	0	1	1	2	2	0	0	6	6
4310051	1	0.00	1.10	1.10	BOOKHAM RD	N			20	2	2	1	1	0	0	1	1	2	2	0	0	6	6
4310051	2	1.10	2.40	1.30	BOOKHAM RD	N			20	2	2	2	2	0	0	1	1	2	2	2	1	9	8
4310051	3	2.40	4.70	2.30	BOOKHAM RD	N			20	2	2	1	1	0	0	2	1	2	2	1	1	8	7
4310051	4	4.70	6.00	1.30	BOOKHAM RD	N			20	2	2	1	1	0	0	1	1	2	2	1	1	7	7
4310051	5	6.00	7.40	1.40	BOOKHAM RD	N			20	2	2	1	1	0	0	1	1	2	2	1	1	7	7
4310052	1	0.00	1.50	1.50	THIEL RD	W	21/03/2004	JAN HUGH TRENORDEN		1	1	0	0	0	0	1	1	2	2	1	1	5	5
4310052	2	1.50	3.99	2.49	THIEL RD	W	21/03/2004	JAN HUGH TRENORDEN		2	2	1	1	1	1	1	0	2	1	2	2	9	7
4310053	1	0.00	2.35	2.35	MITCHELL RD	N	20/10/2003	JOY LEONIE	20	2	2	0	0	1	1	1	1	2	2	0	0	6	6
4310054	1	0.00	5.50	5.50	MINNIVALE NORTH EAST RD	SW	20/10/2003	JOY LEONIE	60	2	2	1	0	1	1	2	2	2	2	1	1	9	8
4310055	1	0.00	1.70	1.70	OLD NALKAIN RD	W	13/10/2003	JUSTIN	20	2	2	1	1	0	0	0	0	2	2	0	0	5	5
4310055	2	1.70	3.79	2.09	OLD NALKAIN RD	W	13/10/2003	JUSTIN	20	2	2	0	1	0	1	0	1	2	1	0	0	4	6
4310055	3	3.79	4.85	1.06	OLD NALKAIN RD	SW	13/10/2003	JUSTIN	20	2	2	1	1	0	0	0	0	2	2	0	0	5	5
4310055	4	4.85	7.20	2.35	OLD NALKAIN RD	SW	13/10/2003	JUSTIN	20	2	2	0	0	0	0	0	0	2	2	0	0	4	4
4310055	5	7.20	11.85	4.65	OLD NALKAIN RD	W	20/10/2003	JOY LEONIE	20	2	2	1	1	1	1	2	2	2	2	0	0	8	8
4310056	1	1.00	3.40	2.40	BEGLEY RD	N	16/09/2004	TEAGAN LEONIE		2	2	1	2	1	1	2	2	2	2	1	1	9	10
4310057	1	0.00	4.23	4.23	CARTER RD	N	20/10/2003	JOY LEONIE	20	2	2	1	1	2	2	2	2	2	2	1	1	10	10

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310059	1	0.00	1.41	1.41	FLOWERY PATCH RD	S	12/05/2004	GARNERS		2	2	1	1	1	1	1	0	2	1	0	0	7	5
4310060	1	0.00	2.40	2.40	SHIELDS RD	N	21/03/2004	JAN HUGH TRENORDEN		2	1	0	0	1	1	1	0	1	2	2	2	7	6
4310060	2	2.40	7.90	5.50	SHIELDS RD	N	21/03/2004	JAN HUGH TRENORDEN		1	1	1	1	1	1	1	2	2	2	1	2	7	9
4310060	3	7.90	12.33	4.43	SHIELDS RD	N	21/03/2004	JAN HUGH TRENORDEN		1	1	0	0	0	0	1	1	2	2	2	2	6	6
4310062	1	0.00	0.90	0.90	WESTLAKE RD	N	16/09/2004	TEAGAN LEONIE		2	2	2	2	2	2	2	2	0	0	2	2	10	10
4310062	2	0.90	1.90	1.00	WESTLAKE RD	N	16/09/2004	TEAGAN LEONIE		2	2	2	0	2	0	2	1	0	2	2	0	10	5
4310063	1	0.00	2.58	2.58	WILSON RD	E	16/09/2004	TEAGAN LEONIE		2	2	1	1	1	1	1	2	2	2	1	1	8	9
4310064	1	0.00	3.03	3.03	MIZEN RD	W	2/11/2003	SHARON PHIL	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310065	1	0.00	3.45	3.45	CLIFFORD RD	E	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	1	1	7	7
4310065	2	3.45	6.43	2.98	CLIFFORD RD	S	9/02/2004	JUSTIN	20	2	2	1	1	2	1	0	0	0	2	1	0	6	6
4310066	1	0.00	0.50	0.50	GAMBRELL RD	N	16/09/2004	TEAGAN LEONIE		1	2	0	1	0	1	0	2	2	0	1	1	4	7
4310066	2	0.50	3.61	3.11	GAMBRELL RD	N	16/09/2004	TEAGAN LEONIE		2	2	0	0	2	2	1	1	2	2	0	0	7	7
4310067	1	0.00	5.33	5.33	FARMER RD	N	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	2	2	2	0	0	7	7
4310068	1	0.00	3.53	3.53	BOYLE RD	W	21/03/2004	JAN HUGH TRENORDEN		1	1	1	1	1	1	1	1	2	2	1	2	7	8
4310069	1	0.00	1.10	1.10	RHIND RD	E	16/09/2004	TEAGAN LEONIE		2	2	1	1	1	1	2	2	2	2	0	0	8	8
4310070	1	0.00	1.30	1.30	BUTT RD	E	10/02/2004	JUSTIN		2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310071	1	0.00	3.38	3.38	JACKSON RD	E	16/09/2004	TEAGAN LEONIE		2	2	0	0	1	1	2	2	2	2	0	0	7	7
4310073	1	0.00	4.13	4.13	WILLIAMSON RD	N	16/09/2004	TEAGAN LEONIE		2	2	0	0	0	0	2	1	2	2	0	0	6	5
4310075	1	0.00	2.83	2.83	MAITLAND RD	E	4/11/2003	E V GARNER		2	2	1	1	1	1	1	0	2	2	0	0	7	6
4310075	2	2.83	4.36	1.53	MAITLAND RD	E	4/11/2003	E V GARNER		2	2	2	2	0	1	0	1	2	0	0	1	6	7
4310075	3	4.36	6.86	2.50	MAITLAND RD	E	4/11/2003	E V GARNER		2	2	2	2	0	1	1	1	2	2	1	1	8	9
4310077	1	0.00	1.15	1.15	SUTHERLAND RD	N	20/10/2003	JOY LEONIE	20	2	2	1	1	1	1	2	2	2	2	2	2	10	10
4310079	1	0.00	2.80	2.80	GANGELL RD	SE	9/02/2004	JUSTIN	20	2	2	2	2	1	1	0	0	1	1	2	2	8	8
4310082	1	0.00	4.00	4.00	HOBDEN RD	E	12/05/2004	GARNERS		2	2	2	2	0	0	0	0	2	2	0	0	6	6
4310085	1	1.10	4.48	3.38	GNUCA NALKAIN RD	N	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	1	2	1	0	0	6	6
4310086	1	0.00	3.51	3.51	FISHER RD	W	12/05/2004	GARNERS		2	2	1	1	1	1	1	0	2	2	0	0	7	6
4310087	1	0.00	0.43	0.43	JENNINGS RD	S	15/10/2003			2	2	2	2	2	2	1	1	0	0	2	2	9	9

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310087	2	0.43	3.26	2.83	JENNINGS RD	S	15/10/2003			2	2	1	1	0	0	1	1	1	2	0	0	5	6
4310087	3	3.26	3.85	0.59	JENNINGS RD	S	15/10/2003			2	2	2	2	2	2	1	1	1	0	2	2	10	9
4310088	1	0.00	1.53	1.53	NEMBUDDING BIN RD	W	16/09/2004	TEAGAN LEONIE		2	2	2	2	2	2	2	2	0	0	2	2	10	10
4310089	1	0.00	0.82	0.82	METCALF RD	W	20/10/2003	JOY LEONIE	20	1	1	1	1	0	0	2	0	2	2	0	0	6	4
4310097	1	0.00	2.50	2.50	JARVIS RD	N	4/11/2003	E V GARNER		1	2	0	1	0	0	1	1	2	2	1	1	5	7
4310097	2	2.50	4.20	1.70	JARVIS RD	N	4/11/2003	E V GARNER		2	2	2	2	1	1	0	0	2	2	2	2	9	9
4310097	3	4.20	5.20	1.00	JARVIS RD	N	4/11/2003	E V GARNER		2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310097	4	5.20	6.70	1.50	JARVIS RD	N	4/11/2003	E V GARNER		0	0	0	0	0	0	0	0	2	2	0	0	2	2
4310097	5	6.70	8.99	2.29	JARVIS RD	N	4/11/2003	E V GARNER		2	2	1	1	0	0	0	0	2	2	1	1	6	6
4310099	1	0.00	3.89	3.89	YORKRAKINE EAST RD	E	16/09/2004	TEAGAN LEONIE		2	2	0	0	0	0	2	2	2	2	0	0	6	6
4310122	1	0.00	1.60	1.60	COX RD	S	1/11/2003	SHARON PHIL	20	1	2	1	1	1	1	1	1	0	2	1	1	5	8
4310122	2	1.60	5.80	4.20	COX RD	S	1/11/2003	SHARON PHIL	20	2	2	1	1	0	0	1	1	1	1	1	1	6	6
4310122	3	5.80	7.20	1.40	COX RD	S	1/11/2003	SHARON PHIL	20	1	1	0	0	0	0	1	1	2	2	0	0	4	4
4310122	4	7.20	11.00	3.80	COX RD	S	1/11/2003	SHARON PHIL	20	2	2	1	1	1	1	1	1	2	2	2	2	9	9
4310122	5	11.00	12.70	1.70	COX RD	S	1/11/2003	SHARON PHIL	20	2	2	2	2	1	1	1	1	2	0	2	2	10	8
4310123	1	0.00	0.90	0.90	TYLER RD	N	1/10/2003	SHARON PHIL	20	2	2	2	2	1	1	2	2	0	0	2	2	9	9
4310123	2	0.90	2.50	1.60	TYLER RD	N	1/10/2003	SHARON PHIL	20	2	2	1	1	0	0	2	2	2	2	1	1	8	8
4310123	3	2.50	4.42	1.92	TYLER RD	N	1/10/2003	SHARON PHIL	20	2	2	1	1	1	1	2	2	0	0	2	2	8	8
4310125	1	0.00	1.95	1.95	LACKMAN RD	N	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310125	2	1.95	3.57	1.62	LACKMAN RD	N	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310125	3	3.57	5.77	2.20	LACKMAN RD	N	9/02/2004	JUSTIN	20	2	2	1	2	1	2	0	1	2	0	1	1	7	8
4310125	4	5.77	10.36	4.59	LACKMAN RD	N	9/02/2004	JUSTIN	20	2	2	1	1	1	1	0	0	2	2	0	0	6	6
4310125	5	10.36	11.66	1.30	LACKMAN RD	N	9/02/2004	JUSTIN	20	2	2	0	0	0	0	0	0	2	2	0	0	4	4
4310130	1	0.00	0.60	0.60	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	1	2	1	2	2	2	0	1	2	2	8	11
4310130	2	0.60	1.70	1.10	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	1	2	1	2	2	2	2	1	2	2	10	11
4310130	3	1.70	2.70	1.00	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	2	2	2	2	2	2	0	1	2	2	10	11
4310130	4	2.70	3.60	0.90	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	0	1	0	1	1	2	2	1	0	2	5	9
4310130	5	3.60	20.20	16.60	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	1	1	2	2	1	1	2	2	0	0	8	8
4310130	6	20.20	22.05	1.85	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	1	1	1	1	1	1	1	2	1	1	7	8
4310130	7	22.05	22.45	0.40	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		0	0	0	0	0	0	0	0	1	2	0	0	1	2

ROAD #	SECT#	FROM	TO	SECT LENGTH	ROAD NAME	DIR	DATE	OBSERVER	Road Reserve Width	Native Vegetation Structure		Extent of Vegetation		#Native Plant Spp		Value as Biological Corridor		Adjoining Landuse		Weeds		Conservation Value Score	
		(km)	(km)							(km)	(m)	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
4310130	8	22.45	24.05	1.60	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		1	1	0	0	0	0	1	1	2	2	0	0	4	4
4310130	9	24.05	24.45	0.40	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		2	2	2	2	2	2	2	2	0	0	2	2	10	10
4310130	10	24.45	25.52	1.07	WYALKATCHEM SOUTHERN CROSS RD	N	16/09/2004	TEAGAN LEONIE		1	1	0	0	0	0	1	0	2	2	0	0	4	3
4310131	1	0.00	0.93	0.93	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	1	1	0	0	0	0	0	2	2	0	0	4	3
4310131	2	0.93	2.03	1.10	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		0	0	0	0	0	0	0	0	2	2	0	0	2	2
4310131	3	2.03	4.73	2.70	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		2	2	1	1	1	1	0	0	2	1	0	0	6	5
4310131	4	4.73	5.03	0.30	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	1	2	2	0	0	0	0	2	2	0	0	5	5
4310131	5	5.03	7.43	2.40	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		2	2	1	1	1	0	0	0	2	2	0	0	6	5
4310131	6	7.43	8.23	0.80	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	0	0	0	0	0	0	0	1	1	0	0	2	1
4310131	7	8.23	11.33	3.10	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		2	1	1	0	0	0	0	0	1	2	2	2	6	5
4310131	8	11.33	22.53	11.20	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	1	1	1	1	1	0	1	2	2	0	0	5	6
4310131	9	22.53	23.93	1.40	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	1	0	1	0	0	0	0	2	2	0	0	3	4
4310131	10	23.93	29.23	5.30	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		2	2	1	1	1	1	0	2	2	2	0	0	6	8
4310131	11	29.23	30.33	1.10	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		1	1	0	0	0	0	0	0	2	2	0	0	3	3
4310131	12	30.33	31.23	0.90	CUNDERDIN WYALKATCHEM RD	N	12/05/2004	GARNERS		0	2	0	0	0	0	0	0	2	1	0	0	2	3
4310132	1	0.00	6.10	6.10	TAMMIN WYALKATCHEM RD	W	11/10/2003	SHARON PHIL	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310132	2	6.10	11.60	5.50	TAMMIN WYALKATCHEM RD	N	1/11/2003	SHARON PHIL	20	0	0	0	0	0	0	1	1	2	2	0	0	3	3
4310132	3	11.60	12.80	1.20	TAMMIN WYALKATCHEM RD	N	1/11/2003	SHARON PHIL	20	2	2	1	1	1	1	1	1	2	2	1	1	8	8
4310132	4	12.80	28.44	15.64	TAMMIN WYALKATCHEM RD	N	4/11/2003	E V GARNER		2	2	0	0	0	0	2	2	2	2	0	0	6	6
4310133	1	0.00	1.70	1.70	BENJABERRING STH RD	N	20/10/2003	JOY LEONIE	20	2	2	1	1	1	1	2	2	2	2	1	1	9	9
4310133	2	1.70	2.66	0.96	BENJABERRING STH RD	N	20/10/2004	JOY LEONIE		2	2	2	2	2	2	2	2	1	1	2	2	11	11

Appendix

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APPENDIX 3

Road names and lengths: Shire of Wyalkatchem (Source- Main Roads WA 2003)

Road #	Road Name	Road length (km)
4310019	ALLAN RD	6.63
4310012	AMERY-BENJABBERRING RD	5.13
4310126	AQUATIC ACCESS RD	0.52
4310056	BEGLEY RD	4.54
4310133	BENJABBERRING SOUTH RD	2.66
4310027	BENJABBERRING-HINDMARSH RD	15.69
4310044	BLAKISTANS RD	1.59
4310051	BOOKHAM RD	7.40
4310043	BORGWARD RD	3.79
4310068	BOYLE RD	3.53
4310092	BRENNANS RD	6.28
4310039	BROOKE RD	4.64
4310047	BRUSE RD	11.99
4310025	BUTLIN ST	0.19
4310070	BUTT RD	2.78
4310018	BYRNE RD	2.39
4310057	CARTER RD	4.23
4310029	CEMETERY RD	5.09
4310036	CHILMAN RD	6.22
4310065	CLIFFORD RD	6.43
4310061	COTTRELL RD	1.51
4310028	COWCOWING WEST RD	5.80
4310121	COWCOWING-SIDING RD	0.54
4310122	COX RD	12.70
4310131	CUNDERDIN-WYALKATCHEM RD	31.23
4310011	DAVIES RD	21.36
4310006	DAVIES SOUTH RD	13.25
4310072	DAWSON RD	1.54
4310100	DEPIERRES NORTH RD	2.30
4310022	DEPIERRES RD	13.32
4310095	DERDIBIN RD	1.70
4310001	DIVERS RD	6.09
4310048	ELASHGIN EAST WEST RD	10.00
4310005	ELASHGIN RD	14.94
4310003	ELSEGOOD RD	20.94
4310067	FARMER RD	5.33
4310093	FAULKER RD	3.94
4310084	FENWICK RD	1.61
4310114	FERRIES ST	0.21
4310086	FISHER RD	3.51
4310107	FLINT ST	0.91
4310059	FLOWERY PATCH RD	1.41
4310037	GAMBLE RD	2.74
4310104	GAMBLE ST	1.86
4310066	GAMBRELL RD	3.61
4310079	GANGELL RD	2.80
4310038	GARN RD	6.24
4310085	GNUCA-NALKAIN RD	8.25
4310015	GOLDFIELDS RD	16.95
4310109	GRACE ST	0.61
4310127	GRAIN ACCESS RD	0.30
4310023	GREAVES RD	3.44
4310035	HAMMOND RD	9.41
4310034	HARDWICK RD	7.52
4310033	HARRISON RD	8.95

4310031	HENNESSEY RD	2.10
4310082	HOBDEN RD	4.00
4310032	HODGSON RD	3.41
4310020	HOLDSWORTHS RD	17.49
4310129	HONOUR AVE	0.75
4310071	JACKSON RD	3.38
4310097	JARVIS RD	8.99
4310087	JENNINGS RD	3.85
4310108	JOHNSTON ST	0.78
4310016	KORRELOCKING NORTH RD	3.31
4310125	LACKMAN RD	11.66
4310017	LAWRENCE RD	5.90
4310041	LEWIS EAST WEST RD	3.53
4310013	LEWIS RD	7.11
4310116	LINDSAY ST	0.35
4310081	LYNCHS RD	0.31
4310075	MAITLAND RD	6.86
4310014	MARTIN RD	13.99
4310040	MCKAY RD	3.66
4310120	MCLEAN ST	0.12
4310009	MCNEE RD	18.77
4310049	MCPHERSON RD	2.17
4310089	METCALF RD	0.82
4310054	MINNIVALE NORTH EAST RD	6.73
4310053	MITCHELL RD	2.35
4310128	MITCHELL ST	0.23
4310064	MIZEN RD	3.03
4310088	NEMBUDDING BIN RD	1.53
4310008	NEMBUDDING SOUTH RD	19.64
4310101	NORTH WEST BOUNDARY RD	2.50
4310055	OLD NALKAIN RD	11.85
4310007	PARSONS RD	16.18
4310078	PETERS RD	1.54
4310110	PIESSE ST	0.87
4310050	PULFORD RD	1.84
4310103	RAILWAY TCE	0.73
4310042	REMNANT RD	4.31
4310069	RHIND RD	1.31
4310105	RICHES ST	0.49
4310076	RICHTER RD	1.69
4310021	RIFLE RANGE RD	6.86
4310026	ROSS RD	5.43
4310045	RYAN RD	6.54
4310115	SCOTT ST	0.17
4310060	SHIELLS RD	12.33
4310111	SLOCUM ST	0.93
4310077	SUTHERLAND RD	1.15
4310112	SWAN ST	0.73
4310132	TAMMIN-WYALKATCHEM RD	28.44
4310052	THIEL RD	3.99
4310113	THURSTUN ST	0.58
4310024	TILBROOK RD	9.10
4310119	TOWN ACCESS RD	0.18
4310058	TRENORDEN RD	1.63
4310046	TURNER RD	7.16
4310123	TYLER RD	4.42
4310010	WALLAMBIN RD	19.71
4310062	WEST LAKE RD	1.90
4310030	WHITE DAM RD	2.53
4310073	WILLIAMSON RD	4.13

4310063	WILSON RD	2.58
4310106	WILSON ST	0.73
4310002	WYALKATCHEM NORTH RD	25.45
4310130	WYALKATCHEM-SOUTHERN CROSS RD	25.52
4310099	YORKRAKINE EAST RD	3.89
4310004	YORKRAKINE WEST RD	11.13

Appendix

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APPENDIX 4

Flora species in the Shire of Wyalkatchem (Source- W.A Herbarium)

Note: not a comprehensive list.

* = Weed species

P = Priority species

R = Rare species

Acacia acanthoclada subsp. acanthoclada
Acacia acoma
Acacia acoma ms
Acacia acuaria
Acacia acuminata
Acacia acuminata subsp. acuminata ms
Acacia aestivalis
Acacia ancistrophylla var. ancistrophylla
Acacia ancistrophylla var. perarcuata P3
Acacia andrewsii
Acacia anthochaera
Acacia assimilis
Acacia beauverdiana
Acacia bidentata
Acacia brachyclada
Acacia brumalis
Acacia caesariata P1
Acacia campylophylla P2
Acacia chrysellia
Acacia coolgardiensis subsp. coolgardiensis
Acacia densiflora
Acacia dielsii
Acacia enervia subsp. explicata
Acacia eremophila var. eremophila
Acacia ericksoniae ms
Acacia erinacea
Acacia fragilis
Acacia graniticola ms
Acacia hemiteles
Acacia heteroneura var. jutsonii
Acacia heteroneura var. petila
Acacia inceana subsp. conformis P1
Acacia jacksonioides
Acacia jutsonii
Acacia lasiocalyx
Acacia lasiocarpa var. sedifolia
Acacia leptopetala
Acacia ligustrina
Acacia lineolata subsp. lineolata
Acacia longispinea
Acacia mackeyana
Acacia merinthophora
Acacia merrallii
Acacia microbotrya
Acacia multispicata
Acacia neurophylla subsp. erugata
Acacia nigripilosa subsp. nigripilosa ms
Acacia nyssophylla
Acacia orbifolia
Acacia prainii
Acacia pulchella var. pulchella
Acacia resinimarginea
Acacia rigens
Acacia saxatilis
Acacia scirpifolia
Acacia sclerophylla var. sclerophylla
Acacia sericocarpa
Acacia spinosissima
Acacia stereophylla var. stereophylla
Acacia torticarpa
Acacia tratmaniana
Acacia verrucula
Acacia yorkrakinensis subsp. ? acrita
Acacia yorkrakinensis subsp. acrita
Acacia yorkrakinensis subsp. yorkrakinensis
Actinotus superbus
Adenanthos argyreus
*Agave americana
Allocauarina acutivalvis
Allocauarina acutivalvis subsp. acutivalvis
Allocauarina campestris
Allocauarina corniculata
Alyxia buxifolia
Amphipogon strictus
Amphipogon turbinatus
Amyema gibberula var. tatei
Andersonia lehmanniana subsp. pubescens
Angianthus tomentosus
Anigozanthos humilis subsp. humilis
Aphelia brizula
*Arctotheca calendula
Aristida contorta
Astartea aff. heteranthera
Astartea heteranthera
Astroloma serratifolium
Atriplex bunburyana
Atriplex limbata
Atriplex semibaccata
Atriplex stipitata
Austrodanthonia caespitosa
Austrostipa elegantissima
Austrostipa hemipogon

Austrostipa platychaeta
 Austrostipa tenuifolia
 Austrostipa variabilis

 Baeckea crispiflora
 Baeckea cryptonoma ms
 Baeckea maidenii
 Baeckea muricata
 Baeckea recurva ms
 Baeckea sp.Bencubbin-Koorda(M.E.Trudgen 5421)
 Baeckea sp.Wubin(M.E.Trudgen 5404)
 Beaufortia bracteosa
 Beaufortia interstans
 Beaufortia micrantha
 Beaufortia micrantha var. puberula
 Billardiera bicolor
 Billardiera bicolor var. bicolor
 Billardiera coriacea
 Blennospora drummondii
 Blennospora phlegmatocarpa P2
 Boronia coerulescens subsp. spinescens
 Boronia crenulata
 Boronia fabianoides subsp. rosea ms
 Borya constricta
 Borya laciniata
 Borya sphaerocephala
 *Bromus diandrus
 *Bromus rubens
 Brunonia australis

 Caladenia incensa ms
 Caladenia x ericksoniae
 Callistemon phoeniceus
 Callitris canescens
 Calothamnus gilesii
 Calothamnus quadrifidus var. "unsorted"
 Calytrix breviseta subsp. stipulosa
 Calytrix glutinosa
 Calytrix leschenaultii
 Calytrix oldfieldii
 Calytrix sapphirina
 *Centaurea melitensis
 Cephalopterum drummondii
 Ceratogyne obionoides
 Chamaexeros fimbriata
 Chamelaucium brevifolium
 Chamelaucium drummondii subsp. hallii ms
 Chamelaucium halophilum ms
 Chamelaucium micranthum
 Cheilanthes sieberi subsp. sieberi
 Chorizema racemosum
 Chrysocephalum apiculatum
 Chrysocoryne drummondii
 Chthonocephalus pseudevax
 Comesperma drummondii

 Comesperma integerrimum
 Comesperma scoparium
 Conospermum brownii
 Conospermum canaliculatum subsp. canaliculatum
 Conospermum stoechadis subsp. stoechadis
 Conostephium preissii
 Conostylis aculeata subsp. bromelioides
 Conostylis prolifera
 Conostylis teretifolia subsp. teretifolia
 Convolvulus erubescens
 Coopernookia strophiolata
 Cotula cotuloides
 Cryptandra apetala var. anomala
 Cryptandra apetala var. apetala
 Cryptandra pungens
 Cryptandra wichurae
 Cyanicula gemmata ms
 Cyanostegia angustifolia
 Cyanostegia microphylla
 Cyphanthera odgersii subsp. occidentalis R
 Cyphanthera odgersii subsp. odgersii

 Dampiera eriocephala
 Dampiera juncea
 Dampiera lavandulacea
 Dampiera luteiflora
 Dampiera stenostachya
 Dampiera tomentosa
 Dampiera wellsiana
 Darwinia halophila ms
 Daviesia benthamii subsp. benthamii
 Daviesia hakeoides subsp. subnuda ms
 Daviesia nematophylla
 Daviesia nudiflora subsp. nudiflora
 Dianella revoluta var. divaricata
 Dichopogon capillipes
 Dicrastylis parvifolia
 Dicrastylis reticulata
 Dicrastylis velutina
 Didymanthus roei
 Diplachne fusca
 Diplolaena microcephala var. velutina
 Diplolaena velutina
 Dodonaea adenophora
 Dodonaea bursariifolia
 Dodonaea caespitosa
 Dodonaea inaequifolia
 Dodonaea larreoides
 Dodonaea stenozyga
 Dodonaea viscosa subsp. angustissima
 Drosera andersoniana
 Drosera glanduligera
 Drosera macrantha subsp. macrantha
 Drosera microphylla
 Dryandra sessilis

Dryandra sessilis var. sessilis
 Duboisia hopwoodii

 Ecdeiocolea monostachya
 *Echium plantagineum
 *Eragrostis cilianensis
 Eremaea beaufortoides
 Eremaea pauciflora
 Eremophila decipiens subsp. decipiens ms
 Eremophila drummondii
 Eremophila glabra subsp. albicans
 Eremophila lehmanniana
 Eremophila miniata
 Eremophila papillata ms
 Eremophila resinosa R
 Eremophila subfloccosa subsp. subfloccosa
 Eriachne ovata
 Eriochilus dilatatus subsp. undulatus ms
 Eriochiton sclerolaenoides
 Eriostemon deserti
 Eriostemon glaber
 Eriostemon tomentellus
 Erodium cygnorum
 Eucalyptus brachycorys
 Eucalyptus burracoppinensis
 Eucalyptus calycogona var. calycogona
 Eucalyptus capillosa subsp. capillosa
 Eucalyptus celastroides subsp. virella
 Eucalyptus crucis subsp. lanceolata
 Eucalyptus erythronema var. erythronema
 Eucalyptus flocktoniae
 Eucalyptus hypochlamydea subsp. ecdysiastes
 ms
 Eucalyptus hypochlamydea subsp.
 hypochlamydea ms
 Eucalyptus incrassata
 Eucalyptus kochii subsp. plenissima
 Eucalyptus leptopoda subsp. leptopoda
 Eucalyptus loxophleba subsp. lissophloia
 Eucalyptus obtusiflora
 Eucalyptus oldfieldii
 Eucalyptus rigidula
 Eucalyptus salicola
 Eucalyptus salmonophloia
 Eucalyptus sheathiana
 Eucalyptus stowardii
 Eucalyptus subangusta subsp. cerina
 Eucalyptus subangusta subsp. subangusta
 Eucalyptus vegrandis
 Eucalyptus yilgarnensis
 Exocarpos sparteus

 Fitzwillia axilliflora P2
 Furcraea selloa

 Gastrolobium bennettsianum

 Gastrolobium calycinum
 Gastrolobium parviflorum
 Gastrolobium spinosum var. triangulare
 Gastrolobium spinosum var. trilobum
 Gilberta tenuifolia
 Glischrocaryon aureum var. angustifolium
 Glischrocaryon aureum var. aureum
 Glischrocaryon flavescens
 Gnephosis tenuissima
 Gnephosis uniflora
 Gompholobium aff. obcordatum
 Gompholobium obcordatum
 Gonocarpus nodulosus
 Goodenia berardiana
 Goodenia caerulea
 Goodenia dyeri
 Goodenia helmsii
 Goodenia pinifolia
 Goodenia tripartita
 Grevillea acuaria
 Grevillea didymobotrya subsp. didymobotrya
 Grevillea eryngioides
 Grevillea excelsior
 Grevillea hakeoides subsp. hakeoides
 Grevillea hakeoides subsp. stenophylla
 Grevillea haplantha subsp. haplantha
 Grevillea haplantha subsp. recedens
 Grevillea hookeriana
 Grevillea huegelii
 Grevillea integrifolia
 Grevillea juncifolia subsp. temulenta
 Grevillea oligomera
 Grevillea paniculata
 Grevillea paradoxa
 Grevillea petrophiloides
 Grevillea polybotrya
 Grevillea pterosperma
 Grevillea shuttleworthiana subsp.
 shuttleworthiana
 Grevillea teretifolia
 Grevillea uncinulata subsp. uncinulata
 Grevillea yorkrakinensis
 Gunniopsis intermedia
 Gunniopsis quadrifida
 Gyrostemon racemiger

 *Hainardia cylindrica
 Hakea erecta
 Hakea invaginata
 Hakea kippistiana
 Hakea lissocarpha
 Hakea meisneriana
 Hakea minyma
 Hakea preissii
 Hakea recurva subsp. recurva
 Halgania anagalloides var. anagalloides ms

Halgania lavandulacea
 Halosarcia halocnemoides
 Halosarcia halocnemoides subsp. catenulata
 Halosarcia halocnemoides subsp. caudata
 Halosarcia halocnemoides subsp. halocnemoides
 Halosarcia indica subsp. bidens
 Halosarcia leptoclada subsp. inclusa
 Halosarcia lylei
 Halosarcia peltata
 Halosarcia pergranulata subsp. pergranulata
 Halosarcia syncarpa
 Harmsiodoxa brevipes var. brevipes
 Helichrysum leucopsidium
 Hemigenia dielsii
 Hemigenia westringioides
 Hemiphora elderi
 Hibbertia arcuata
 Hibbertia eatoniae
 Hibbertia enervia
 Hibbertia exasperata
 Hibbertia glomerosa
 Hibbertia polystachya
 Hibbertia rupicola
 Homalocalyx coarctatus
 Homalocalyx thryptomenoides
 Hornungia procumbens
 Hyalosperma cotula
 Hyalosperma zacchaeus
 Hybanthus floribundus subsp. floribundus
 Hypericum gramineum

 Isoetes caroli
 Isolepis congrua
 Isopogon scabriusculus subsp. scabriusculus ms
 Isopogon scabriusculus subsp. stenophyllus
 Isopogon scabriusculus subsp. stenophyllus ms
 Isotoma hypocrateriformis
 Isotropis drummondii

 Jacksonia fasciculata
 Jacksonia nematoclada
 *Juncus bufonius
 *Juncus capitatus
 Juncus radula

 Keraudrenia integrifolia
 Kippistia suaedifolia

 *Lactuca serriola
 Lawrencella rosea
 Laxmannia paleacea
 Lechenaultia biloba
 Lepidium genistoides P2
 Lepidosperma costale
 Lepidosperma tenue
 Lepidosperma tuberculatum

 Leptomeria preissiana
 Leptosema daviesioides
 Leptospermum erubescens
 Leptospermum nitens
 Leptospermum roei
 Leucopogon conostephioides
 Leucopogon hamulosus
 Leucopogon obtusatus
 Leucopogon woodsii
 *Linaria maroccana
 Lobelia winfridae
 Logania flaviflora
 Lycium australe
 Lysiana casuarinae
 Lysiosepalum rugosum

 Maireana amoena
 Maireana appressa
 Maireana carnosus
 Maireana diffusa
 Maireana georgei
 Maireana marginata
 Maireana oppositifolia
 Maireana trichoptera
 Maireana triptera
 Malleostemon roseus
 Malleostemon tuberculatus
 Mallophora globiflora
 Mallophora rugosifolia
 Marianthus erubescens
 Melaleuca acuminata subsp. acuminata ms
 Melaleuca acuminata subsp. websteri ms
 Melaleuca adnata
 Melaleuca aff. scabra
 Melaleuca ciliosa
 Melaleuca conothamnoides
 Melaleuca cordata
 Melaleuca coronicarpa
 Melaleuca eleuterostachya
 Melaleuca fulgens subsp. fulgens
 Melaleuca halmaturorum
 Melaleuca hamulosa
 Melaleuca holosericea
 Melaleuca lateriflora subsp. lateriflora ms
 Melaleuca laxiflora
 Melaleuca leptospermoides
 Melaleuca macronychia subsp. macronychia
 *Melaleuca nesophila
 Melaleuca oldfieldii
 *Melaleuca pentagona
 Melaleuca platycalyx
 Melaleuca radula
 Melaleuca seriata
 Melaleuca sp. Wongan Hills (R. Davis 1959)
 Melaleuca subtrigona
 Melaleuca thyoides

Melaleuca trichophylla
 Melaleuca uncinata
 Mesomelaena preissii
 Microcorys ericifolia
 Micromyrtus obovata
 Mirbelia ramulosa
 Mirbelia trichocalyx
 *Moraea flaccida (Homeria flaccida)

*Narcissus tazetta
 Nemcia obovata
 Nicotiana rosulata subsp. rosulata
 Nuysia floribunda

Olax benthamiana
 Olearia homolepis
 Olearia incondita
 Olearia muelleri
 Olearia propinqua
 Osteocarpum salsuginosum
 *Osteospermum clandestinum
 *Oxalis pes-caprae

Patersonia drummondii subsp. borealis ms
 Patersonia drummondii subsp. drummondii ms
 Persoonia coriacea
 Persoonia elliptica
 Persoonia quinquenervis
 Persoonia ruffiflora
 Persoonia saundersiana
 Persoonia striata
 Petrophile seminuda
 Petrophile wonganensis
 Phebalium ambiguum
 Phebalium canaliculatum
 Phebalium filifolium
 Phebalium megaphyllum ms
 Phebalium tuberculosum
 Phebalium tuberculosum subsp. megaphyllum
 Phlegmatospermum drummondii R
 Phyllangium sulcatum
 Physopsis viscida
 Pimelea aeruginosa
 Pimelea angustifolia
 Pimelea avonensis
 Pimelea brevistyla subsp. minor
 Pimelea imbricata var. piligera
 Pittosporum phylliraeoides
 Pittosporum phylliraeoides var. microcarpa
 Pityrodia dilatata
 Pityrodia halganiacea
 Pityrodia scabra R
 Pityrodia teckiana
 Pityrodia terminalis
 Podolepis canescens
 Podolepis capillaris

Podolepis lessonii
 Podolepis tepperi
 Podotheca angustifolia
 Podotheca gnaphalioides
 Pogonolepis muelleriana
 Pogonolepis stricta
 Prostanthera canaliculata
 Prostanthera eckersleyana
 Psammomoya choretroides
 Ptilotus carlsonii
 Ptilotus exaltatus var. exaltatus
 Ptilotus gaudichaudii var. gaudichaudii
 Ptilotus polystachyus var. polystachyus

Raphanus raphanistrum
 Rhagodia drummondii
 Rhagodia preissii subsp. preissii
 Rhodanthe citrina
 Rhodanthe haigii
 Rhodanthe heterantha
 Rhodanthe laevis
 Rhodanthe rubella
 Rhodanthe spicata
 Ricinocarpos velutinus
 Rulingia kempeana

Salsola kali
 Santalum acuminatum
 Santalum murrayanum
 Santalum spicatum
 Scaevola restiacea
 Scaevola restiacea subsp. restiacea
 Schoenia cassiniana
 Schoenus sculptus
 Schoenus sp. smooth culms (K.R. Newbey 7823)
 Scholtzia drummondii
 Sclerolaena diacantha
 Sclerolaena eurotioides
 Sclerostegia moniliformis
 Sclerostegia tenuis
 Senna pleurocarpa var. angustifolia
 *Sisymbrium irio
 *Sisymbrium orientale
 *Solanum hoplopetalum
 Solanum lasiophyllum
 Solanum nummularium
 *Solanum rostratum
 *Sonchus asper subsp. glaucescens
 *Sonchus oleraceus
 Spartochloa scirpoidea
 Stachystemon brachyphyllus
 Stellaria filiformis
 Stenanthemum pomaderroides
 Stenopetalum robustum
 Styliidium adpressum
 Styliidium breviscapum var. breviscapum

Stylidium dielsianum
Stylidium leptophyllum
Stylidium limbatum
Stylidium petiolare
Stylidium piliferum
Stylidium yilgarnense
Stylobasium australe
Swainsona colutoides
Synaphea interioris

Tecticornia verrucosa
Templetonia smithiana
Templetonia sulcata
Teucrium sessiliflorum
Thelymitra antennifera
Thelymitra sargentii
Thryptomene aspera subsp. Gabbin(S.B.Rosier
368) P1
Thryptomene kochii
Thysanotus dichotomus
Thysanotus sparteus
Trachymene cyanopetala
Trachymene ornata
Trichanthodium skirrophorum
Triglochin sp.A Perth Flora(A.S.George 4100)
Triodia longipalea
Trymalium angustifolium
Trymalium daphnifolium

Urodon capitatus
Urodon dasyphyllus

Velleia discophora
Verticordia acerosa var. preissii
Verticordia brachypoda
Verticordia chrysantha
Verticordia chrysanthella
Verticordia eriocephala
Verticordia mitchelliana
Verticordia picta
Verticordia pritzelii
Verticordia serrata var. ciliata
Verticordia tumida subsp. tumida
Vittadinia gracilis

Waitzia acuminata var. acuminata
Waitzia nitida
Waitzia suaveolens var. suaveolens
Westringia discipulorum
Westringia rigida
Wilsonia humilis

Xylomelum angustifolium

Zygophyllum ovatum
Zygophyllum simile

Appendix

5

APPENDIX 5

Fauna species in the Shire of Wyalkatchem (Source- W.A Museum, 2005)

Information provided by Western Australian Museum, Fauna Base, latitude/longitude coordinates -30.4500, 116.4333 and -31.000, 117.2333.

Note- not a comprehensive list.

* represents an introduced species.

BIRD SPECIES

Acanthizidae

Acanthiza uropygialis
Pyrrholaemus brunneus
Smicrornis brevirostris

Cracticidae

Cracticus nigrogularis

Cuculidae

Cuculus pallidus

Falconidae

Falco peregrinus

Maluridae

Malurus pulcherrimus

Megapodiidae

Leipoa ocellata

Meliphagidae

Acanthagenys rufogularis
Lichenostomus virescens
Melithreptus brevirostris leucogenys

Pachycephalidae

Oreoica gutturalis

Pardalotidae

Pardalotus punctatus punctatus
Pardalotus striatus

Petroicidae

Drymodes brunneopygia

Pomatostomidae

Pomatostomus superciliosus

Psittacidae

Cacatua roseicapilla assimilis
Glossopsitta porphyrocephala
Neophema elegans
Platycercus zonarius
Platycercus zonarius zonarius
Polytelis anthopeplus anthopeplus

Strigidae

Ninox novaeseelandiae

Turnicidae

Turnix varia varia

Tytonidae

Tyto alba

Tyto alba delicatula

MAMMAL SPECIES

Burramyidae

Cercartetus concinnus

Dasyuridae

Sminthopsis crassicaudata

Sminthopsis dolichura

Sminthopsis gilberti

Sminthopsis murina

Leporidae

**Oryctolagus cuniculus*

Macropodidae

Macropus fuliginosus

Macropus robustus erubescens

Macropus sp

Muridae

**Mus musculus*

Notomys mitchellii

Peramelidae

Isoodon obesulus fusciventer

Vespertilionidae

Chalinolobus gouldii

REPTILE SPECIES

Agamidae

Ctenophorus cristatus

Ctenophorus maculatus griseus

Ctenophorus ornatus

Ctenophorus reticulatus

Moloch horridus

Pogona minor minor

Boidae

Aspidites ramsayi

Elapidae

Brachyuropsis semifasciata

Parasuta gouldii

Pseudonaja modesta

Pseudonaja nuchalis

Simoselaps bertholdi

Gekkonidae

Crenadactylus ocellatus

Crenadactylus ocellatus ocellatus

Diplodactylus granariensis granariensis

Diplodactylus maini

Diplodactylus pulcher

Gehyra variegata
Oedura reticulata
Underwoodisaurus milii

Pygopodidae

Delma fraseri fraseri
Lialis burtonis
Pygopus lepidopodus
Pygopus nigriceps

Scincidae

Cryptoblepharus plagiocephalus
Ctenotus pantherinus pantherinus
Ctenotus schomburgkii
Egernia depressa
Egernia stokesii badia
Lerista distinguenda
Lerista macropisthopus macropisthopus
Lerista muelleri
Menetia greyii
Morethia obscura
Tiliqua occipitalis
Tiliqua rugosa rugosa

Typhlopidae

Ramphotyphlops waitii

AMPHIBIA SPECIES

Myobatrachidae

Crinia pseudinsignifera
Crinia sp
Heleioporus albopunctatus
Heleioporus psammophilus
Myobatrachus gouldii
Neobatrachus kunapalari
Neobatrachus pelobatoides
Neobatrachus sp
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 cannot 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 roadside in areas where the vegetation is close to the road, where vehicles cannot 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:

- 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

Part16 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.