

Roadside Vegetation and Conservation Values: Shire of Nannup



Rare and Priority Flora such as the Scott River jug flower, pictured above, can be found along roadsides in the Shire of Nannup.

Photography by S. D. Hopper. Photo used with the permission of the WA Herbarium, CALM (<http://florabase.calm.wa.gov.au/help/photos#reuse>).

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Roadside Conservation Committee



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Executive Summary

This report provides an overview of roadside conservation issues relevant to the Shire of Nannup. Primarily providing detailed results of the roadside survey, with accompanying management recommendations, it also briefly describes the natural environment in the Nannup area.

Aware of the need to conserve roadside remnants, the Shire of Nannup and community volunteers, liaised with the Roadside Conservation Committee (RCC) between 2000-2003 to survey roadside vegetation in the Shire. Surveys to assess the conservation values of roadside remnants were conducted from October 2001, May and June 2002 and May, October and November 2003. The enthusiastic efforts of the surveyors; Merryn Delaney, Gwen Goodred and Julia Boniface, ensured that this project was successfully completed.

The majority (553.6 km) of Nannup's roads were assessed by the RCC for their roadside conservation status and maps produced via a Geographic Information System (GIS). The survey indicated that high conservation value roadsides covered approximately 77.1% of the roadsides surveyed, with medium-high conservation value roadsides accounting for 9.8%. Medium-low and low conservation value roadsides covered 2.9% and 10.3% of the total surveyed, respectively. A more detailed analysis of results is presented in this report.

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

- identifying degraded areas for strategic rehabilitation or in need of specific management techniques and weed control programs;
- prioritising roadside vegetation protection and/or rehabilitation programs;
- establishing habitat linkages throughout the Shire's overall conservation network;
- developing regional or district fire management plans;
- identifying potential tourist routes, i.e. roads with high conservation value would provide visitors with an insight into the remnant vegetation of the district; and
- incorporating into Landcare, Natural Resource Management (NRM) 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 Nannup to utilise the RCV map into many facets of its Landcare, tourism, road maintenance operations and 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.



The Western Brush Wallaby (*Macropus irma*) has been recorded in the Shire of Nannup

Photo by Babs and Bert Wells courtesy of CALM

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.



High conservation value roadsides form significant tracts of remnant vegetation.

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

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

Amendments to the *Environmental Protection Act* 1986 have put in place a permit application process designed to assess vegetation clearing based upon a number of clearing principles which ensure ecological, conservation and land degradation issues are considered. Under the Act clearing native vegetation requires a permit unless it is for exempt purposes. 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 the:

- 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/District 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.



The impact of a fire 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 105 weed species in the Shire of Nannup, see Appendix 4.

In recent times, the Shire of Nannup has been proactive in identifying and managing weeds throughout the Shire. Funds received from the Natural Heritage Trust allowed for a number of part-time coordinators to be employed in various parts of the Blackwood area, including a weed coordinator in the Shire of Nannup. Throughout 2001-2003, the Shire of Nannup, with assistance from the Blackwood Basin Group (BBG) retained a Weed Action Coordinator. This person ultimately developed the *Nannup Shire Reserves Weed Control and Management Plan (2003)*. Detailed weed information was collected in nine reserves, via on-ground mapping. This included several roadside reserves that had been used as gravel pits or for uses other than conservation.

The weed action coordinator in Nannup also coordinated a biological control program for Bridal Creeper. Rust fungus and bridal creeper leafhoppers were given to volunteers, who were shown how to release and spread the agents. They could then take responsibility for a small stretch of the river or a roadside, and continue spreading and monitoring the biocontrol agents.

The *Blackwood Weed Strategy* (March 2003) was developed from the work done by the BBG weed coordinators over a two-year period. It outlined a number of strategies to continue the work of the weed coordinators, with these intended to be implemented by the community, Local Government and State Government Agencies.

Throughout the roadside survey, six types of weeds were recorded, and their locations mapped by the RCC onto clear overlays.



Roadside infestation of bridal creeper
Photo by K. Jackson

The six nominated weed types surveyed throughout the survey were:

- Cape weed;
- Wild radish,
- Bridal creeper,
- Grass weeds,
- Bulbs; and
- Weed wattles

Further information on the presence of the six nominated weed types is presented in Part C of this report. Roadside populations of these weeds can be observed on the weed overlays provided with the Nannup Roadside Conservation Value map (2004). The Roadside Conservation Value map and weed overlays will assist the Shire and community in coordinating strategic weed control projects, with the highest priority to protect and preserve the high conservation value roadsides, working towards rehabilitating those with a lower conservation value.



Weedy wattles such as *Acacia decurrens* are invasive roadside weeds.

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



Grassy weeds often invade degraded roadsides.

Photo by K. Jackson

2.5 *Phytophthora* Dieback

The *Phytophthora* species dieback is made up of several types of introduced fungi. About one third of native plants in Western Australia's south-west are susceptible, including species of Banksia, Hakea, Eucalyptus, Melaleuca, Verticordia, Acacia and Grevillea. The Shire of Nannup is a known *Phytophthora* dieback risk area as it has an annual rainfall of more than 800 mm.

The *Phytophthora* fungus infects the roots and inhibits the uptake of water and nutrients, eventually causing death. It is more widespread and severe in the higher rainfall zone, waterlogged sites and multiple use forested areas.

Phytophthora spreads by the movement of spores in water, or by the spread of infected soil. The spores can be introduced to uninfected areas by human activities, particularly through the soil carried on vehicle tyres or footwear. Daily activities, such as routine maintenance or construction, have the potential to spread *Phytophthora* fungi. Currently, there is no practical method of eradicating *Phytophthora* once it is established in an area.

The Dieback Working Group published a booklet titled *Managing Phytophthora Dieback in Bushland: A guide for Landholders and Community Conservation Groups* (2000), that provides detailed information on minimising the risk of introducing or spreading *Phytophthora*.



Impact of *Phytophthora* Dieback
Photo Dieback Working Group

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

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

This assessment process is designed to provide a more comprehensive and stringent land clearing control system. There are two land clearing permits available, an area permit and a purpose permit. Where clearing

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

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

4.0 Special Environment Areas

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

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

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

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

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



Roadside SEA markers are highly visible.

Photo by K. Jackson

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

5.0 Flora Roads

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

Although presently there are no Flora Roads designated within the Shire of Nannup, 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. This has the dual effect of drawing the attention of tourists to the high conservation value roadside and also alerting all that work in the roadside environment that the marked section of roadside requires due care to protect the values present.



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

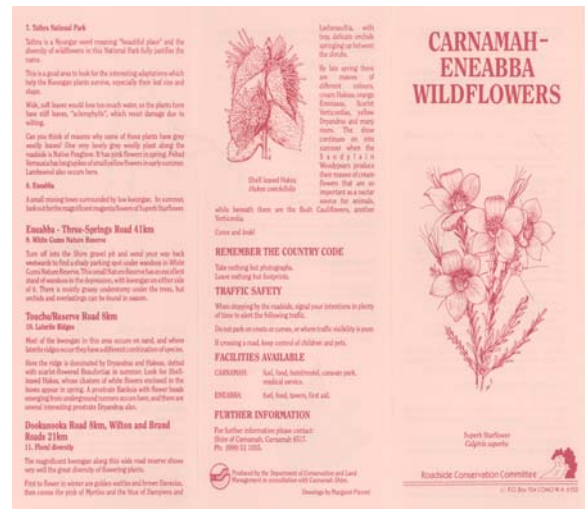
Photo by CALM

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

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

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

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



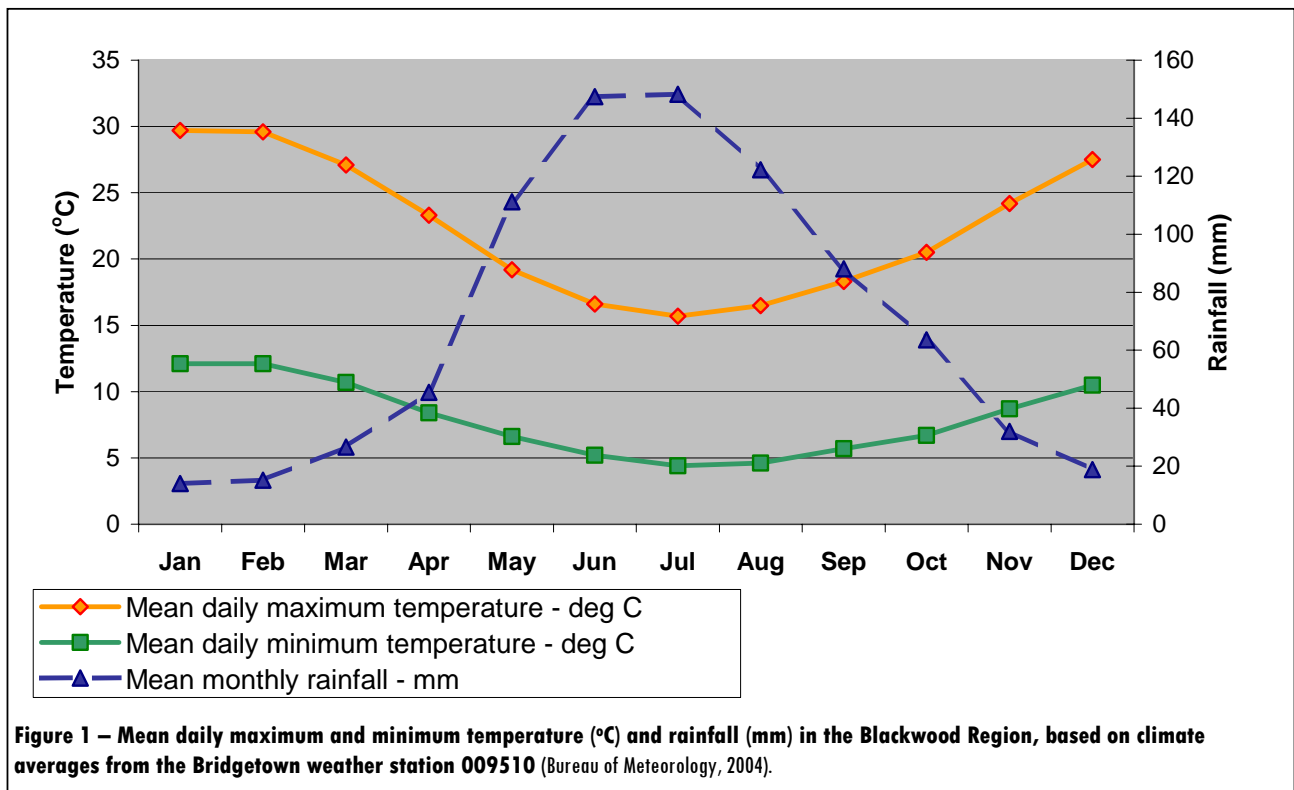
PART B

The Natural Environment in Nannup

1.0 Introduction

The Shire of Nannup is located 288 km south of Perth in Western Australia's south west region. The Nannup town site is located on the Vasse Highway approximately halfway between Busselton and Pemberton. The Shire covers an area of 2,953 square kms and supports a population of approximately 1,187 people.

The area experiences a Mediterranean climate with an average annual rainfall of 832.7 mm. Seasonal temperatures are characterised by warm summers, with maxima averaging from the high twenties, and mild winters, with maxima in the mid teens. Mean daily maximum and minimum temperatures and rainfall statistics are shown below.



Typical of the region, the main industries are timber, agriculture (beef in particular), horticulture, viticulture, aquaculture and small business including woodworking, arts, crafts and floriculture. Tourism plays an important role with the area's spectacular natural resources being a major attraction.

Salient features of the area include the Blackwood River, Nannup heritage townsite, local arts and crafts, and Tulip Farm. The Blackwood River runs through the district and provided camping, fishing and recreational opportunities. Scenic drives, bushwalks, canoeing and fishing are major drawcards for tourists. Other main attractions are the superb Balingup Road Drive, the south coast area and the numerous National Parks.

2.0 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.

Based on WA Herbarium records, over 1,100 species of plants have been recorded from the Shire of Nannup. These include 47 species of *Acacia*, 28 species of *Hibbertia*, 37 *Stylidium* (trigger plant) species, 13 species of *Melaleuca* and 22 species of *Leucopogon*. The complete list of recorded flora can be seen in Appendix 4 of this report.



Pink fountain triggerplant (*Stylidium brunonianum*)

Photography by B. Fuhrer and M Hislop. Photo used with the permission of the WA Herbarium, CALM (<http://florabase.calm.wa.gov.au/help/photos#reuse>).

3.0 Declared Rare Flora (DRF)

Declared Rare Flora (DRF) refers to species, or populations of native plants that are of great significance and should 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 marked out by yellow stakes with an identification plate welded on.

It is the responsibility of the road manager to ensure these markers are installed, and guides for this are outlined in 'Guidelines for Managing SEA's in transport corridors', available from the Roadside Conservation Committee. A DRF sites register needs to be established in the Shire of Nannup (if this had not yet been done) and sites checked for the presence of appropriate markers. These locations should be made known to all involved in the management, planning and carrying out of works within the roadside environment.

For more information regarding DRF it is advisable to contact the Flora or Nature Conservation Officer for the CALM Blackwood District on (08) 9752 5555. If roadworks are to be carried out near DRF sites, or the yellow stakes have been disturbed, it is advisable to contact CALM at least several weeks in advance.

As of January 2005, CALM records indicated that 19 populations of rare and priority flora occur on roadsides in the Shire of Nannup, with 12 of these sites vested in the Shire. These included the following species:

- *Thysanotus formosus*;
- *Grevillea drummondii*;
- *Pultenaea skinneri*;
- *Stylidium barleei*;
- *Adenanthos detmoldii*;
- *Chordifex jacksonii*;
- *Meziella trifida*;
- *Caladenia harringtoniae*;
- *Banksia meisneri* subsp. *ascendens*.
- *Isopogon formosus* subsp. *dasylepis*;



Isopogon formosus subsp. *dasylepis*

Photos: J.A. Cochrane & J. Stevens

4.0 Fauna

The Western Australian Museum records 290 species of native fauna from the Nannup 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, rather than a comprehensive list. Of the native fauna species recorded in the Nannup area, there were 130 bird, 19 amphibia, 40 fish, 49 mammal and 52 reptile species.

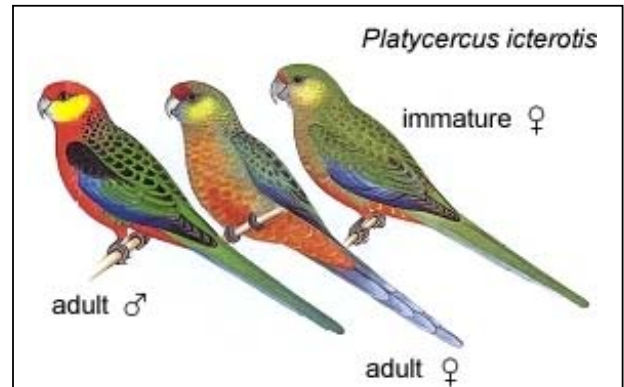
A number of the fauna species recorded from Nannup are classified as endemic to the southwest region of Western Australia, or even smaller regions within the southwest. For example, the Western Rosella (*Platycercus icterotis*) is endemic to WA and is distributed only throughout south western forests and woodlands, including those in the Shire of Nannup.

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". Threatened and priority fauna observed in the Shire of Nannup, based on distributional information from the Department of Conservation and Land Management (CALM), indicated that 13 species have been recorded or sighted throughout the Shire. These include:

- Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*)
- Chuditch (*Dasyurus geoffroi*)
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*)
- Malleefowl (*Leipoa ocellate*)
- Quenda (*Isoodon obesulus fusciventer*)

***Isopogon formosus* subsp. *dasylepis* occurs in a roadside in the Shire of Nannup.**

Photography by J. A. Cochrane & J. Stevens. Photo used with the permission of the WA Herbarium, CALM <http://florabase.calm.wa.gov.au/help/photos#reuse>).



The Western Rosella is endemic to the south west forest and woodlands of WA.

Photo by Martin Thompson, photo used with permission of the WA Museum, Faunabase <http://www.museum.wa.gov.au/faunabase/prod/index.htm>

- Quokka (*Setonix brachyurus*)
- Southern Brush-tailed Phascogale (*Phascogale tapoatafa tapoatafa*)
- Western Brush Wallaby (*Macropus irma*)
- Western False Pipistrelle (*Falsistrellus mackenziei*)
- Western Ringtail Possum (*Pseudocheirus occidentalis*)
- Woylie (*Bettongia penicillata ogilbyi*)

Note - records from CALM's Threatened and Priority Fauna Database are not an accurate representation of the species present in the Shire, but simply those for which there are records for in the database.



Baudin's Black Cockatoo
Photo by B & B Wells Courtesy of CALM



Quenda
Photo by C Freeguard Courtesy of CALM



Red-tailed Black Cockatoo
Photo by B & B Wells Courtesy of CALM

5.0 Remnant Vegetation Cover

The Shire of Nannup retains 94% of its original native vegetation, and these are located in a variety of tenures, from nature and crown reserves to privately owned bushland. These remaining remnants may vary in condition (some may be in a degraded state), and therefore these levels may be depleted if proactive measures are not taken to manage this priceless resource. A comparison of remnant vegetation remaining in Nannup and surrounding Shires can be seen in Table 1.

Shire	Total area (ha)	Vegetation Cover Remaining (%)
Augusta-Margaret River	222,718	71.7%
Bridgetown-Greenbushes	135,387	67.9%
Busselton	145,966	44.5
Donnybrook-Balingup	155,143	72.0%
Manjimup	705,670	83.9%
Nannup	293,198	94.0%

Table 1. Remnant vegetation remaining in the Shire of Nannup and surrounding Shires (Shepherd, Beeston and Hopkins, 2001).

Flora and fauna living in these areas require connectivity throughout the landscape to find nesting sites, food, shelter and to breed. As a consequence, the presence of native vegetation in transport corridors is of vital importance to the survival of our native flora and fauna.

The 21 broad vegetation associations known from the Shire of Nannup, described in Table 2, provide an indication of the assemblages of native vegetation present prior to European settlement. It should be noted that these assemblages are indicative of the Shire per se and not specifically representative of roadside remnants.

National Objectives and Targets for Biodiversity Conservation 2001-2005 (Environment Australia, 2001) stated that vegetation associations represented by less than 30% remnant vegetation cover are considered ecologically endangered and in need of protection and restoration wherever they are located.

Table 2 shows that there are two vegetation associations below the 30% target of vegetation coverage in the Shire of Nannup, these being # 965- Medium woodland Jarrah and Marri (4.7%) and



High conservation value roadsides form significant tracts of remnant vegetation.

Photo by S. Smith

#999- Medium woodland Marri (11.8%). National targets for biodiversity conservation (2001-2005) state the need to have protection measures in place for those vegetation associations that are below 30%. Vegetation associations with less than 10% are considered endangered whilst those between 10-30% are considered vulnerable and those between 30-50% are considered depleted (of the pre 1750 extent).

Beard's Vegetation Association #	Description of Vegetation Association	% Remaining
1	Tall forest; karri (<i>Eucalyptus diversicolor</i>)	66.2
3	Medium forest; jarrah-marri	72.1
22	Low woodland; <i>Agonis flexuosa</i>	65.8
23	Low woodland; jarrah-banksia	67.2
27	Low woodland; paperbark (<i>Melaleuca</i> sp.)	66.1
37	Shrublands; tea-tree thicket	55.9
51	Sedgeland; reed swamps, occasionally with heath	51.7
949	Low woodland; banksia	82.6
965	Medium woodland; jarrah & marri	4.7
975	Low woodland; jarrah	76.3
990	Low forest; peppermint (<i>Agonis flexuosa</i>)	60.8
999	Medium woodland; marri	11.8
1002	Medium open woodland; jarrah	95.3
1108	Shrublands; <i>Acacia decipiens</i>	66.6
1109	Shrublands; peppermint scrub, <i>Agonis flexuosa</i>	69.7
1112	Mosaic; Tall forest, karri/Tall forest; jarrah & marri	79.0
1134	Medium woodland; jarrah (south coast)	83.1
1144	Tall forest; karri & marri (<i>Corymbus calophylla</i>)	69.7
1157	Tall forest; jarrah & marri	81.5
1183	Medium woodland; <i>Eucalyptus rudis</i> & Blackbutt with some Bullich, Jarrah & Marri (fringing Blackwood River)	88.0
1184	Medium woodland – fringing; jarrah, marri, <i>Eucalyptus rudis</i> & <i>Agonis flexuosa</i>	51.7

Table 2. Vegetation association's occurring in the Shire of Nannup, and the percentage of their original extent remaining throughout WA (Shepherd, Beeston and Hopkins, 2001).



Only 11.8% of medium Marri woodlands remain throughout the state.
 Photography by S. D. Hopper. Photo used with the permission of the WA Herbarium, CALM
 (<http://florabase.calm.wa.gov.au/help/photos#reuse>).

PART C

ROADSIDE

SURVEYS IN THE

SHIRE OF NANNUP

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 (553.6 km) of the Shire of Nannup's roadsides were assessed for their conservation status and mapped. Fieldwork was carried out throughout October 2001, May and June in 2002 and May, October and November in 2003. The enthusiastic efforts of the surveyors, Merryn Delaney, Gwen Goodred and Julia Boniface, and the support provided by Council and Shire staff ensured that this project was successfully completed.

1.1 Methods

The methods to assess and calculate the conservation value of the roadside reserves are described in the RCC publication *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.

Ideally, the survey is undertaken by a group of local volunteers, who, aided by their knowledge of the area, are able to provide an accurate and cost effective method of data collection. Community participation also ensures a sense of ownership of the end product, which increases the likelihood of its acceptance and use by the local community and road managers (Lamont and Blyth, 1995).

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

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

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

<u>Conservation Value Score</u>	<u>Conservation Status</u>	<u>Colour Code</u>
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;
- presence of 6 nominated weed types;
- fauna observed;
- general comments.

It is felt that the recording of these attributes will provide a community database that would provide information useful in many spheres, such as local government and community interest groups.

1.2 Mapping Conservation Values

The RCC produced a computer-generated map (using a Geographic Information System, or GIS), at a scale of 1:100,000 of the Shire of Nannup. 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 Nannup. 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

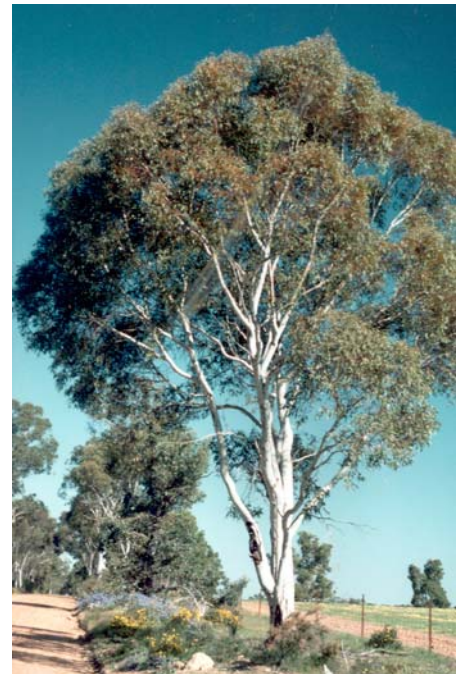
1.3.1 High conservation value

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.

Right: This high conservation value roadside contains relatively intact, diverse remnant vegetation and important habitat trees.

Photo B.M. Hussey



1.3.2 Medium-high conservation value

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, and
- medium to high value as a biological corridor.



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

Photo RCC.

1.3.3 Medium-low conservation value

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, and
- medium to low value as a biological corridor.



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

Photo by RCC

1.3.4 Low conservation value

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, and
- low value as a biological corridor.



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

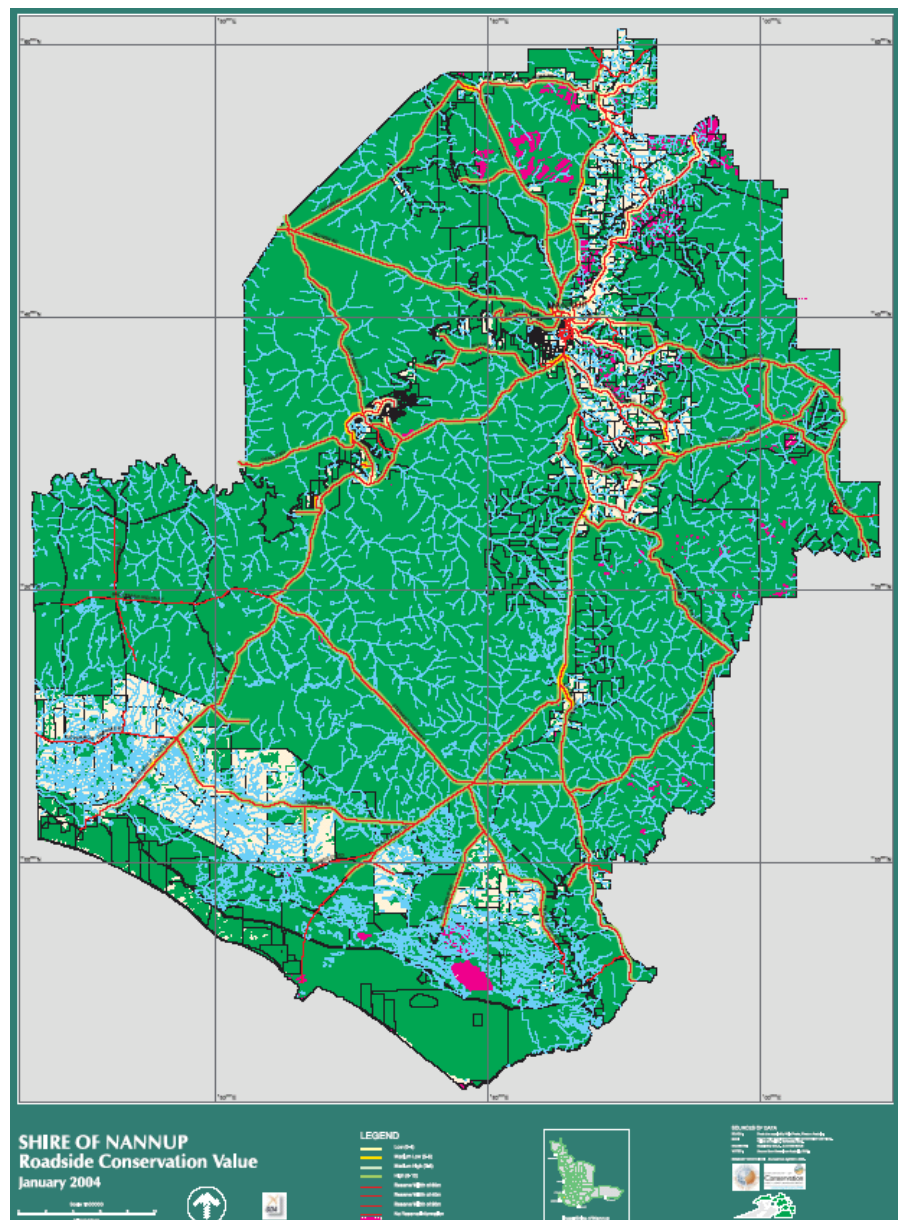
Photo by K. Jackson

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 Roadside Conservation Value (RCV) map depicts roadside conservation values in the Shire of Nannup.

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 conservation values in the Shire of Nannup are 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.

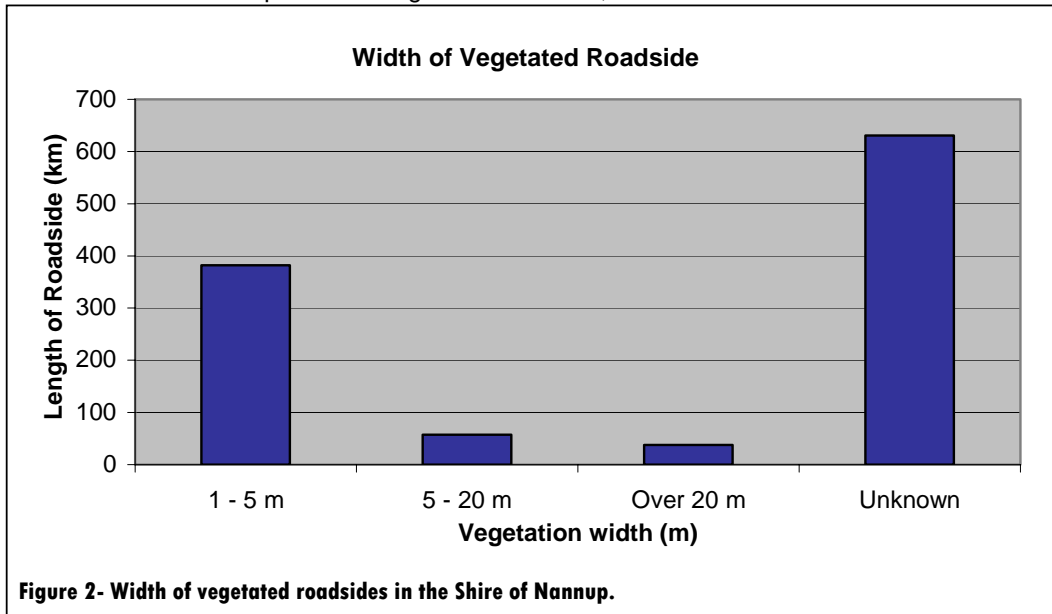
Summary Roadside Information: Shire of Nannup					
Length of roadsides surveyed: 1107.1 km					
<u>Roadside Conservation Status</u>			<u>Native Vegetation on Roadside</u>		
	Total (km)	(%)		Total (km)	(%)
Low	113.6	10.3	0 vegetation layers	54.0	4.9
Medium-low	31.9	2.9	1 vegetation layer	65.2	5.9
Medium-high	108.5	9.8	2-3 vegetation layers	988.0	89.2
High	853.1	77.1			
Total	1107.1	100.1	Total	1107.1	100.0
<u>Roadside Conservation Values</u>			<u>Extent of Native Vegetation</u>		
	Total (km)	(%)		Total (km)	(%)
0	0.0	0.0	<20%, Low	132.2	11.9
1	29.5	2.7	20-80%, Medium	130.9	11.8
2	28.4	2.6	>80%, Good	844.0	76.2
3	17.9	1.6	Total	1107.1	99.9
4	37.9	3.4			
5	18.6	1.7	<u>Number of Native Plant Species</u>		
6	13.3	1.2		Total (km)	(%)
7	32.7	3.0	0 - 5 native species	120.0	10.8
8	75.8	6.8	6 - 19 native species	133.7	12.1
9	101.2	9.1	Over 20 native species	853.4	77.1
10	714.2	64.5	Total	1107.1	100.0
11	37.7	3.4			
12	0.0	0.0	<u>Weed Infestation</u>		
Total	1107.1	100.0		Total (km)	(%)
<u>Adjoining landuse</u>			Heavy	128.1	11.6
	Total (km)	(%)	Medium	91.0	8.2
Cleared	15.7	1.4	Light	888.0	80.2
Industrial/urban	1.9	0.2	Total	1107.1	100.0
Plantation	55.2	5.0	<u>Value as a Biological Corridor</u>		
Scattered	199.8	18.1		Total (km)	(%)
Uncleared	833.5	75.3	Low	79.7	7.2
Other	0.9	0.1	Medium	164.6	14.9
Total	1107.1	100.1	High	862.9	77.9
			Total	1107.1	100.0

Roadside surveys were conducted in the Nannup Shire throughout 2001, 2002 & 2003

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

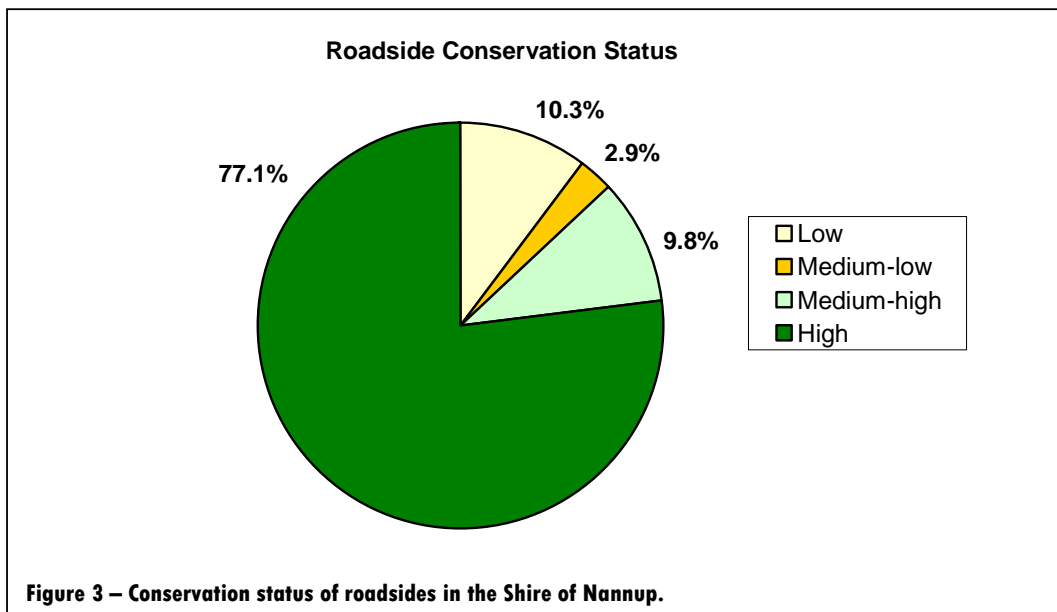
Width of Vegetated Roadside

The 'width of vegetated roadside' value provided an insight into the amount of vegetation occurring within roadsides in the Shire of Nannup. The surveyor selected one of four width categories, 1-5 metres, 5-20 metres, over 20 metres or unknown, to record the 'width of vegetated roadside'. Roadsides where the vegetation width was between 1-5m covered 382km, or 34.5% of the roads surveyed. 57km, or 5.1% of roadsides supported vegetation between 5-20m in width, and 37.2km, or 3.4% of roadsides contained native vegetation greater than 20m in width. The width of vegetation was unknown for 630.9 km or 57%, which is common when a road passes through unfenced land, such as Nature reserves and State Forest.



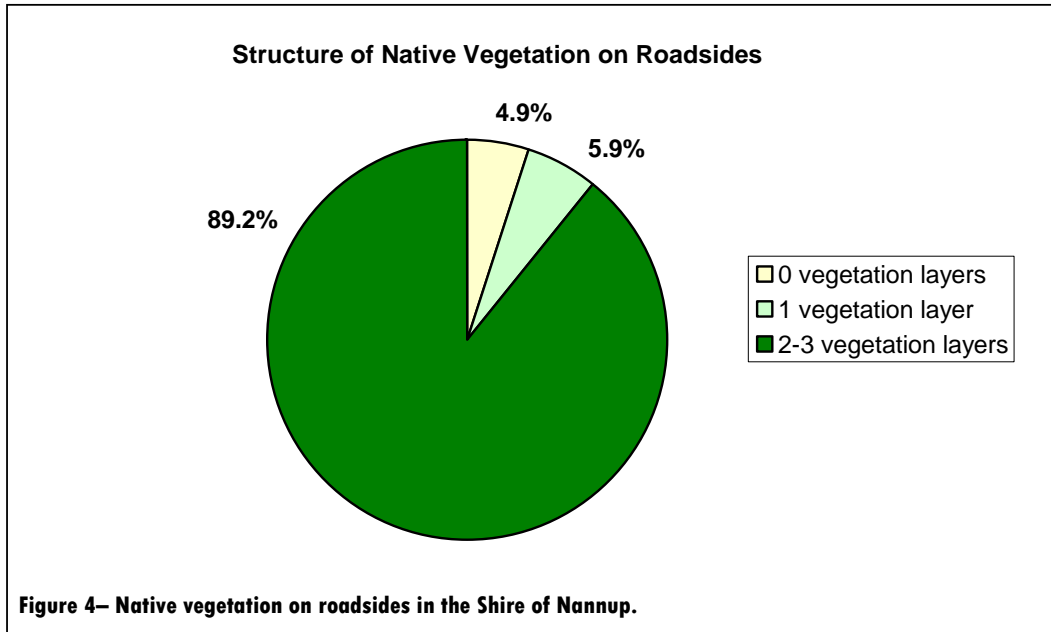
Roadside Conservation Status

Roadside sections of high conservation value covered 77.1% of the length of roadsides surveyed (853.1 km). Medium-high conservation value roadsides accounted for 9.8% of the total surveyed (108.5 km), medium-low conservation roadside covered 2.9% of the total surveyed (31.9 km). Areas of low conservation value occupied 10.3% of the roadsides surveyed (113.6 km), Table 3, Figure 3.



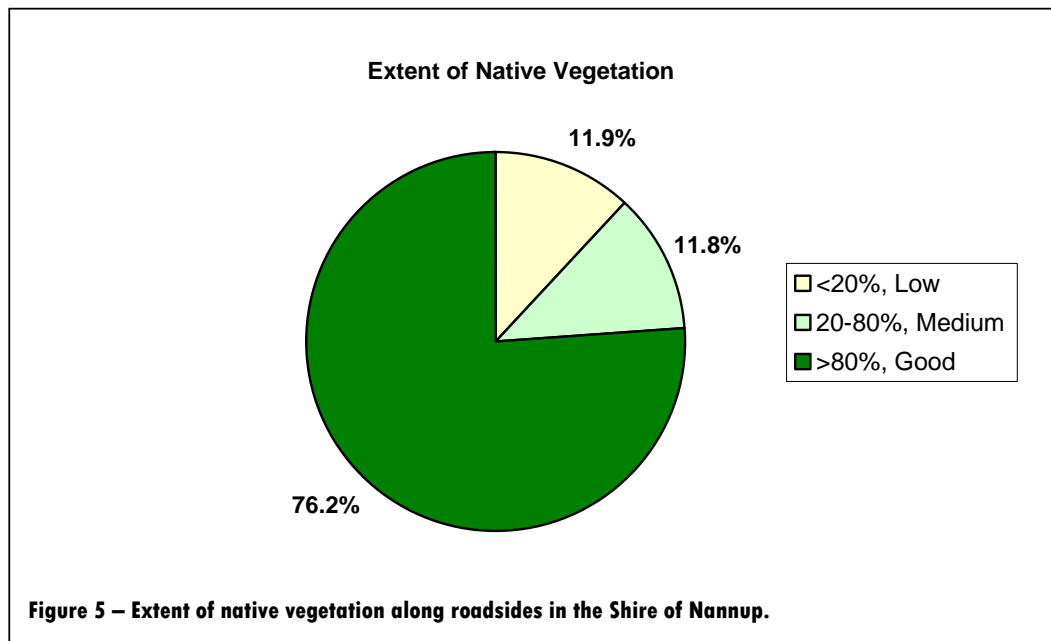
Structure of Native Vegetation

The number of native vegetation layers present, either the tree, shrub or ground layers determines the 'native vegetation on roadside' value. Sections with two to three layers of native vegetation covered 89.2% of the roadside (988.0 km). 5.9% had only one layer (65.2 km) and 4.9% had no layers of native vegetation (54.0 km), Table 3, Figure 4.



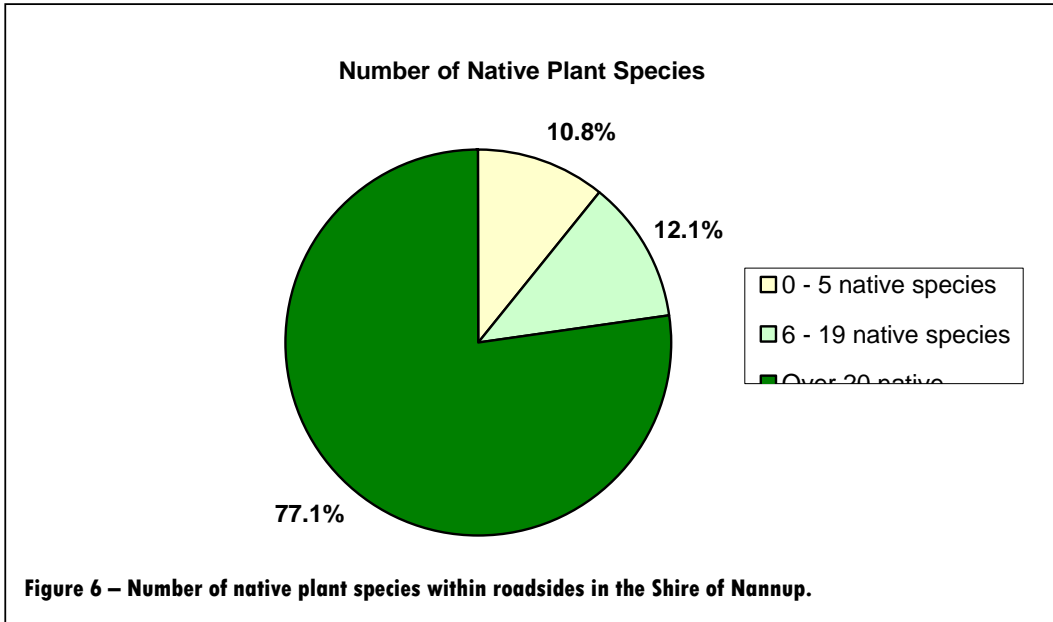
Extent of Native Vegetation.

Roadside vegetation with extensive cover, i.e. greater than 80%, occurred along 76.2% of the roadsides surveyed (844.0 km). Survey sections with 20% to 80% vegetation cover accounted for 11.8% of the roadsides (130.9 km). The remaining 11.9% had less than 20% native vegetation (132.2 km), and therefore, a low 'extent of native vegetation' value, see Table 3, Figure 5.



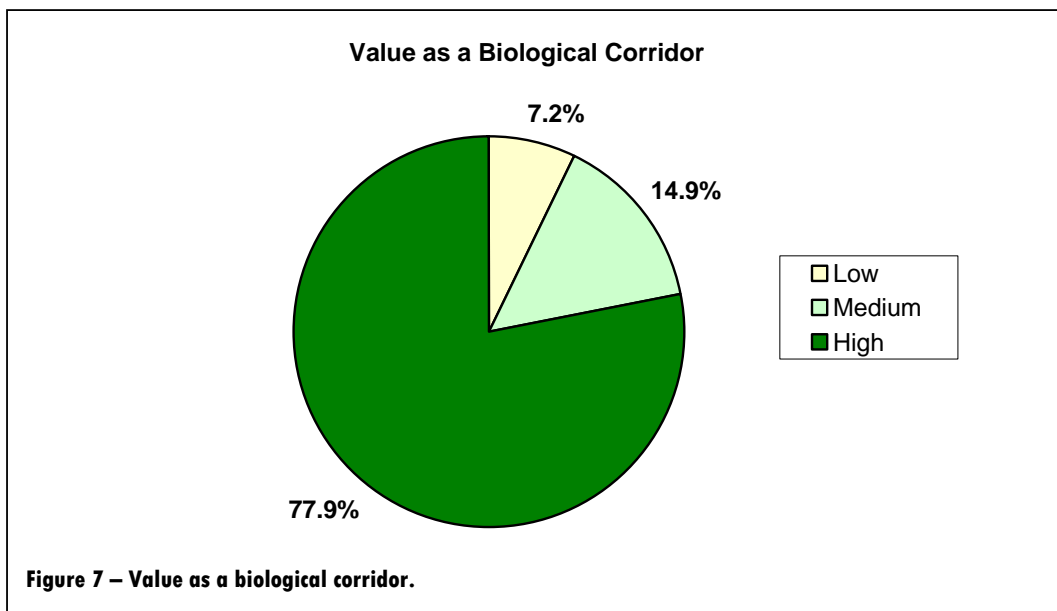
Number of Native Plant Species

The 'number of native species' score provided a measure of the diversity of the roadside vegetation. Survey sections with more than 20 plant species spanned 853.4 km (77.1%) of the roadside. Roadside sections with 6 to 19 plant species accounted for 133.7 km (12.1%) of the roadside. The remaining 120.0 km (10.8%) contained less than 5 plant species, see Table 3, Figure 6.



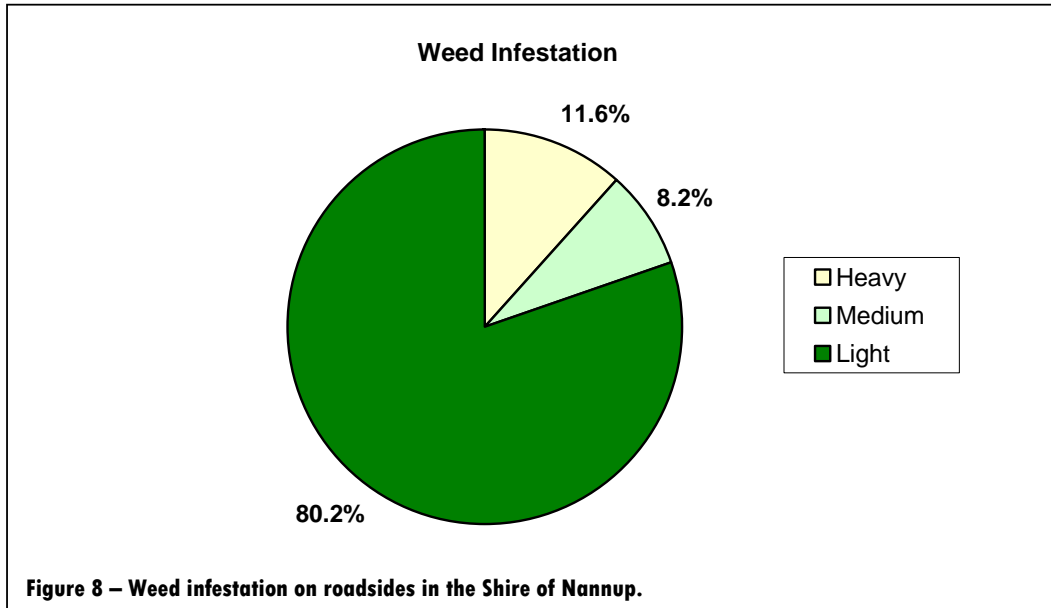
Value as a Biological Corridor

Roadsides determined to have high value as biological corridors (as determined by the roadside surveyors) were present along 77.9% (862.9 km) of the roadside, medium value made up 14.9% (164.6 km), and roadsides with low value as a biological corridor occurred along 7.2% (79.7 km) of the roadsides surveyed, see Table 3, Figure 7.



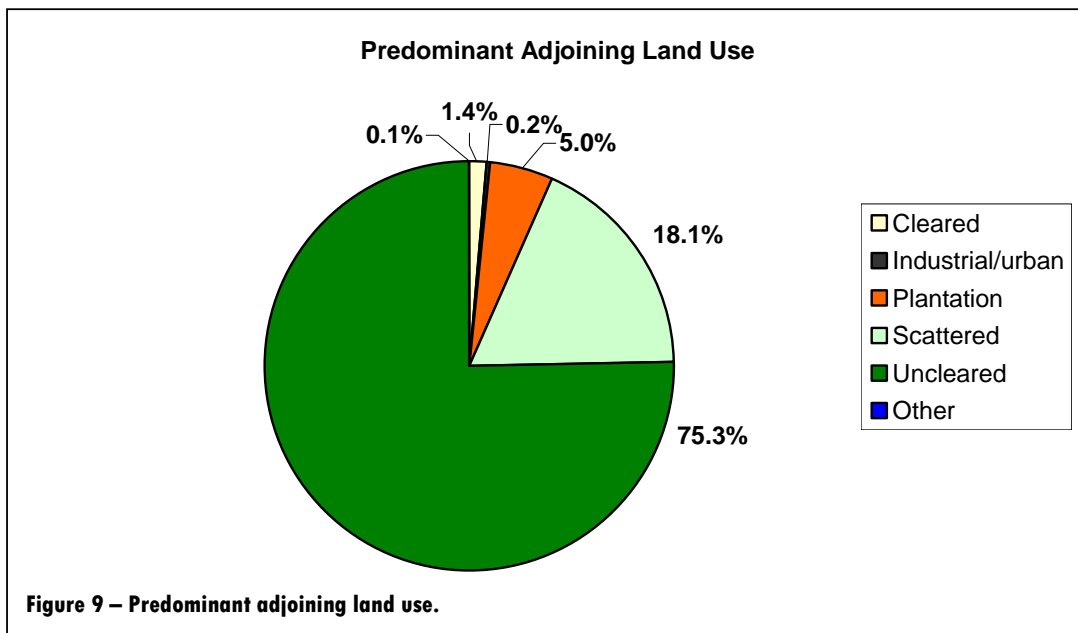
Weed Infestation

Light levels of weed infestation (weeds less than 20% of total plants) were observed on 80.2%, or 888.0 km of the roadsides surveyed. Medium level weed infestation (weeds 20-80% of the total plants) occurred on 8.2%, or 91.0 km of the roadsides and 11.6%, or 128.1 km were heavily infested with weeds (weeds more than 80% of total plants), see Table 3, Figure 8.



Predominant Adjoining Landuse.

Uncleared native vegetation was present on 75.3% (833.5km) of the land adjoining roadsides, whilst 1.4% (15.7 km) of roadsides surveyed were adjoined by land that had been completely cleared for agriculture. 18.1% (199.8 km) of the roadsides surveyed were bordered by land that was cleared for agriculture, but contained a scattered distribution of native vegetation. Plantations of non-natives were the predominant adjoining landuse for 5.0% (55.2 km) of the roadsides surveyed, urban/industrial landuses adjoined 0.2% (1.9 km), and other landuses adjoined 0.1% (0.9 km) of the roadsides surveyed, see Table 3, Figure 9.



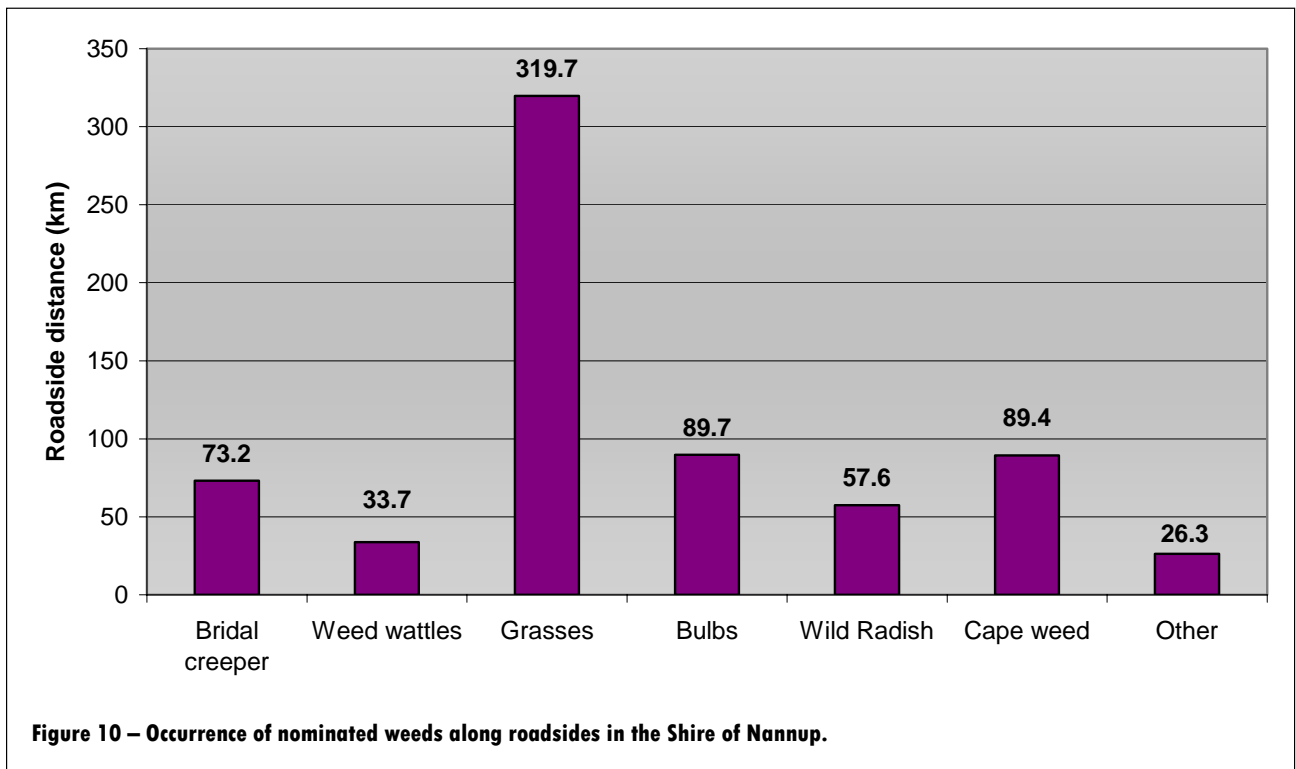
Nominated Weeds

Roadside populations of the following six nominated weed types are indicated on clear overlays accompanying the 2004 RCV map:

- Cape weed;
- Wild Radish;
- Bridal creeper;
- Grass weeds;
- Bulbs; and
- Weed wattles.

The presence of additional weeds were recorded in a separate category called 'other weeds', and these can be seen represented in Figure 10 with the other six nominated weed species observed along roadsides in the Shire.

Of the six nominated weeds surveyed throughout the survey, Grasses were the most highly recorded weed category, occurring along 319.7 km of roadsides. The category 'Bulbs' includes weeds such as Watsonia and these were present along 89.7 km of the roadsides surveyed, whilst Cape weed was recorded along 89.4 km of roadside. Bridal creeper was the next most commonly recorded weed, occurring along 73.2 km of roadside, Wild radish was present along 57.6 km, and Weed wattles 33.7 km. Other weeds were recorded along 26.3km of roadside, see Figure 10.



High Conservation Value Roadsides as 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. Roadsides determined as having high conservation value in the Shire of Nannup include:



- Baker Rd,
- Barrabup Rd,
- Black Point Rd,
- Bogadillup Rd,
- Bridgetown Nannup Rd,
- Brockman Hwy,
- Cambray Rd,
- Chalwell Rd,
- Coronation Rd,
- Cundinup Kirup Rd,
- Cundinup West Rd,
- Denny Rd,
- Dickson Rd,
- Don Rd,
- East Nannup Rd,
- Folly Rd,
- Fouracres Rd,
- Gold Gully Rd,
- Guthridge Rd,
- Helyar Rd,
- Jalbarragup Rd,
- Jandardup Rd,
- King Rd,
- Longbottom Rd,
- Manjimup Carlotta Rd,
- Milyeannup Coast Rd,
- Mount Leewin Loop Rd,
- Mowen Rd,
- Neverman Rd,
- Nickolopolis Rd,
- Old Cundinup Rd,
- Pneumonia Rd,
- Poison Swamp Rd,
- Rinns Rd,
- River Rd,
- Sears Rd,
- South Coast Rd,
- Stacey Rd,
- Stallard Rd,
- Stewart Hwy,
- Storry Rd,
- Tower Rd,
- Vasse Hwy,
- White Rd,
- Wishart Rd, and
- Woodaburru Rd.

(Not a complete list, consult the 2004 Roadside Conservation Value Map- Shire of Nannup.)

These, and other roads may be investigated further to see if they warrant a declaration as a Flora Road. This has a twofold effect of drawing the attention of tourists to the high conservation value roadside and it also alerts all that work in the roadside environment that the marked section of roadside requires due care to protect the values present.

In order to plan roadworks so that important areas of roadside vegetation are not disturbed, road managers should know of these areas. It is suggested that the Shire establish a *Register of Roads Important for Conservation*. This should outline any special treatment, which the site should receive, and be consulted prior to any work being initiated in the area. The road manager can establish a register of roads important for conservation by using the results of the roadside survey, and the information presented in this section.

Tourism

Attractive roadside drives are an important drawcard in this, 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).



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

Photo by CALM

Management

Management objectives should involve disturbing the roadside flora as little as possible, consistent with the provision of a safe and efficient roadway. The management of Flora Roads should aim to:

- Minimise disturbance,
- Control weeds,
- Encourage natural regeneration.

The management techniques referred to in Part D of this report can be employed to minimise disturbance to roadside vegetation. Most importantly, staff should be instructed and supervised so that incremental widening does not occur at every pass of the grader.

Environmental assessments (pre-construction check-lists) should be completed prior to any upgrading 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 always be used.

PART D

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.

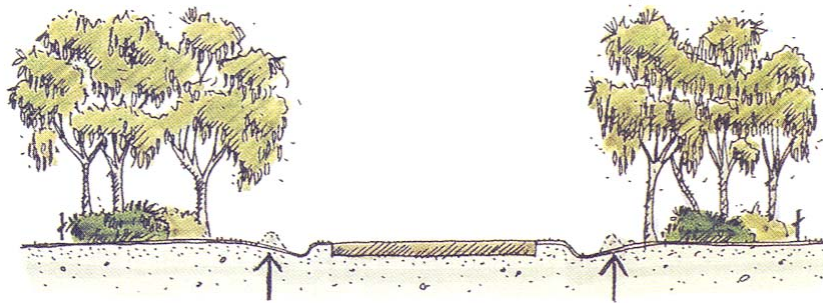
1.3 Improve roadside sections of medium to low conservation value by:

- 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.

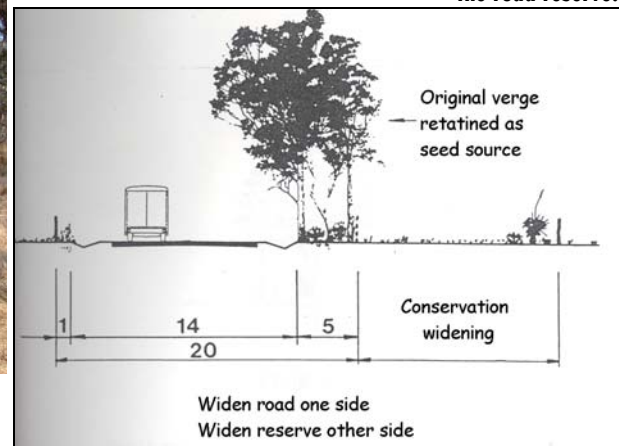


Avoid windrowing drain material into vegetation



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.

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.



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:

- | | |
|---|--|
| <ul style="list-style-type: none">▪ Protect- native vegetation- rare or threatened flora or fauna- cultural and heritage values- community assets from fire | <ul style="list-style-type: none">▪ 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 |
| <ul style="list-style-type: none">▪ Maintain- safe function of the road- native vegetation communities- fauna habitats and corridors- visual amenity and landscape qualities- water quality | <ul style="list-style-type: none">▪ Enhance- indigenous vegetation communities- fauna habitats and corridors |

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APPENDIX

1

APPENDIX

2

Road #	Section #	From	To	Road name	Native Vegetation		Extent of vegetation		# Native species		Value as a corridor		Weeds		Adjoining land use		Conservation value score (0-12)		Dominant weeds
					Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	
2160002	1	0.00	1.00	CUNDINUP KIRUP RD	1	1	0	0	0	0	1	1	0	0	S	S	3	3	GRASSES BULBS WILD_RADISH
2160002	2	1.00	2.40	CUNDINUP KIRUP RD	1	0	0	0	0	0	0	0	0	0	S	S	2	1	GRASSES BULBS OTHER
2160002	3	2.40	4.20	CUNDINUP KIRUP RD	2	2	1	1	1	1	2	2	1	1	S	P	8	8	GRASSES
2160002	4	4.20	4.90	CUNDINUP KIRUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160004	1	0.00	0.47	EAST NANNUP RD	2	2	1	1	1	1	1	1	1	1	I	I	6	6	BRIDAL_CREEPER WEED_WATTLES GRASSES BULBS OTHER
2160004	2	0.47	2.27	EAST NANNUP RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	BRIDAL_CREEPER WEED_WATTLES BULBS
2160004	3	2.27	3.27	EAST NANNUP RD	1	2	0	1	0	1	1	1	1	1	S	P	4	7	BRIDAL_CREEPER GRASSES BULBS OTHER
2160004	4	3.27	3.77	EAST NANNUP RD	0	0	0	0	0	0	0	0	0	0	S	S	1	1	GRASSES OTHER
2160004	5	3.77	5.17	EAST NANNUP RD	2	1	0	0	0	0	0	0	1	1	P	S	4	3	BRIDAL_CREEPER WEED_WATTLES GRASSES
2160004	6	5.17	7.07	EAST NANNUP RD	1	2	0	1	0	1	0	1	1	1	S	P	3	7	BRIDAL_CREEPER GRASSES OTHER
2160004	7	7.07	8.07	EAST NANNUP RD	2	2	1	1	2	2	2	2	1	1	S	S	9	9	BRIDAL_CREEPER GRASSES
2160004	8	8.07	9.07	EAST NANNUP RD	2	2	1	1	2	2	2	2	2	1	S	S	10	9	BRIDAL_CREEPER
2160004	9	9.07	10.47	EAST NANNUP RD	2	2	1	1	1	2	1	2	1	2	S	S	7	10	BRIDAL_CREEPER GRASSES BULBS OTHER
2160004	10	10.47	11.87	EAST NANNUP RD	0	2	0	1	0	0	0	0	0	1	S	S	1	5	GRASSES
2160004	11	11.87	12.87	EAST NANNUP RD	2	2	2	2	2	2	2	2	2	2	U	S	10	11	
2160005	1	0.00	10.30	MILYEANNUP COAST RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160005	2	10.30	11.30	MILYEANNUP COAST RD	2	2	2	1	2	2	2	2	2	1	U	P	10	9	GRASSES
2160005	3	11.30	12.90	MILYEANNUP COAST RD	2	2	2	2	2	2	1	1	2	1	S	S	10	9	WEED_WATTLES CAPE_WEED
2160005	4	12.90	15.40	MILYEANNUP COAST RD	2	2	2	2	2	2	1	1	2	2	S	S	10	10	GRASSES
2160005	5	15.40	16.30	MILYEANNUP COAST RD	2	2	2	0	2	1	1	1	2	0	P	S	10	5	GRASSES
2160005	6	16.30	19.80	MILYEANNUP COAST RD	2	2	2	1	2	2	1	1	2	1	S	S	10	8	GRASSES
2160005	7	19.80	21.10	MILYEANNUP COAST RD	2	2	1	1	1	1	1	1	1	1	S	S	7	7	GRASSES
2160006	1	0.00	13.00	SEARS RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	CAPE_WEED
2160009	1	0.00	8.10	RIVER RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160009	2	8.10	8.70	RIVER RD	2	2	2	1	2	1	2	2	2	1	U	S	10	8	BRIDAL_CREEPER
2160008	1	7.32	8.42	GOLD GULLY RD	2	2	2	2	1	1	2	2	2	2	P	P	10	10	
2160008	2	8.42	9.22	GOLD GULLY RD	2	2	0	2	1	2	0	2	2	2	S	U	6	10	
2160008	3	9.22	22.32	GOLD GULLY RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160010	1	0.00	3.64	BARRABUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160010	2	3.64	4.69	BARRABUP RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	GRASSES
2160010	3	4.69	5.69	BARRABUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160010	4	5.69	7.09	BARRABUP RD	2	2	2	1	2	1	2	2	2	1	S	U	10	8	GRASSES CAPE_WEED
2160010	5	7.09	7.69	BARRABUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160013	1	0.00	1.00	WHITE RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	BRIDAL_CREEPER GRASSES BULBS OTHER
2160013	2	1.00	1.40	WHITE RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160013	3	1.40	1.70	WHITE RD	2	0	2	0	2	0	2	0	2	0	U	S	10	1	GRASSES BULBS

Road #	Section #	From	To	Road name	Native Vegetation		Extent of vegetation		# Native species		Value as a corridor		Weeds		Adjoining land use		Conservation value score (0-12)		Dominant weeds
2160013	4	1.70	2.10	WHITE RD	2	0	2	2	2	2	2	2	2	2	U	S	10	9	GRASSES
2160016	1	0.00	1.00	TOWER RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160016	2	1.00	1.50	TOWER RD	2	0	0	0	2	0	2	0	2	0	U	S	8	1	GRASSES
2160016	3	1.50	3.22	TOWER RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160017	1	0.00	3.40	MOUNT LEEWIN LOOP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160017	2	3.40	5.10	MOUNT LEEWIN LOOP RD	2	2	1	1	2	2	2	2	2	2	P	P	10	10	BRIDAL_CREEPER GRASSES BULBS
2160017	3	5.10	6.90	MOUNT LEEWIN LOOP RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	GRASSES CAPE_WEED
2160019	1	0.00	4.83	CAMBRAY RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160020	1	0.00	1.63	NICKOLOPOLIS RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES CAPE_WEED
2160021	1	0.00	2.60	OLD CUNDINUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160021	2	2.60	3.50	OLD CUNDINUP RD	2	1	1	1	1	0	2	1	2	0	U	O	8	4	GRASSES
2160021	3	3.50	5.60	OLD CUNDINUP RD	2	2	2	2	2	2	2	2	2	2	U	S	10	11	
2160022	1	0.00	0.50	STACEY RD	2	2	2	1	1	1	2	2	2	2	U	P	9	9	GRASSES
2160022	2	0.50	2.68	STACEY RD	2	2	2	2	1	1	2	2	2	2	U	U	9	9	
2160026	1	0.00	0.30	GUTHRIDGE RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160026	2	0.30	1.70	GUTHRIDGE RD	2	2	2	2	2	2	2	2	2	2	U	S	10	11	
2160026	3	1.70	2.25	GUTHRIDGE RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	GRASSES BULBS
2160029	1	0.00	0.60	CHALWELL RD	2	2	0	2	0	2	1	2	0	2	S	U	4	10	GRASSES CAPE_WEED
2160029	2	0.60	1.70	CHALWELL RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	WEED_WATTLES GRASSES BULBS
2160029	3	1.70	4.50	CHALWELL RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	BULBS
2160029	4	4.50	5.20	CHALWELL RD	0	0	0	0	0	0	1	1	2	2	P	P	4	4	
2160031	1	0.00	0.65	RINNS RD	2	2	2	2	1	1	2	2	2	2	U	U	9	9	
2160045	1	3.00	3.53	JALBARRAGUP RD	2	2	1	1	1	1	2	2	1	1	S	P	8	8	WEED_WATTLES GRASSES BULBS
2160045	2	3.53	4.53	JALBARRAGUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160045	3	4.53	19.80	JALBARRAGUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160047	1	0.00	23.34	MOWEN RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160048	1	0.00	17.20	BAKER RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160049	1	0.00	10.30	BLACK POINT RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160049	2	10.30	15.80	BLACK POINT RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160049	3	15.80	19.80	BLACK POINT RD	2	2	2	2	2	2	2	2	2	2	S	U	11	10	
2160052	1	0.00	9.50	STALLARD RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160055	1	0.00	0.65	PERKS RD	2	2	1	1	1	1	0	2	2	2	S	U	7	8	GRASSES
2160055	2	0.65	1.30	PERKS RD	1	1	0	0	0	0	1	1	0	0	S	S	3	3	WEED_WATTLES WILD_RADISH CAPE_WEED
2160056	1	0.00	1.30	FOLLY RD	0	0	0	0	0	0	0	0	0	0	C	C	2	2	GRASSES CAPE_WEED OTHER
2160056	2	1.30	3.95	FOLLY RD	0	0	0	0	0	0	1	1	0	0	S	S	2	2	GRASSES CAPE_WEED OTHER
2160056	3	3.95	6.92	FOLLY RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160063	1	0.00	17.70	CORONATION RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160066	1	0.00	9.50	PNEUMONIA RD	2	2	2	2	2	2	2	2	2	2	U	U	10	11	
2160067	1	0.00	3.10	JANGARDUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES BULBS

Road #	Section #	From	To	Road name	Native Vegetation		Extent of vegetation		# Native species		Value as a corridor		Weeds		Adjoining land use		Conservation value score (0-12)		Dominant weeds
2160067	2	3.10	5.80	JANGARDUP RD	2	2	2	2	2	2	2	1	2	2	P	P	11	10	
2160067	3	5.80	7.10	JANGARDUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160067	4	7.10	9.70	JANGARDUP RD	2	2	2	2	2	2	2	2	2	2	S	U	11	10	
2160067	5	9.70	11.39	JANGARDUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160069	1	0.00	4.10	FOURACRES RD	2	2	2	2	2	2	2	2	2	2	U	U	11	11	WEED_WATTLES
2160069	2	4.10	6.60	FOURACRES RD	0	0	0	0	0	0	0	0	0	0	P	P	1	1	GRASSES
2160069	3	6.60	9.50	FOURACRES RD	2	2	2	2	2	2	1	1	2	2	P	P	10	10	GRASSES
2160069	4	9.50	12.50	FOURACRES RD	2	2	2	2	2	2	1	1	2	2	U	P	10	10	
2160069	5	12.50	22.20	FOURACRES RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160071	1	0.00	2.30	DENNY RD	2	2	1	1	1	1	1	0	2	2	U	U	7	6	
2160071	2	2.30	3.00	DENNY RD	2	2	0	0	0	0	2	1	2	2	U	U	6	5	
2160071	3	3.00	12.09	DENNY RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160072	1	0.00	1.92	DON RD	2	2	2	2	2	2	1	1	2	2	P	S	10	10	GRASSES
2160076	1	0.00	1.00	Longbottom RD	2	1	0	0	0	0	0	0	0	0	S	S	3	2	WEED_WATTLES BULBS OTHER
2160076	2	1.00	4.08	Longbottom RD	2	2	2	2	1	1	2	2	2	2	U	U	9	9	
2160080	1	0.00	0.50	HELYAR RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES CAPE_WEED
2160080	2	0.50	1.22	HELYAR RD	2	2	0	2	1	1	1	2	0	0	S	U	5	7	GRASSES CAPE_WEED
2160081	1	0.00	1.00	BEGGARS RD	1	2	1	0	1	0	2	0	1	0	U	I	6	2	WEED_WATTLES GRASSES BULBS CAPE_WEED
2160082	1	0.00	0.60	BOGADILLUP RD	2	2	2	2	1	1	2	2	2	2	U	U	9	9	
2160082	2	0.60	1.40	BOGADILLUP RD	2	1	1	1	1	0	0	2	0	1	S	S	5	6	BRIDAL_CREEPER WEED_WATTLES BULBS
2160083	1	0.00	1.60	POISON SWAMP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160085	1	0.00	3.44	SOUTH COAST RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160086	1	0.00	2.34	STORRY RD	2	2	2	2	1	2	2	2	2	2	U	U	9	10	
2160091	1	0.00	2.20	JOHNSTON RD	2	2	0	0	0	0	0	1	0	0	S	S	3	4	WILD_RADISH
2160091	2	2.20	2.97	JOHNSTON RD	2	2	1	1	1	1	1	1	2	2	U	U	7	7	
2160092	1	0.00	0.58	CRAIGIE DRV	1	1	0	0	0	0	1	1	0	0	S	S	3	3	
2160093	1	0.00	1.00	CUNDINUP WEST RD	0	2	0	2	0	2	0	2	0	2	S	U	1	10	GRASSES BULBS WILD_RADISH
2160093	2	1.00	2.00	CUNDINUP WEST RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	BULBS
2160093	3	2.00	5.00	CUNDINUP WEST RD	0	2	0	2	1	2	0	2	0	2	S	U	2	10	GRASSES BULBS CAPE_WEED
2160093	4	5.00	8.00	CUNDINUP WEST RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	BULBS OTHER
2160093	5	8.00	9.41	CUNDINUP WEST RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	GRASSES BULBS CAPE_WEED
2160094	1	0.00	0.50	CUNDINUP SOUTH RD	2	2	1	2	2	2	2	2	1	1	S	U	9	9	BULBS
2160094	2	0.50	2.50	CUNDINUP SOUTH RD	1	1	0	0	0	0	0	0	0	0	S	S	2	2	BRIDAL_CREEPER WEED_WATTLES GRASSES BULBS CAPE_WEED OTHER
2160094	3	2.50	4.50	CUNDINUP SOUTH RD	1	2	2	2	2	2	0	2	2	2	U	U	7	10	
2160094	4	4.50	5.50	CUNDINUP SOUTH RD	2	2	1	2	1	2	2	2	0	2	S	U	7	10	WEED_WATTLES GRASSES BULBS
2160094	5	5.50	7.50	CUNDINUP SOUTH RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	BULBS
2160094	6	7.50	8.50	CUNDINUP SOUTH RD	2	2	0	2	1	2	2	2	0	2	S	U	6	10	GRASSES BULBS

Road #	Section #	From	To	Road name	Native Vegetation		Extent of vegetation		# Native species		Value as a corridor		Weeds		Adjoining land use		Conservation value score (0-12)		Dominant weeds
2160094	7	8.50	10.50	CUNDINUP SOUTH RD	0	2	0	2	0	2	0	2	2	2	U	U	2	10	
2160094	8	10.50	13.03	CUNDINUP SOUTH RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160098	1	0.00	2.12	MAYALL RD	2	2	1	1	2	2	1	1	1	1	S	S	8	8	GRASSES
2160099	1	0.00	0.40	KING RD	2	2	2	2	1	1	2	2	2	2	U	U	9	9	
2160099	2	0.40	0.89	KING RD	0	0	0	0	0	0	0	1	0	0	S	P	1	2	BRIDAL_CREEPER GRASSES CAPE_WEED
2160100	1	0.00	2.20	BLACKWOOD RIVER DRV	0	0	0	0	0	0	2	1	0	0	S	S	3	2	GRASSES WILD_RADISH CAPE_WEED
2160101	1	0.00	1.18	GREENWOOD RD	0	0	0	0	0	0	0	0	0	0	S	S	1	1	GRASSES CAPE_WEED
2160105	1	0.00	1.92	NEVERMAN RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160106	1	0.00	2.21	DEAN RD	0	0	0	0	0	0	0	1	0	0	S	S	1	2	GRASSES CAPE_WEED
2160107	1	0.00	0.79	BALINGUP RD	1	2	0	0	0	0	2	2	0	0	S	P	4	5	BRIDAL_CREEPER GRASSES BULBS
2160107	2	0.79	1.29	BALINGUP RD	0	1	0	0	0	0	1	1	0	0	S	S	2	3	BRIDAL_CREEPER WEED_WATTLES GRASSES BULBS WILD_RADISH OTHER
2160107	3	1.29	2.29	BALINGUP RD	0	1	0	0	0	0	0	1	0	0	S	S	1	3	GRASSES BULBS WILD_RADISH
2160107	4	2.29	7.29	BALINGUP RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	BRIDAL_CREEPER GRASSES BULBS WILD_RADISH OTHER
2160107	5	7.29	10.69	BALINGUP RD	1	1	0	0	0	0	2	2	0	0	S	S	4	4	BRIDAL_CREEPER GRASSES WILD_RADISH
2160107	6	10.69	19.49	BALINGUP RD	1	1	0	0	0	0	2	2	0	0	S	S	4	4	BRIDAL_CREEPER GRASSES BULBS WILD_RADISH CAPE_WEED
2160109	1	0.00	14.00	BRIDGETOWN NANNUP RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES
2160109	2	14.00	15.35	BRIDGETOWN NANNUP RD	2	2	1	2	1	2	1	0	0	1	S	U	6	7	GRASSES
2160109	3	15.35	17.35	BRIDGETOWN NANNUP RD	2	2	1	1	1	1	2	2	1	1	P	P	8	8	GRASSES
2160109	4	17.35	18.65	BRIDGETOWN NANNUP RD	2	2	1	1	1	1	2	2	1	1	U	S	7	8	GRASSES WILD_RADISH
2160109	5	18.65	23.24	BRIDGETOWN NANNUP RD	0	0	0	0	0	0	0	0	0	0	P	P	1	1	BRIDAL_CREEPER GRASSES WILD_RADISH
2160114	1	0.00	0.40	THOMAS RD	0	2	0	1	0	0	0	2	0	0	S	S	1	6	WEED_WATTLES GRASSES
2160114	2	0.40	0.58	THOMAS RD	1	2	0	0	0	0	2	1	0	0	S	S	4	4	GRASSES
2160115	1	0.00	1.40	WOODABURRUP RD	2	2	1	1	2	2	1	2	1	1	S	S	8	9	GRASSES
2160115	2	1.40	2.60	WOODABURRUP RD	2	2	2	2	2	2	1	1	2	2	U	U	9	9	GRASSES
2160115	3	2.60	4.79	WOODABURRUP RD	2	2	0	0	1	1	1	1	0	0	S	S	5	5	GRASSES OTHER
2160116	1	0.00	2.74	LESCHENAULTIA RD	2	2	1	1	1	1	2	2	2	2	U	U	8	8	
2160123	1	0.00	1.70	WISHART RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160300	1	0.00	11.00	DICKSON RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160119	1	0.00	14.50	MANJIMUP CARLOTTA RD	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
2160119	2	14.50	17.70	MANJIMUP CARLOTTA RD	2	2	1	1	1	1	2	2	1	1	S	S	8	8	GRASSES
2160119	3	17.70	18.26	MANJIMUP CARLOTTA RD	0	0	0	0	0	0	0	1	0	0	S	S	1	2	WEED_WATTLES GRASSES WILD_RADISH
M080	1	0.00	0.80	STEWART HWY	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
M080	2	0.80	10.10	STEWART HWY	2	2	2	2	2	2	1	2	2	2	U	U	9	10	
M080	3	10.10	27.56	STEWART HWY	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
M027	1	0.00	0.94	BROCKMAN HWY	2	2	1	1	0	0	1	1	0	0	S	S	5	5	WEED_WATTLES GRASSES
M027	2	0.94	18.38	BROCKMAN HWY	2	2	2	2	2	2	2	2	2	2	U	U	10	10	

Road #	Section #	From	To	Road name	Native Vegetation		Extent of vegetation		# Native species		Value as a corridor		Weeds		Adjoining land use		Conservation value score (0-12)		Dominant weeds
M027	3	18.38	19.40	BROCKMAN HWY	2	1	0	0	0	0	1	0	0	0	S	S	4	2	WEED_WATTLES GRASSES CAPE_WEED OTHER
M027	4	19.40	31.62	BROCKMAN HWY	2	2	2	2	2	2	1	1	2	2	U	U	9	9	
M008	1	34.70	36.70	VASSE HWY	2	2	2	2	2	2	1	1	2	2	U	U	9	9	
M008	2	36.70	37.70	VASSE HWY	2	2	0	0	1	1	2	2	0	0	S	S	6	6	GRASSES CAPE_WEED
M008	3	37.70	51.10	VASSE HWY	2	2	2	2	2	2	1	1	2	2	U	U	9	9	
M008	4	51.10	53.20	VASSE HWY	2	2	2	1	2	1	2	2	2	1	U	S	10	8	WEED_WATTLES GRASSES
M008	5	53.20	56.40	VASSE HWY	2	2	2	2	2	2	2	2	2	2	U	U	10	10	GRASSES CAPE_WEED
M008	6	56.40	58.00	VASSE HWY	0	1	0	0	0	0	0	1	0	0	S	S	1	3	BRIDAL_CREEPER WEED_WATTLES GRASSES BULBS WILD_RADISH
M008	7	60.01	62.76	VASSE HWY	2	2	1	1	0	2	2	2	0	1	C	C	7	10	BRIDAL_CREEPER GRASSES
M008	8	62.76	65.16	VASSE HWY	2	2	2	2	2	2	2	2	2	2	U	S	10	11	GRASSES
M008	9	65.16	66.26	VASSE HWY	1	0	0	0	0	0	0	0	0	0	U	S	2	1	GRASSES
M008	10	66.26	70.06	VASSE HWY	1	2	0	2	0	1	0	2	1	2	C	C	4	11	GRASSES
M008	11	70.06	70.86	VASSE HWY	0	0	0	0	0	0	0	0	2	2	P	P	3	3	GRASSES
M008	12	70.86	72.86	VASSE HWY	2	2	1	2	1	2	1	2	0	2	P	U	6	10	GRASSES
M008	13	72.86	83.76	VASSE HWY	2	1	2	1	2	1	2	2	2	2	U	U	10	7	GRASSES
M008	14	83.76	87.26	VASSE HWY	2	2	0	0	1	1	1	1	0	0	S	S	5	5	GRASSES
M008	15	87.26	95.96	VASSE HWY	2	2	2	1	2	2	2	2	2	2	U	U	10	9	
M008	16	95.96	97.26	VASSE HWY	2	2	2	1	2	1	2	2	2	0	U	S	10	7	GRASSES
M008	17	97.26	98.46	VASSE HWY	2	2	2	2	2	2	2	2	2	2	U	U	10	10	
M008	18	98.46	99.26	VASSE HWY	2	2	1	2	1	2	1	2	2	2	S	U	8	10	GRASSES
M008	19	99.26	109.70	VASSE HWY	2	2	2	2	2	2	2	0	2	2	U	U	10	8	

APPENDIX

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APPENDIX 3

Road names, numbers and lengths in the Shire of Nannup (alphabetically listed)

(Source of data- Main Roads WA, 2003)

Road number (MRWA)	Road name	Length (km)
2160034	ADAM ST	0.32
2160057	ANNELS RD (F)	5.47
2160058	ASPLINS RD (F)	2.77
2160064	AVERY RD	1.61
2160048	BAKER RD	17.20
2160107	BALINGUP-NANNUP RD	19.49
2160010	BARRABUP RD	7.69
2160081	BEGGARS RD	1.00
2160043	BISHOP ST	0.16
2160049	BLACK POINT RD	25.00
2160301	BLACKWATER RD	5.00
2160100	BLACKWOOD RIVER DRIVE	2.20
2160082	BOGGADILLUP RD	1.60
2160109	BRIDGETOWN-NANNUP RD	23.24
2160039	BROCKMAN ST	0.32
2160122	BUCKLEY RD	0.72
2160019	CAMBRAY RD (F)	4.83
2160078	CAREY RD	0.62
2160035	CAREY ST	0.80
2160029	CHALWELL RD	5.29
2160084	CHESTER RD (F)	4.86
2160063	CORONATION RD	17.70
2160092	CRAIGIE DRIVE	0.58
2160041	CROSS ST	0.18
2160001	CUNDINUP RD	0.53
2160094	CUNDINUP SOUTH RD	13.03
2160093	CUNDINUP WEST RD	9.41
2160014	CUNDINUP-DUDINYILLUP RD	6.29
2160002	CUNDINUP-KIRUP RD	4.86
2160106	DEAN RD	2.21
2160071	DENNY RD (F)	12.09
2160300	DICKSON RD	11.00
2160072	DON RD	1.92
2160011	DONNELLY MILL RD	2.40
2160037	DUNNET RD	1.44
2160004	EAST NANNUP RD	12.87
2160056	FOLLY RD (F)	6.92
2160087	FORD WAY	0.24
2160040	FORREST ST	0.16
2160108	FORREST ST	0.15
2160069	FOURACRES RD	22.20
2160015	FULLERS RD	3.56
2160065	GINGILUP RD	5.15
2160125	GLACIER RD	3.71
2160008	GOLD GULLY RD	22.32
2160007	GOVERNOR BROOME RD	10.73
2160032	GRANGE RD	0.66
2160101	GREENWOOD RD	1.18
2160026	GUTHRIDGE RD	2.25
2160018	HALLEY FORMATION	4.84
2160074	HARTNETTS RD	1.00
2160028	HAYES RD	1.29

Road number (MRWA)	Road name	Length (km)
2160080	HELYAR RD	1.22
2160038	HIGGINS ST	0.72
2160117	HOVEA PLACE	0.74
2160045	JALBARRAGUP RD	19.80
2160067	JANGARDUP RD	11.39
2160042	JEPHSON ST	0.16
2160091	JOHNSTON RD	2.97
2160033	KEARNEY ST	0.81
2160099	KING RD	0.89
2160116	LESCHENAUTIA DRIVE	2.74
2160076	LONGBOTTOM RD	4.08
2160119	MANJIMUP-CARLOTTA RD	18.26
2160098	MAYALL RD	2.12
2160121	MCKITTRICK RD	1.03
2160112	MELALEUCA PLACE	0.19
2160005	MILYEANNUP COAST RD	23.80
2160095	MONOGHAN ST	0.21
2160079	MONOHAN RD	0.90
2160017	MOUNT LEEWIN LOOP RD	6.90
2160047	MOWEN RD (F)	23.34
2160077	NEDS RD	0.25
2160105	NEVERMAN RD	1.92
2160020	NICKOLOPLOS RD	1.63
2160036	NORTH ST	0.70
2160124	NURSERY RD	0.49
2160021	OLD CUNDINUP RD (F)	5.60
2160118	ORCHID PLACE	0.66
2160055	PERKS RD	1.30
2160066	PNEUMONIA RD	12.41
2160083	POISON SWAMP	1.60
2160090	PRIVATE RD TO HOUSES	0.16
2160089	PRIVATE RD TO MILL	0.21
2160111	RAILWAY ST	0.11
2160031	RINNS RD	0.65
2160009	RIVER RD	9.00
2160104	RIVERGUM WAY	0.39
2160103	ROSELLA CLOSE	0.20
2160024	SAVAGE RD	1.80
2160030	SCOTT RD	3.50
2160006	SEARS RD	13.00
2160025	SEVEN DAY RD	1.93
2160097	SEXTON WAY	0.75
2160113	SHEOAK PLACE	0.19
2160023	SMITH RD	1.77
2160085	SOUTH COAST RD (F)	3.44
2160022	STACEY RD	2.68
2160052	STALLARD RD	9.50
2160120	STEWART RD	27.82
2160086	STORRY RD	2.34
2160046	STRUTHERS ST	0.40
2160110	TERRY ST	0.15
2160114	THOMAS RD	0.58
2160075	TOMAS RD	0.45
2160016	TOWER RD	3.22
2160088	UN-NAMED RD	0.50
2160073	WALTER ST	0.48
2160102	WATTLE PL	0.38
2160013	WHITE RD	3.70

Road number (MRWA)	Road name	Length (km)
2160096	WILSON ST	0.50
2160123	WISHART RD	1.70
2160115	WOODABURRUP RD	4.79
M080	STEWART HWY	
M027	BROCKMAN HWY	
M008	VASSE HWY	

APPENDIX

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APPENDIX 4

Flora species in the Shire of Nannup

(Source of data- WA Herbarium)

Note: This is not a comprehensive list.

* = weed species.

P = is/was a Priority Flora Species.

R = is/was declared a Rare Flora Species.

Acacia alata	Acacia varia
Acacia alata var. alata	Acacia varia var. varia
Acacia applanata	Acacia willdenowiana
Acacia assimilis subsp. assimilis	Acanthocarpus preissii
Acacia browniana	Actinodium cunninghamii
Acacia browniana var. browniana	Actinotus glomeratus
Acacia browniana var. obscura	Actinotus omnifertilis
Acacia cochlearis	Adenanthos barbiger subsp. intermedius ms
Acacia cyclops	Adenanthos detmoldii P4
*Acacia dealbata	Adenanthos meisneri
*Acacia decurrens	Adenanthos obovatus
Acacia dentifera	Adenanthos x pamela P4
Acacia divergens	Adiantum aethiopicum
Acacia extensa	*Agonis flexuosa
Acacia flagelliformis P4	*Agonis flexuosa var. flexuosa
Acacia gilbertii	Agonis juniperina
Acacia hastulata	Agonis linearifolia
Acacia insolita	Agonis parviceps
Acacia insolita subsp. insolita	Agonis sp.Coarse Agonis(J.R.Wheeler 2939)
Acacia lateriticola	Agonis sp.Lake Jasper(B.Hammersley 567)
Acacia littorea	Agrostis plebeia
Acacia mearnsii	Agrostocrinum scabrum
*Acacia melanoxylon	*Aira caryophyllea
Acacia mooreana P2	Allocauarina decussata
Acacia myrtifolia	Allocauarina fraseriana
Acacia nervosa	*Alternanthera nodiflora
Acacia obovata	*Amaryllis belladonna
Acacia pentadenia	Amperea ericoides
Acacia preissiana	Amperea simulans
Acacia pulchella	Amperea volubilis
Acacia pulchella var. glaberrima	Amphipogon amphipogonoides
Acacia pulchella var. goadbyi	*Anagallis arvensis
Acacia pulchella var. pulchella	Anarthria gracilis
*Acacia pycnantha	Anarthria laevis
Acacia saligna	Anarthria prolifera
Acacia scalpelliformis	Anarthria scabra
Acacia semitrullata P3	Andersonia amabile ms P3
Acacia stenoptera	Andersonia auriculata P2
Acacia subracemosa P2	Andersonia barbata
Acacia tayloriana	Andersonia caerulea
Acacia tayloriana P4	Andersonia heterophylla
Acacia tetragonocarpa	Andersonia involucreta
Acacia triptycha	Andersonia latiflora
Acacia urophylla	Andersonia lehmanniana

Andersonia longifolia P3
 Andersonia micrantha
 Andersonia sprengeloides
 Anigozanthos bicolor subsp. decrescens
 Anigozanthos flavidus
 Anigozanthos manglesii subsp. manglesii
 Anigozanthos viridis subsp. viridis
 Anthoxanthum odoratum
 Aotus intermedia
 Aotus passerinoides
 Aotus sp.Scott River(K.F.Kenneally 2371)
 *Aphanes arvensis
 Aphelia cyperoides
 *Arctotheca calendula
 *Asparagus officinalis
 Asplenium aethiopicum P4
 Asplenium flabellifolium
 Astartea fascicularis
 Astartea sp.Gingalup(N.Gibson & M.Lyons 119)
 Astartea sp.Rivers(K.Newbey 1740)
 Astartea sp.Scott River(D.Backshall 88233) P4
 Asterolasia pallida subsp. pallida
 Asterolasia squamuligera
 Astroloma baxteri
 Astroloma ciliatum
 Astroloma drummondii
 Astroloma pallidum
 Astroloma prostratum
 Astroloma sp.Nannup(R.D.Royce 3978) P4
 Austrodanthonia acerosa
 Austrodanthonia pilosa
 Austrostipa campylachne
 Austrostipa compressa
 Austrostipa macalpinei
 Austrostipa semibarbata
 Baeckea arbuscula P4
 Banksia attenuata
 Banksia grandis
 Banksia ilicifolia
 Banksia littoralis
 Banksia meisneri subsp. ascendens P4
 Banksia occidentalis
 Banksia occidentalis subsp. occidentalis
 Banksia seminuda
 Baumea acuta
 Baumea articulata
 Baumea juncea
 Baumea preissii subsp. laxa ms
 Baumea rubiginosa
 Baumea vaginalis
 Baxteria australis
 Beaufortia decussata
 Beaufortia sparsa
 Beaufortia squarrosa
 Billardiera coeruleo-punctata
 Billardiera floribunda
 Billardiera laxiflora
 Billardiera parviflora
 Billardiera parviflora var. parviflora
 Billardiera variifolia
 Boronia crenulata
 Boronia crenulata subsp. pubescens ms
 Boronia crenulata var. crenulata
 Boronia defoliata
 Boronia dichotoma
 Boronia fastigiata
 Boronia fastigiata subsp. tenuior ms
 Boronia gracilipes
 Boronia heterophylla
 Boronia juncea
 Boronia juncea subsp. minima ms
 Boronia megastigma
 Boronia molloyae
 Boronia spathulata
 Boronia stricta
 Bossiaea aquifolium
 Bossiaea aquifolium subsp. aquifolium
 Bossiaea aquifolium subsp. laidlawiana
 Bossiaea laidlawiana
 Bossiaea linophylla
 Bossiaea ornata
 Bossiaea praetermissa
 Bossiaea pulchella
 Bossiaea rufa
 Brachyloma preissii
 Brachyscome iberidifolia
 Bracteantha bracteata
 *Briza minor
 *Bromus diandrus
 Burchardia multiflora
 Caesia micrantha
 Caesia occidentalis
 Caladenia arrecta ms P4
 Caladenia attingens subsp. attingens ms
 Caladenia brownii ms
 Caladenia cairnsiana
 Caladenia corynephora
 Caladenia flava
 Caladenia flava subsp. flava ms
 Caladenia flava subsp. sylvestris ms
 Caladenia gardneri ms
 Caladenia harringtoniae ms R
 Caladenia huegelii R
 Caladenia infundibularis
 Caladenia interjacens ms P4
 Caladenia latifolia
 Caladenia longicauda subsp. longicauda ms
 Caladenia longicauda subsp. merrittii ms
 Caladenia longiclavata
 Caladenia macrostylis
 Caladenia nana subsp. nana ms
 Caladenia nana subsp. unita ms

Caladenia pholcoidea ms
 Caladenia plicata P4
 Caladenia rhomboidiformis
 Calandrinia liniflora
 Callistachys lanceolata
 Callistemon glaucus
 Calochilus robertsonii
 Calothamnus graniticus
 Calothamnus lateralis
 Calothamnus pallidifolius P3
 Calothamnus sanguineus
 Calothamnus sp.Scott River(R.D.Royce 84) P2
 Calytrix angulata
 Calytrix tenuiramea
 *Cardamine hirsuta
 *Carduus pycnocephalus
 Carex fascicularis
 Cartonema philydroides
 Cassytha flava
 Cassytha glabella
 Cassytha pomiformis
 Cassytha racemosa
 Cassytha racemosa forma pilosa
 Cassytha racemosa forma racemosa
 *Centaurium erythraea
 Centella asiatica
 Centipeda cunninghamii
 Centrolepis aristata
 Centrolepis drummondiana
 Cephalotus follicularis
 Chaetanthus leptocarpoides
 Chamaescilla corymbosa
 Chamaescilla corymbosa var. corymbosa
 Chamaexeros serra
 Chamelaucium erythrochlorum ms P4
 Cheiranthra preissiana
 *Chenopodium glaucum
 Chordifex amblycoleus ms
 Chordifex gracilior ms P3
 Chordifex jacksonii ms P1
 Choretrum lateriflorum
 Chorilaena quercifolia
 Chorizandra cymbaria
 Chorizandra enodis
 Chorizandra multiarticulata P3
 Chorizema cordatum
 Chorizema diversifolium
 Chorizema glycinifolium
 Chorizema nanum
 Chorizema reticulatum P3
 Chorizema retrorsum
 Chorizema retrorsum ms
 Chorizema rhombeum
 Chorizema spathulatum
 *Cirsium vulgare
 Clematis pubescens

Comesperma calymega
 Comesperma ciliatum
 Comesperma confertum
 Comesperma flavum
 Comesperma nudiusculum
 Comesperma virgatum
 Conospermum caeruleum
 Conospermum caeruleum subsp. caeruleum
 Conospermum caeruleum subsp. marginatum ms
 Conospermum capitatum
 Conospermum capitatum subsp. capitatum
 Conospermum capitatum subsp. glabratum
 Conospermum paniculatum P3
 Conospermum stoechadis
 Conospermum teretifolium
 Conostephium pendulum
 Conostephium preissii
 Conostylis aculeata
 Conostylis aculeata subsp. aculeata
 Conostylis juncea
 Conostylis laxiflora
 Conostylis serrulata
 Conostylis setigera
 Conostylis setigera subsp. setigera
 *Conyza albida
 *Conyza parva
 *Corrigiola litoralis
 Corybas recurvus
 Corymbia calophylla
 Corymbia haematoxylon
 Corynotheca micrantha
 *Cotula australis
 *Cotula turbinata
 Crassula colorata var. acuminata
 *Crepis capillaris
 *Crepis foetida
 Crowea angustifolia var. angustifolia
 Crowea angustifolia var. platyphylla
 Cryptostylis ovata
 *Cuscuta epithymum
 Cyanica sericea ms
 Cyathochaeta avenacea
 Cyathochaeta clandestina
 Cyathochaeta stipoides P3
 Cyathochaeta teretifolia P3
 *Cyperus congestus
 *Cyperus tenellus
 Cyrtostylis huegelii
 Cyrtostylis robusta
 *Dactylis glomerata
 Dampiera hederacea
 Dampiera heteroptera P3
 Dampiera leptoclada
 Dampiera linearis
 Darwinia citriodora
 Darwinia inconspicua ms

Darwinia oederoides
 Darwinia sp. Williamson (G.J. Keighery 12717) R
 Darwinia thymoides
 Darwinia vestita
 Dasypogon bromeliifolius
 Dasypogon hookeri
 Daucus glochidiatus
 Daviesia angulata
 Daviesia cordata
 Daviesia decurrens
 Daviesia horrida
 Daviesia inflata
 Daviesia longifolia
 Daviesia physodes
 Daviesia preissii
 Daviesia rhombifolia
 Desmocladius fasciculatus ms
 Desmocladius flexuosus ms
 Deyeuxia inaequalis P1
 Deyeuxia quadriseta
 Dianella revoluta
 Diaspasis filifolia
 Dichelachne crinita
 Dichondra repens
 Dichopogon preissii
 Dillwynia uncinata
 Dillwynia uncinata var. Capel (R.D. Royce 4853)
 Diplolaena drummondii
 *Dipogon lignosus
 *Dischisma arenarium
 Diuris heberlei P2
 Diuris laxiflora
 Diuris longifolia
 Dodonaea ceratocarpa
 Dodonaea viscosa
 Dodonaea viscosa subsp. angustissima
 Drakaea glyptodon
 Drakaea livida
 Drakaea micrantha ms R
 Drakaea thynniphila
 Drosera enodes
 Drosera erythrorhiza
 Drosera hamiltonii
 Drosera macrantha subsp. macrantha
 Drosera modesta
 Drosera myriantha
 Drosera pallida
 Drosera pulchella
 Drosera stelliflora
 Drosera stolonifera subsp. stolonifera
 Dryandra armata
 Dryandra bipinnatifida subsp. bipinnatifida
 Dryandra formosa
 Dryandra lindleyana subsp. sylvestris
 Dryandra lindleyana var. lindleyana
 Dryandra mimica R
 Dryandra nivea
 Dryandra nivea subsp. uliginosa R
 Dryandra squarrosa subsp. argillacea R
 Dryandra squarrosa subsp. squarrosa
 Dysphania glomulifera subsp. glomulifera
 Echinopogon ovatus
 *Ehrharta erecta
 *Ehrharta longiflora
 Elythranthera brunonis
 Elythranthera emarginata
 Empodisma gracillimum
 Eragrostis brownii
 *Eragrostis curvula
 Eremosyne pectinata
 Eriochilus dilatatus subsp. magnus ms
 Eriochilus dilatatus subsp. multiflorus ms
 Eriochilus scaber subsp. scaber ms
 Eriochilus tenuis
 Eriostemon gardneri subsp. globosa ms P1
 Eriostemon spicatus
 Eryngium pinnatifidum
 Eucalyptus cornuta
 Eucalyptus decipiens subsp. chalara
 Eucalyptus diversicolor
 Eucalyptus drummondii
 Eucalyptus marginata
 Eucalyptus marginata subsp. marginata
 Eucalyptus megacarpa
 Eucalyptus obtusa ms
 Eucalyptus patens
 Eucalyptus rudis
 Euchilopsis linearis
 Euchiton gymnocephalus P3
 Euchiton sphaericus
 *Euphorbia peplus
 Eutaxia densifolia
 Eutaxia epacridoides
 Eutaxia obovata
 Eutaxia virgata
 Evandra aristata
 Exocarpos sparteus
 *Festuca arundinacea
 *Ficus carica
 *Filago gallica
 Franklandia fucifolia
 Franklandia triaristata P4
 *Fumaria capreolata
 Gahnia aristata
 Gahnia decomposita
 Gahnia lanigera
 Gahnia trifida
 *Galium divaricatum
 Gastrolobium bilobum
 Gastrolobium spinosum
 *Genista monspessulana
 *Geranium dissectum

Geranium solanderi
 Glischrocaryon aureum var. angustifolium
 Gompholobium amplexicaule
 Gompholobium capitatum
 Gompholobium confertum
 Gompholobium knightianum
 Gompholobium marginatum
 Gompholobium ovatum
 Gompholobium polymorphum
 Gompholobium preissii
 Gompholobium scabrum
 Gompholobium tomentosum
 Gompholobium venustum
 Gompholobium villosum
 Gonocarpus benthamii
 Gonocarpus benthamii subsp. benthamii ms
 Gonocarpus diffusus
 Gonocarpus hexandrus
 Gonocarpus hexandrus subsp. "unsorted"
 Gonocarpus hexandrus subsp. serratus
 Gonocarpus paniculatus
 Gonocarpus simplex P3
 Goodenia caerulea
 Goodenia eatoniana
 Goodenia filiformis
 Goodenia incana
 Goodenia leptoclada
 Goodenia pulchella
 Goodenia pusilla
 *Grammatotheca bergiana
 Gratiola pubescens
 Grevillea brachystylis
 Grevillea brachystylis subsp. brachystylis P2
 Grevillea bronwenae
 Grevillea centristigma
 Grevillea cirsiifolia P4
 Grevillea disjuncta
 Grevillea drummondii P4
 Grevillea manglesioides
 Grevillea papillosa P3
 Grevillea pulchella
 Grevillea pulchella subsp. ascendens
 Grevillea pulchella subsp. ascendens ms
 Grevillea pulchella subsp. pulchella
 Grevillea quercifolia
 Grevillea sp.Scott River(G.J.Keighery 4070) P1
 Grevillea trifida
 Gymnoschoenus anceps
 Haemodorum discolor
 Haemodorum laxum
 Haemodorum paniculatum
 Haemodorum simplex
 Haemodorum sparsiflorum
 Haemodorum spicatum
 Hakea amplexicaulis
 Hakea ceratophylla
 Hakea cyclocarpa
 Hakea falcata
 Hakea lasiantha
 Hakea lasianthoides
 Hakea linearis
 Hakea lissocarpha
 Hakea oleifolia
 Hakea ruscifolia
 Hakea sulcata
 Hakea varia
 Haloragis brownii
 Hardenbergia comptoniana
 Hemarthria uncinata var. uncinata
 Hemiantra pungens
 Hemigenia incana
 Hemigenia rigida
 Hemigenia sp.Albany(G.J.Keighery 8712)
 Hibbertia acerosa
 Hibbertia amplexicaulis
 Hibbertia aurea
 Hibbertia commutata
 Hibbertia cuneiformis
 Hibbertia cunninghamii
 Hibbertia ferruginea
 Hibbertia furfuracea
 Hibbertia furfuracea
 Hibbertia glomerata
 Hibbertia grossulariifolia
 Hibbertia hypericoides
 Hibbertia inconspicua
 Hibbertia lasiopus
 Hibbertia mylnei
 Hibbertia pachyrrhiza
 Hibbertia perfoliata
 Hibbertia pilosa
 Hibbertia quadricolor
 Hibbertia racemosa
 Hibbertia recurvifolia
 Hibbertia rhadinopoda
 Hibbertia serrata
 Hibbertia silvestris P4
 Hibbertia sp.hairy sepals(J.R.Wheeler 2464)
 Hibbertia stellaris
 Hibbertia subvaginata
 Hibbertia vaginata
 Hodgsoniola junciformis
 *Holcus lanatus
 Homalosciadium homalocarpum
 Homalospermum firmum
 *Homeria flaccida
 Hovea chorizemifolia
 Hovea elliptica
 Hovea trisperma
 Hyalosperma pusillum
 Hybanthus debilissimus
 Hybanthus volubilis P2

Hydrocotyle alata
Hydrocotyle callicarpa
Hydrocotyle hirta
Hydrocotyle plebeya
 **Hypericum perforatum* var. *angustifolium*
Hypocalymma angustifolium
Hypocalymma cordifolium
Hypocalymma ericifolium
Hypocalymma robustum
Hypocalymma scariosum
Hypocalymma sp. Scott River (A.S. George 11773)
 P4
Hypocalymma strictum
 **Hypochoeris glabra*
Hypolaena exsulca
Hypolaena fastigiata
Hypolaena pubescens
Hypolaena viridis ms
 **Hypolepis rugosula*
Hypoxis glabella
 **Iris germanica*
Isolepis cyperoides
 **Isolepis marginata*
Isolepis nodosa
 **Isolepis prolifera*
Isolepis setiformis
Isopogon attenuatus
Isopogon formosus subsp. *dasylepis* P3
Isopogon sphaerocephalus
Isotoma hypocrateriformis
Isotropis cuneifolia
Ixiolaena viscosa
Jacksonia aff. *horrida*
Jacksonia furcellata
Jacksonia horrida
Jacksonia sparsa ms P3
Jansonia formosa P3
Johnsonia lupulina
Juncus amabilis
Juncus aridicola
 **Juncus bufonius*
Juncus caespiticus
 **Juncus capitatus*
Juncus gregiflorus
Juncus holoschoenus
Juncus kraussii
Juncus kraussii subsp. *australiensis*
Juncus pallidus
Juncus pauciflorus
Juncus planifolius
Juncus subsecundus
 **Juncus usitatus*
Kennedia carinata
Kennedia coccinea
Kingia australis
Kunzea ciliata

Kunzea glabrescens
Kunzea recurva
Kunzea rostrata
Kunzea spathulata ms
Kunzea sulphurea
Labichea lanceolata
Lagenifera huegelii
Lambertia multiflora
Lambertia orbifolia R
Lambertia rariflora subsp. *rariflora* P4
Lasiopetalum floribundum
Latrobea diosmifolia
Latrobea tenella
Latrobea tenella var. *tenella*
 **Lavandula stoechas*
Laxmannia jamesii R
Laxmannia sessiliflora subsp. *australis*
Laxmannia squarrosa
Lechenaultia biloba
Lechenaultia expansa
Lepidosperma angustatum
Lepidosperma effusum
Lepidosperma gladiatum
Lepidosperma gracile
Lepidosperma leptostachyum
Lepidosperma leptostachyum
Lepidosperma longitudinale
Lepidosperma pubisquameum
Lepidosperma resinsum
Lepidosperma squamatum
Lepidosperma striatum
Lepidosperma tenue
Lepidosperma tetraquetrum
Lepidosperma tuberculatum
Lepidosperma viscidum
Leptinella drummondii P2
Leptocarpus crebriculmis ms
Leptocarpus diffusus ms
Leptocarpus elegans ms
Leptocarpus ramosissimus ms
Leptocarpus scariosus
Leptocarpus tenax
Leptocarpus tephrius ms
Leptoceras menziesii
Leptomeria cunninghamii
Leptomeria ellytes ms
Leptomeria lehmannii
Leptomeria scrobiculata
Leptomeria squarrolosa
Lepyrodia drummondiana
Lepyrodia heleocharoides P3
Lepyrodia hermaphrodita
Lepyrodia muirii
Leucophyta brownii
Leucopogon aff. *pendulus*
Leucopogon alternifolius

Leucopogon atherolepis
Leucopogon australis
Leucopogon capitellatus
Leucopogon carinatus
Leucopogon cinereus
Leucopogon cordatus
Leucopogon distans
Leucopogon distans subsp. *distans* ms
Leucopogon elatior
Leucopogon gilbertii P3
Leucopogon glabellus
Leucopogon hirsutus
Leucopogon obovatus
Leucopogon oxycedrus
Leucopogon parviflorus
Leucopogon pendulus
Leucopogon propinquus
Leucopogon racemosulus
Leucopogon reflexus
Leucopogon unilateralis
Leucopogon verticillatus
Levenhookia preissii
Levenhookia pusilla
Lindsaea linearis
Lobelia alata
Lobelia rhytidosperma
Lobelia tenuior
Logania campanulata
Logania serpyllifolia
Logania serpyllifolia subsp. *angustifolia*
Logania serpyllifolia subsp. *serpyllifolia*
Logania spermacocea
Logania vaginalis
 **Lolium perenne*
 **Lolium rigidum*
Lomandra brittanii
Lomandra caespitosa
Lomandra drummondii
Lomandra hermaphrodita
Lomandra integra
Lomandra nigricans
Lomandra nutans
Lomandra odora
Lomandra pauciflora
Lomandra preissii
Lomandra purpurea
Lomandra sericea
Lomandra sonderi
 **Lonicera japonica*
Loxocarya cinerea
Loxocarya flexuosa
Loxocarya sp. *Rosa Brook* (R.D.Royce 2465)
 **Lupinus angustifolius*
Lycopodiella serpentina
Lyginia barbata
Lysinema ciliatum

Lysinema conspicuum
Macrozamia riedlei
Marianthus candidus
Meeboldina coangustata ms
Meeboldina crassipes ms P3
Meeboldina denmarkica
Meeboldina roycei ms
Meeboldina scariosa ms
Meeboldina tephрина ms
Meeboldina thysanantha ms P3
Melaleuca basiccephala P4
Melaleuca incana
Melaleuca incana subsp. *Gingilup* (N.Gibson & M.Lyons 593) P2
Melaleuca incana subsp. *incana*
Melaleuca lateritia
Melaleuca microphylla
Melaleuca pauciflora
Melaleuca preissiana
Melaleuca raphiophylla
Melaleuca ringens P2
Melaleuca thymoides
Melaleuca viminea subsp. "unsorted"
Melaleuca viminea subsp. *viminea*
Melanostachya ustulata ms
 **Mentha pulegium*
 **Mentha spicata*
 **Mentha suaveolens*
Mesomelaena graciliceps
Mesomelaena preissii
Mesomelaena stygia
Mesomelaena tetragona
Meziella trifida R
Microlaena stipoides
Microtis brownii
Microtis media subsp. *media*
Microtis pulchella P4
Millotia myosotidifolia
Millotia tenuifolia var. *tenuifolia*
Mirbelia dilatata
 **Modiola caroliniana*
 **Monopsis debilis*
Monotaxis grandiflora
Monotaxis occidentalis
 **Muehlenbeckia adpressa*
Myoporum oppositifolium
Myriocephalus helichrysoides
Nemcia coriacea
Notodanthonia occidentalis
Notodanthonia pilosa
Nuytsia floribunda
Olax benthamiana
Olax phyllanthi
Olearia axillaris
Olearia cassiniaie
Olearia muricata

Olearia paucidentata
Opercularia apiciflora
Opercularia echinocephala
Opercularia hispidula
Opercularia vaginata
Opercularia volubilis
 **Ornithopus pinnatus*
Orthrosanthus laxus
Orthrosanthus laxus var. *laxus*
Orthrosanthus polystachyus
 **Ottelia ovalifolia* subsp. *ovalifolia*
 **Oxalis corniculata*
 **Oxalis glabra*
 **Oxalis purpurea*
Oxylobium lineare
Ozothamnus cordatus
Ozothamnus ramosus
Paracaleana nigrita
Paraserianthes lophantha subsp. *lophantha*
 **Parentucellia viscosa*
Patersonia babianoides
Patersonia juncea
Patersonia limbata
Patersonia pygmaea
Patersonia sp. Swamp Form (N. Gibson & M. Lyons 544)
Patersonia umbrosa
Patersonia umbrosa var. *xanthina*
Pelargonium littorale subsp. *littorale*
 **Pennisetum clandestinum*
 **Pennisetum macrourum*
Pentapeltis peltigera
Pentapeltis silvatica
Pericalymma crassipes
Pericalymma ellipticum
Pericalymma ellipticum var. *ellipticum* ms
Pericalymma ellipticum var. *floridum* ms
Pericalymma spongiocaulum ms
Persicaria decipiens
Persicaria prostrata
Persoonia elliptica
Persoonia graminea
Persoonia hakeiformis P2
Persoonia longifolia
Persoonia saccata
Petrophile acicularis
Petrophile diversifolia
Petrophile linearis
Petrophile serruriae
Petrophile squamata
Petrophile squamata subsp. *pluridissecta* ms
Petrophile squamata subsp. *squamata*
Petrorhagia velutina
Phebalium anceps
Phebalium obovatum ms
Philydrella pygmaea
Phlebocarya ciliata
Phlebocarya filifolia
Phyllangium paradoxum ms
Phyllanthus calycinus
Phylloglossum drummondii
Picris angustifolia subsp. *angustifolia*
Pimelea angustifolia
Pimelea ciliata subsp. *ciliata*
Pimelea clavata
Pimelea ferruginea
Pimelea hispida
Pimelea imbricata
Pimelea imbricata var. *piligera*
Pimelea lanata
Pimelea longiflora
Pimelea longiflora subsp. *longiflora*
Pimelea preissii
Pimelea rosea subsp. *rosea*
Pimelea spectabilis
Pimelea suaveolens
Pimelea suaveolens subsp. *suaveolens*
Pimelea sylvestris
Pimelea tinctoria
 **Pinus pinaster*
Pithocarpa pulchella var. *melanostigma* ms
 **Plantago lanceolata*
 **Plantago major*
Platychorda applanata ms
Platysace compressa
Platysace filiformis
Platysace tenuissima
Platytheca galioides
Poa drummondiana
Poa homomalla
Poa poiformis
Poa porphyroclados
Poa serpentum
Podocarpus drouynianus
Podolepis canescens
Podolepis gracilis
Podotheca angustifolia
Podotheca chrysantha
 **Polygala myrtifolia*
 **Polypogon monspeliensis*
Poranthera huegelii
Prasophyllum brownii
Prasophyllum elatum
Prasophyllum macrostachyum
Prasophyllum triangulare
 **Prunella vulgaris*
 **Prunus cerasifera*
Pseudanthus virgatus
 **Pseudognaphalium luteoalbum*
Pteridium esculentum
Pterostylis aff. *nana*
Pterostylis barbata

Pterostylis pyramidalis
Pterostylis recurva
Pterostylis turfosa P1
Pterostylis vittata
Ptilotus manglesii
Ptilotus sericostachyus subsp. *sericostachyus*
Pultenaea drummondii
Pultenaea ericifolia
Pultenaea ochreatea
Pultenaea pinifolia P3
Pultenaea radiata P3
Pultenaea reticulata
Pultenaea skinneri P4
Pultenaea strobilifera
Pultenaea verruculosa var. *verruculosa*
Pyrorchis forrestii
Pyrorchis nigricans
Quinetia urvillei
Ranunculus colonorum
 **Ranunculus muricatus*
Reedia spathacea P4
Regelia ciliata
Restio amblycoleus
Restio applanatus
Rhagodia baccata
Rhodanthe citrina
Ricinocarpos glaucus
 **Rosa laevigata*
 **Rosa rubiginosa*
 **Rubus discolor*
Rulingia corylifolia
Scaevola calliptera
Scaevola crassifolia
Scaevola glandulifera
Scaevola globulifera
Scaevola microphylla
Scaevola nitida
Scaevola striata
Scaevola striata var. *striata*
Schizaea fistulosa
Schoenolaena juncea
Schoenus cruentus
Schoenus curvifolius
Schoenus efoliatus
Schoenus grandiflorus
Schoenus laevigatus
Schoenus sp. *Bullsbrook* (J.J. Alford 915) P2
Schoenus subbulbosus
Schoenus subflavus
Schoenus subflavus subsp. *subflavus*
Schoenus sublateralis
Schoenus subluxus
Schoenus tenellus
Schoenus variicellae
Selaginella gracillima
 **Senecio diaschides*
 **Senecio elegans*
Senecio glomeratus
Senecio hispidulus
Senecio minimus
Senecio ramosissimus
Sequoia sempervirens
 **Sigesbeckia orientalis*
Siloxerus filifolius
Siloxerus humifusus
 **Silybum marianum*
 **Solanum linnaeanum*
Sollya heterophylla
 **Sonchus asper*
 **Sonchus oleraceus*
Sowerbaea laxiflora
Sphaerolobium fornicatum
Sphaerolobium grandiflorum
Sphaerolobium medium
Sphaerolobium nudiflorum
Sphaerolobium racemosum
Sphaerolobium scabriusculum
 **Sphaeropteris cooperi*
Sphenotoma capitatum
Sphenotoma gracile
Sphenotoma parviflorum P3
Sphenotoma squarrosum
Spinifex hirsutus
Sporadanthus rivularis ms P3
Sporadanthus strictus ms
Spyridium globulosum
Stachystemon vermicularis
Stackhousia monogyna
Stackhousia pubescens
Stenotalis ramosissima
Stirlingia latifolia
Stirlingia seselifolia
Strangea stenocarpoides
Stylidium adnatum
Stylidium adnatum var. *abbreviatum*
Stylidium aff. *spathulatum*
Stylidium affine
Stylidium amoenum
Stylidium barleei P3
Stylidium breviscapum
Stylidium brunonianum
Stylidium brunonianum subsp. *brunonianum*
Stylidium brunonianum subsp. *minor*
Stylidium bulbiferum
Stylidium calcaratum
Stylidium ciliatum
Stylidium corymbosum
Stylidium crassifolium
Stylidium falcatum
Stylidium glaucum
Stylidium glaucum subsp. *angustifolium*
Stylidium guttatum

Stylidium inundatum
Stylidium junceum
Stylidium junceum subsp. *brevius*
Stylidium lateriticola
Stylidium leeuwinense ms P3
Stylidium lineatum
Stylidium luteum
Stylidium mimeticum P3
Stylidium piliferum
Stylidium plantagineum P4
Stylidium pulchellum
Stylidium repens
Stylidium rhynchocarpum
Stylidium rupestre
Stylidium scandens
Stylidium spathulatum
Stylidium squamosotuberosum
Stylidium uniflorum
Styphelia tenuiflora
Synaphea acutiloba P3
Synaphea favosa
Synaphea floribunda
Synaphea gracillima
Synaphea otio stigma P1
Synaphea petiolaris
Synaphea petiolaris subsp. *petiolaris*
Synaphea petiolaris subsp. *triloba*
Synaphea whicherensis P3
Taraxis glaucescens ms
Taraxis grossa ms
Tetrraria capillaris
Tetrraria octandra
Tetrrarrhena laevis
Tetrratheca filiformis
Tetrratheca hirsuta
Tetrratheca setigera
Thelymitra canaliculata
Thelymitra cornicina
Thelymitra crinita
Thelymitra cucullata
Thelymitra flexuosa
Thelymitra fuscolutea
Thomasia brachystachys P1
Thomasia grandiflora
Thomasia heterophylla ms
Thomasia laxiflora P1
Thomasia macrocalyx
Thomasia paniculata
Thomasia pauciflora
Thomasia sp. Big Brook (M.Koch 2373)
Thomasia triphylla
Thryptomene saxicola
Thysanotus arbuscula
Thysanotus arenarius
Thysanotus dichotomus
Thysanotus formosus P1
Thysanotus glaucus P4
Thysanotus gracilis
Thysanotus manglesianus
Thysanotus multiflorus
Thysanotus patersonii
Thysanotus pauciflorus
Thysanotus pseudojunceus
Thysanotus sparteus
Thysanotus spiniger
Thysanotus tenellus
Thysanotus thyrsoides
Thysanotus triandrus
**Tolpis barbata*
Trachymene coerulea var. *coerulea*
Trachymene pilosa
Trachymene sp. Walpole (A.S. George 15063)
Tremandra diffusa
Tremandra stelligera
Tremulina cracens ms
Tremulina tremula ms
Tribonanthes australis
Trichocline spathulata
Tricoryne elatior
Tricoryne humilis
Tricostularia neesii var. *elatior*
Tricostularia neesii var. *neesii*
**Trifolium dubium*
**Trifolium ligusticum*
**Trifolium resupinatum* var. *resupinatum*
Triglochin huegelii
Triglochin lineare
Triglochin mucronatum
Tripterococcus brunonis
**Tritonia lineata*
Trymalium floribundum
Trymalium floribundum subsp. *trifidum*
Trymalium ledifolium var. *rosmarinifolium*
Tyrbastes glaucescens ms P4
Utricularia benthamii
Utricularia multifida
Utricularia simplex
Utricularia violacea
Velleia macrophylla
Velleia trinervis
**Vellereophyton dealbatum*
**Verbascum virgatum*
Veronica calycina
Verticordia lehmannii P4
Verticordia plumosa var. *plumosa*
**Vicia sativa* subsp. *nigra*
Villarsia albiflora
Villarsia lasiosperma
Villarsia latifolia
Villarsia parnassifolia
Villarsia submersa P4
Wahlenbergia communis

Wahlenbergia littorcola
Wahlenbergia multicaulis
Wahlenbergia preissii
Wurmbea monantha
Xanthorrhoea brunonis subsp. semibarbata
Xanthorrhoea gracilis
Xanthorrhoea preissii
Xanthosia atkinsoniana
Xanthosia candida
Xanthosia huegelii
Xanthosia huegelii subsp. southern(G.J.Keighery
2165)
Xanthosia peduncularis P3
Xanthosia pusilla
Xylomelum occidentale
Xyris flexifolia
Xyris indivisa
Xyris lacera
Xyris lanata
Xyris laxiflora
Xyris roycei
*Zantedeschia aethiopica

APPENDIX

5

APPENDIX 5

Fauna Species in the Nannup area (Source- WA Museum Faunabase)

Information provided by Western Australian Museum, Faunabase for the latitude/longitude coordinates: -33.7833, 115.3333 and -34.4666, 116.9833. May contain native and exotic species.

Note: not a comprehensive list. * denotes an introduced species.

AMPHIBIA SPECIES

Hylidae

Litoria adelaidensis .
Litoria moorei .

Myobatrachidae

Crinia georgiana .
Crinia glauerti .
Crinia pseudinsignifera .
Crinia sp .
Crinia subinsignifera .
Geocrinia leai .
Geocrinia rosea .
Geocrinia sp .
Heleioporus eyrei .
Heleioporus psammophilus .
Heleioporus sp .
Limnodynastes dorsalis .
Metacrinia nichollsi .
Myobatrachus gouldii .
Neobatrachus albipes .
Neobatrachus pelobatoides .
Pseudophryne guentheri .

BIRD SPECIES

Acanthizidae

Acanthiza apicalis .
Acanthiza apicalis leeuwinensis .
Acanthiza chrysorrhoa .
Acanthiza inornata .
Calamanthus campestris .
Sericornis frontalis .
Sericornis frontalis maculatus .

Accipitridae

Accipiter cirrocephalus .
Accipiter cirrocephalus cirrocephalus .
Accipiter fasciatus fasciatus .
Aquila audax .
Aquila morphnoides morphnoides .
Circus assimilis .
Elanus caeruleus axillaris .
Haliastur sphenurus .

Hamirostra isura .
Pandion haliaetus cristatus .

Aegothelidae

Aegotheles cristatus .
Aegotheles cristatus cristatus .

Anatidae

Anas superciliosa .
Biziura lobata .

Ardeidae

Ixobrychus minutus dubius .
Nycticorax caledonicus hilli .

Artamidae

Artamus cyanopterus .

Burhinidae

Burhinus grallarius .

Campephagidae

Coracina maxima .
Coracina novaehollandiae .
Coracina novaehollandiae novaehollandiae .
Lalage tricolor .

Caprimulgidae

Eurostopodus argus .

Casuariidae

Dromaius ater .

Charadriidae

Charadrius rubricollis .

Climacteridae

Climacteris rufa .

Columbidae

Phaps chalcoptera .
Phaps elegans .

Corvidae

Corvus coronoides perplexus .

Cracticidae

Cracticus tibicen .
Cracticus tibicen dorsalis .

Cuculidae

Cacomantis flabelliformis .
Cacomantis flabelliformis flabelliformis .
Chrysococcyx lucidus plagosus .
Cuculus pallidus .

Dasyornithidae

Dasyornis longirostris .

Dicaeidae

Dicaeum hirundinaceum .

Dicruridae

Grallina cyanoleuca .

Myiagra inquieta .

Rhipidura fuliginosa preissi .

Falconidae

Falco berigora berigora .

Falco cenchroides cenchroides .

Falco longipennis longipennis .

Falco peregrinus .

Halcyonidae

Dacelo novaeguineae .

Dacelo novaeguineae novaeguineae .

Todiramphus sanctus sanctus .

Hirundinidae

Hirundo neoxena .

Hirundo nigricans nigricans .

Laridae

Sterna leucoptera .

Maluridae

Malurus elegans .

Malurus splendens .

Malurus splendens splendens .

Stipiturus malachurus westernensis .

Megapodiidae

Leipoa ocellata .

Meliphagidae

Acanthorhynchus superciliosus .

Anthochaera carunculata .

Anthochaera lunulata .

Lichenostomus ornatus .

Lichmera indistincta indistincta .

Melithreptus chloropsis .

Phylidonyris novaehollandiae .

Phylidonyris novaehollandiae longirostris .

Motacillidae

Anthus australis australis .

Neosittidae

Daphoenositta chrysoptera pileata .

Otididae

Ardeotis australis .

Pachycephalidae

Colluricincla harmonica .
Colluricincla harmonica rufiventris .
Falcunculus frontatus .
Pachycephala pectoralis fuliginosa .
Pachycephala rufiventris rufiventris .

Pardalotidae

Pardalotus punctatus .
Pardalotus punctatus punctatus .
Pardalotus punctatus xanthopyge .
Pardalotus striatus .
Pardalotus striatus westraliensis .

Passeridae

Stagonopleura oculata .

Petroicidae

Eopsaltria australis griseogularis .
Eopsaltria georgiana .
Eopsaltria griseogularis .
Eopsaltria griseogularis griseogularis .
Petroica multicolor .
Petroica multicolor campbelli .

Phalacrocoracidae

Phalacrocorax melanoleucos melanoleucos .

Phasianidae

Coturnix pectoralis .
Coturnix ypsilophora .

Podargidae

Podargus strigoides .
Podargus strigoides brachypterus .

Podicipedidae

Tachybaptus novaehollandiae novaehollandiae .

Pomatostomidae

Pomatostomus superciliosus .

Procellariidae

Fulmarus glacialisoides .

Psittacidae

Cacatua pastinator pastinator .
Calyptorhynchus banksii .
Calyptorhynchus baudinii .
Calyptorhynchus latirostris .

Psittacidae

Glossopsitta porphyrocephala .
Neophema elegans .
Platycercus icterotis .

Platycercus icterotis icterotis .
Platycercus spurius .
Platycercus zonarius .
Platycercus zonarius semitorquatus .
Polytelis anthopeplus anthopeplus .

Rallidae

Gallinula tenebrosa tenebrosa .
Gallirallus philippensis mellori .
Porphyrio porphyrio bellus .
Rallus pectoralis clelandi .

Strigidae

Ninox connivens .
Ninox connivens connivens .
Ninox novaeseelandiae .
Ninox novaeseelandiae boobook .

Sturnidae

Sturnus vulgaris .

Sylviidae

Acrocephalus australis .
Megalurus gramineus gramineus .

Threskiornithidae

Threskiornis spinicollis .

Turdidae

Turdus merula merula .

Turnicidae

Turnix varia varia .

Tytonidae

Tyto alba .
Tyto alba delicatula .
Tyto novaehollandiae .
Tyto novaehollandiae novaehollandiae .

Zosteropidae

Zosterops lateralis .
Zosterops lateralis gouldi .

FISH SPECIES

Antennariidae

Histiophryne cryptacanthus .

Apogonidae

Dinolestes lewini .

Atherinidae

Atherinosoma wallacei .

Cyprinidae

Carassius auratus .

Engraulididae

Engraulis australis .

Galaxiidae

Galaxias occidentalis .

Galaxiella munda .

Galaxiella nigrostriata .

Galaxiella sp.

Gobiidae

Afurcagobius suppositus .

Pseudogobius olorum .

Kyphosidae

Girella tephraeops .

Girella zebra .

Labridae

Bodianus vulpinus .

Lepidogalaxiidae

Lepidogalaxias salamandroides .

Monacanthidae

Meuschenia flavolineata .

Mullidae

Upeneichthys lineatus .

Nannopercidae

Edelia vittata .

Nannatherina balstoni .

Paralichthyidae

Pseudorhombus jenynsii .

Parascyllidae

Parascyllium variolatum .

Percichthyidae

Bostockia porosa .

Percidae

Perca fluviatilis .

Petromyzontidae

Geotria australis .

Geotria sp.

Plesiopidae

Paraplesiops meleagris .

Trachinops brauni .

Trachinops noarlungae .

Plotosidae

Cnidoglanis macrocephalus .
Tandanus bostocki .

Poeciliidae

Gambusia affinis .

Pomatomidae

Pomatomus saltatrix .

Salmonidae

Salmo gairdneri .
Salmo trutta .

Scorpaenidae

Gymnapistes marmoratus .

Serranidae

Acanthistius pardalotus .
Epinephelides armatus .
Trichonotus sp.

Sparidae

Acanthopagrus butcheri .

Tetraodontidae

Torquigener pleurogramma .

MAMMAL SPECIES

Balaenidae

Eubalaena australis .

Balaenopteridae

Balaenoptera sp.

Bovidae

Ovis aries .

Burramyidae

Cercartetus concinnus .

Canidae

**Canis lupus familiaris* (Dog)
**Vulpes vulpes* (Fox)

Dasyuridae

Antechinus flavipes .
Antechinus flavipes leucogaster .
Dasyurus geoffroii .
Phascogale calura .
Phascogale tapoatafa .
Phascogale tapoatafa tapoatafa .
Sminthopsis gilberti .

Sminthopsis griseoventer .
Sminthopsis griseoventer griseoventer .
Sminthopsis murina .
Sminthopsis sp .

Delphinidae

Pseudorca crassidens .

Equidae

**Equus caballus* (Horse)

Felidae

**Felis catus* (Cat)

Leporidae

**Oryctolagus cuniculus* (Rabbit)

Macropodidae

Macropus fuliginosus .

Macropus irma .

Setonix brachyurus .

Molossidae

Mormopterus planiceps .

Tadarida australis .

Muridae

Hydromys chrysogaster .

**Mus musculus* (House Mouse)

Rattus fuscipes .

**Rattus rattus* (Black Rat)

Myrmecobiidae

Myrmecobius fasciatus .

Otariidae

Neophoca cinerea .

Peramelidae

Isoodon obesulus fusciventer .

Phalangeridae

Trichosurus vulpecula .

Trichosurus vulpecula vulpecula .

Potoroidae

Bettongia penicillata .

Bettongia penicillata ogilbyi .

Bettongia sp .

Pseudocheiridae

Pseudocheirus occidentalis .

Pseudocheirus peregrinus .

Tachyglossidae

Tachyglossus aculeatus .

Tarsipedidae

Tarsipes rostratus .

Thylacomyidae

Macrotis lagotis .

Vespertilionidae

Chalinolobus gouldii .

Chalinolobus morio .

Chalinolobus sp.

Falsistrellus mackenziei .

Nyctophilus cf. gouldi .

Nyctophilus geoffroyi .

Nyctophilus gouldi .

Nyctophilus timoriensis .

Nyctophilus timoriensis timoriensis .

Vespadelus regulus .

Ziphiidae

Mesoplodon bowdoini .

Mesoplodon grayi .

Ziphius cavirostris .

REPTILE SPECIES

Agamidae

Pogona minor minor .

Boidae

Morelia spilota imbricata .

Cheloniidae

Caretta caretta .

Cheluidae

Chelodina oblonga .

Elapidae

Echiopsis curta .

Elapognathus coronatus .

Elapognathus minor .

Notechis scutatus .

Parasuta gouldii .

Parasuta nigriceps .

Pseudonaja affinis affinis .

Rhinoplocephalus bicolor .

Simoselaps bertholdi .

Gekkonidae

Christinus marmoratus .

Diplodactylus granariensis .

Diplodactylus polyophthalmus .

Underwoodisaurus milii .

Pygopodidae

Aprasia pulchella .
Aprasia repens .
Christinus marmoratus .
Lialis burtonis .

Scincidae

Acritoscincus trilineatum .
Cryptoblepharus plagiocephalus .
Ctenophorus sp .
Ctenotus caterifer .
Ctenotus delli .
Ctenotus impar .
Ctenotus labillardieri .
Egernia kingii .
Egernia luctuosa .
Egernia napoleonis .
Egernia pulchra pulchra .
Glaphyromorphus gracilipes .
Hemiernis initialis initialis .
Hemiernis peronii .
Hemiernis peronii peronii .
Hemiernis peronii tridactyla .
Hemiernis quadrilineata .
Lerista distinguenda .
Lerista microtis .
Lerista microtis microtis .
Menetia greyii .
Morethia lineocellata .
Morethia obscura .
Morethia sp .
Tiliqua occipitalis .
Tiliqua rugosa rugosa .

Typhlopidae

Ramphotyphlops australis .
Ramphotyphlops pinguis .
Ramphotyphlops waitii .

Varanidae

Varanus rosenbergi .
Varanus sp .

APPENDIX

6



ROADSIDE CONSERVATION COMMITTEE

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

Preamble

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

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

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

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

Legislation

All Western Australian native flora is protected under the *Wildlife Conservation Act 1950*. Native flora includes all parts of a native plant, including its flowers, seed, and timber.

Protection of native flora under the Act has the effect of requiring a person to only take (cut or remove) native flora from Crown land under a licence.

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

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

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

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

Commercial Wildflower Harvesting

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

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

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

There are situations where some harvesting may be considered, such as in very wide road reserves where the activity can be screened from road users, but mostly road managers have

been discouraged from supporting or allowing such harvesting to occur. If harvesting is to be approved, then the points provided at the end of these guidelines should be considered.

Seed Collection

Throughout much of the south west, revegetation of the native flora is being undertaken to redress the problems that historic clearing has created. Increasingly, this revegetation is aimed at using local native flora so as to recreate the native vegetation to support biodiversity objectives. The paradox is that in many areas the native vegetation has been cleared to such an extent that adequate sources of native seed cannot be found for undertaking this work. Roadside vegetation may be a source of such seed.

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

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

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

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

Timber Harvesting from Roadsides.

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

The RCC seeks to encourage roadside managers to retain timber on roadsides as an important component of the natural habitat, which fulfils ecological, aesthetic and land management

functions. The value of fallen logs and branches within the roadside is often not realised, but this material forms an important habitat for many species of insects, reptiles, mammals and birds, thus enhancing the roadside biodiversity. Insects and reptiles that live in fallen timber are also important elements of the food chain, and are very important to the functioning of natural systems, and the survival of many other native animals.

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

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

Guidelines For Harvesting On Roadsides

- ✓ In all cases the permission of the managing authority, i.e. Main Roads WA, Local Government or CALM, must be sought before native flora is removed from a roadside.
- ✓ Flora removal should be from only designated roads, which have wider vegetated road verges i.e. vegetation width > 3metres
- ✓ The number of operators authorised to remove flora from a roadside should be strictly limited to that which can be sustained and managed. The determination of this is at the judgement of the managing authority, but consideration should be taken of the type of flora being harvested and an evaluation of monitoring of the impact of the harvest activity. Advice may be sought from CALM.
- ✓ Approval for flora harvesting should be for a set period, with a review of the impact and operation before renewal.
- ✓ Approval should also stipulate approved methods of harvesting, the species which may be harvested, and the quantity of material to be taken. Advice on harvest conditions may be obtained from CALM.
- ✓ Any flora removed should not affect the viability of the residual seed bank. It is recommended that no more than 20% of the flowers or seed on a plant should be taken, unless it is in an area that is scheduled to be cleared as part of road management.
- ✓ Methods of harvesting flora should not jeopardise the survival of the plant/tree, unless it is in an area that is scheduled to be cleared as part of road management.
- ✓ The removal of whole plants should be restricted to areas that are scheduled to be cleared as part of road management. Note, some species of flora such as zamia palms and grass trees can not be removed for commercial purposes without a special endorsement on the Commercial Purposes Licence issued by CALM.

- ✓ No flora of special conservation concern (Declared Rare Flora or Priority Flora) should be removed without special authorisation through CALM.
- ✓ No commercial harvesting of any plant product should be allowed for any reason between the markers that delineate a Special Environmental Area.
- ✓ Flora harvesting should be prohibited from designated Flora Roads.
- ✓ Care should be taken that access to Dieback infected areas is limited to the drier months of the year, and vehicular access disallowed.
- ✓ Safety should always be of prime concern and every effort should be made to ensure that personal safety is a key consideration in any harvesting operation.
- ✓ Flora harvesters should not operate from the road side in areas where the vegetation is close to the road, where vehicles can not be safely parked off the road, or where there is poor driver visibility.

Appendix

7



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 CALM);
- 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, CALM) establish a *Register of Roads Important for Conservation* also. This register should be consulted prior to any works being initiated in the area.



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

Photo D. Lamont