

A Survey of Roadside Conservation Values in the Shire of Woodanilling



Declared Rare Flora, such as *Verticordia fimbrilepis* subsp. *fimbrilepis* occur along roadsides in the Shire of Woodanilling

Photos: WA Herbarium, taken by E.A. George, N.J. Stevens, R. Smith,

and Roadside Management Guidelines

September 2003 - Roadside Conservation Committee



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1.0 INTRODUCTION

Woodanilling is located 250 km south east of Perth in Western Australia's south west land division. The Shire covers an area of 1126km² and supports a population of 409 people. The area experiences a mediterranean climate with an average annual rainfall of 455.6 mm. Seasonal temperatures are characterised by warm summers, with maxima averaging in the high twenties, and mild winters, with maxima in the mid teens. Mean daily maximum and minimum temperatures and rainfalls are shown below (Figure 1).

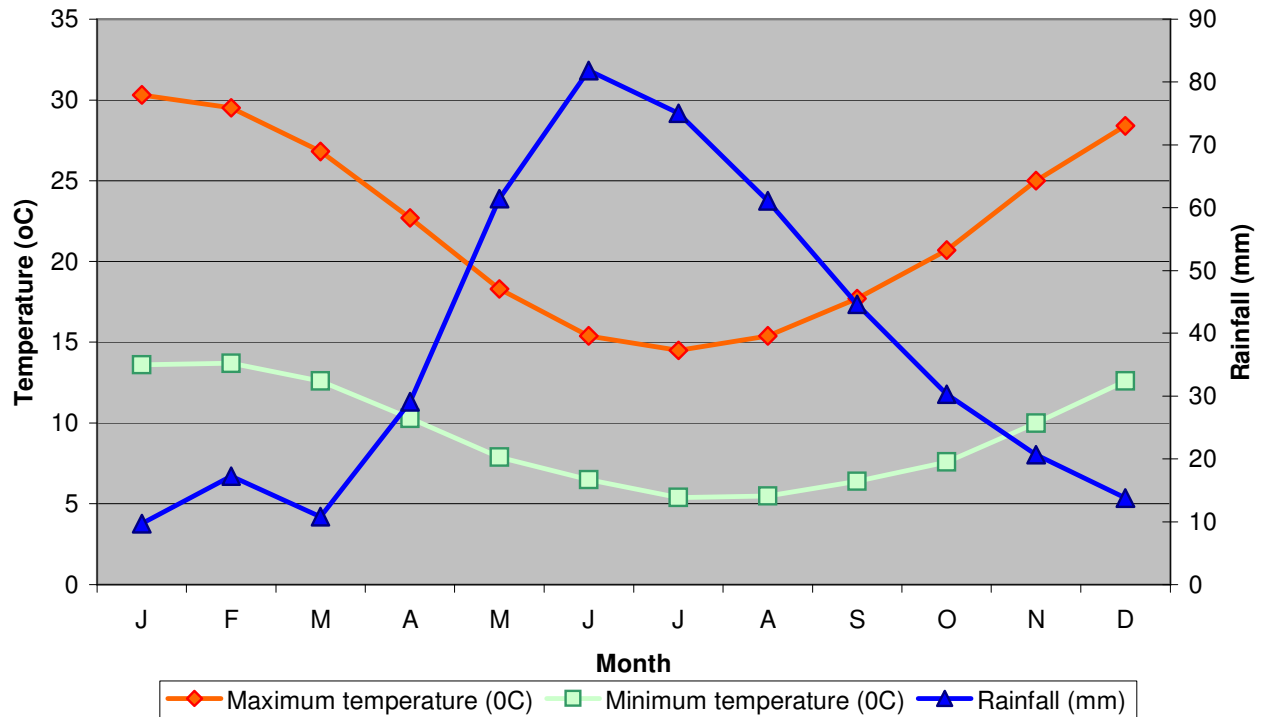


Figure 1. Monthly average maximum and minimum temperatures (C) and rainfall (mm) in the Shire of Woodanilling.

Typical of the region, the major agricultural pursuits are cereal crops, sheep and cattle. Tourism is also an important industry with the area's spectacular natural resources being a major attraction. Salient features of the area include a heritage trail, Wingedyne Nature Reserve, Martup Pool, Queerearrup Lake and the wildflowers that abound in the area.

1.1 Flora and Fauna

Based on WA Herbarium records, almost 400 species of plants have been recorded from the Shire of Woodanilling. These include 14 species of Acacia, 23 species of Orchids, 21 species of Eucalypt and 17 species of Verticordia, see Appendix 4.

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 Environment Area's (SEA's), and are marked out by yellow stakes with an identification plate welded on, see section 6.5 and figure 9.

Based on information from the Department of Conservation and Land Management (DCLM), there are nine populations of rare and priority flora on roadsides in the Shire of Woodanilling. Seven of these locations are vested in the Shire, and two are vested in Main Roads WA.

Species of declared rare, or priority flora, in the Shire include:

- *Verticordia fimbrilepis* subsp. *fimbrilepis*
- *Jacksonia velveta*
- *Verticordia fimbrilepis* subsp. *fimbrilepis*
- *Conostylis drummondii*
- *Dryandra acanthopoda*
- *Jacksonia velveta*



Jacksonia velveta
Photo-WA Herbarium, taken by C. Broex



Dryandra acanthopoda
Photos- WA Herbarium, taken by J.A.Cochrane, M.Hancock, M.Pieroni



Conostylis drummondii
Photo- WA Herbarium, taken by S.D. Hopper

Information collected by the Department of Conservation and Land Management indicated that a number of threatened species of fauna have also been recorded and/or observed in the Shire.

These include:

- Chuditch (*Dasyurus geoffroii*)
- Red-tailed Phascogale (*Phascogale calura*)
- Western Brush Wallaby (*Macropus irma*),
- Numbat (*Myrmecobius fasciatus*),
- Carpet Python (*Morelia spilota imbricata*)



Chuditch

Photo by Bert and Babs Wells

1.2 Weeds

Weed invasion along roadsides is an important issue, as they impact on many aspects and values of the road reserve *per se*. Weeds are often disturbance colonisers and as such invade roadsides, often increasing the fire risk, degrading biodiversity values or interfering with the road and its infrastructure. 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.

WA Herbarium records indicate 12 main weed species recorded in the Shire of Woodanilling, see next page.

Please note - this should not be considered as a complete list, as collectors often overlook weeds as legitimate botanical specimens.



Stinkwort (*Dittrichia graveolens*) is a common roadside weed

Photo- WA Herbarium, taken by K.C. Richardson

List of exotic plants (weeds) recorded in the Shire of Woodanilling:

<u>Botanical Name</u>	<u>Common Name</u>
<i>Asparagus asparagoides</i>	Bridal creeper
<i>Chrysanthemoides monilifera subsp. Monilifera</i>	Boneseed, bitou bush
<i>Dittrichia graveolens</i>	Stinkwort
<i>Eragrostis</i>	Lovegrass
<i>Helichrysum leucopsideum</i>	Common heliotrope
<i>Hordeum geniculatum</i>	Mediterranean barley grass
<i>Ixia maculata</i>	Yellow ixia
<i>Lolium perenne x rigidum</i>	Ryegrass
<i>Monopsis debilis</i>	
<i>Pennisetum setaceum</i>	Fountain grass
<i>Solanum hoplopetalum</i>	Afghan thistle
<i>Sparaxis bulbifera</i>	
<i>Vaccaria hispanica</i>	Cowcockle



Pennisetum setaceum
Photo- Western Weeds (1997)



Sparaxis bulbifera
Photo- WA Herbarium, taken by R.Randall



Monopsis debilis
Photo- Western Weeds (1997)

2.0 VALUE OF ROADSIDES

Since the settlement of Western Australia by Europeans, large areas of native vegetation in the south west of the state have been cleared to make way for agriculture and other development ventures. The fragmentation of the more or less continuous tracts of native vegetation suites by clearing has resulted in the isolation of plant and animal populations and communities. Populations of flora and fauna restricted to these man-made biogeographical islands of small remnants are prone to food shortages, disease and reduced genetic diversity. However, the presence of native vegetation along roadsides can often assist in alleviating this isolation effect by providing corridors between bush remnants, thereby facilitating the movement of biota across the landscape. Unfortunately the protective mantle afforded by the native flora has been badly depleted with now only approximately 14,367 ha, or 12.9% of remnant vegetation remaining in the Shire of Woodanilling. (Beeston *et al*, 2001).

Trees are good - bush is better

Remnant native vegetation includes more than just trees. Trees, shrubs and ground covers (creepers, grasses and herbs) combine to provide valuable food and shelter for different types of wildlife. Existing native vegetation will require less maintenance if left undisturbed.

Native trees, shrubs and grasses on the roadside are valuable because they:

- Often are the only remaining example of original vegetation within cleared areas;
- Are easier to maintain and generally less fire prone than introduced vegetation;
- Provide habitat for many native species of plants, mammals, reptiles amphibians and invertebrates;
- Provide wildlife corridors linking other areas of native vegetation;
- Often contain rare and endangered plants and animals;
- 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. As well as creating a more favourable impression of an area, roadsides attract tourists who visit specifically to view wildflowers.
- Often contain sites of historical or cultural significance;
- Provide windbreaks and stock shelter areas for adjoining farmland; (This can help stabilise temperature and reduce evaporation, and thereby providing microhabitat more suitable to higher levels of productivity. Well-conserved roadsides also assist with erosion and salinity control. In addition, native vegetation on roadsides is generally far less of a fire threat than annual weeds. Undisturbed roadsides provide a benchmark for the study of soil change during agricultural development).
- Are a vital source of local seed for revegetation projects. In lieu of other alternatives and cognisant of limitations; road reserves can also 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.**

In a time of rapid change where the demands placed on the natural world are many, it is vital that there is a coordinated management of lands across all tenures to ensure the sustainability and integrity of the natural biota and processes, agricultural lands and service infrastructure. It is somewhat ironic that the reserves established to cater for a transport system in a modern world are now an integral component of this coordinated management approach.



Roadsides the vital link

3.0 LEGISLATION

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 (DCLM) has the legislative responsibility to manage and protect all native flora and fauna in Western Australia. It is important to note that all 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

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.

The Environmental Protection Amendment Bill 2002 is currently before parliament and it is envisaged that this will require greater adherence to legislative requirements before native vegetation is cleared. This legislation will provide for two types of permits which will provide for permission to clear native vegetation, however they will have certain conditions attached to them. One of these will be to prepare, implement and adhere to a roadside or specific tenure management plan. Before any native vegetation clearing is undertaken it is incumbent on the project manager or land manager to ensure that the proposed clearing is being carried out under the terms and conditions of the pending legislation, as there are transitional provisions within it, which are retrospective from 26th June 2002.

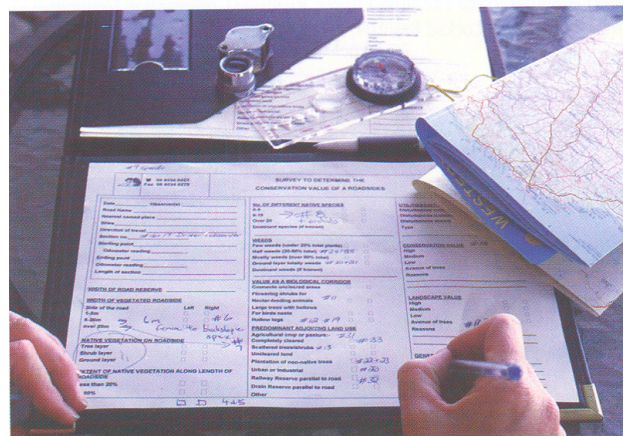
4.0 ASSESSMENT PROCESS

4.1 Methods

The methods to assess and calculate the conservation value of the roadside reserves are described in 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, see Appendix 2. 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).

Fieldwork was conducted by David Lamont and RCC volunteer Siusan Campbell-Lamont during the months of November 1997 and April 1998.

It is now hoped that the data collected will be used by all sectors of the community who have an interest in the roadside environment.



4.2 Quantifying Conservation Values

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

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

Each of these attributes was given a score ranging from 0 to 2 points. The combined scores provide 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

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

Table 1: Colour codes used to depict the conservation status of roadsides.

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;
- dominant native species;
- dominant weeds;
- 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 local government and community interest.

4.3 Mapping Conservation Values

A computer generated (GIS Arc Info) map, at a scale of 1:100 000, depicting the conservation status of the roadside vegetation and the width of the road reserves within the Shire of Woodanilling was produced. The data used to produce both the map and the following figures and tables are presented in Appendix 3.

The roadside conservation value map initially provides an inventory of the *status quo* of the condition of the roadside vegetation. This is important as 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 *per se*, 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 fire management techniques or regimes and weed control programmes.

The map can also be used as a reference to overlay transparencies of other information relevant to roadside conservation. Data obtained from MRWA, DCLM and the Department of Agriculture WA can be used to produce an overlay map that depicts the location of remnant vegetation on both the Crown estate and privately owned land. This enables the roadside vegetation to be assessed in the context of its importance to the shire's overall conservation network. Other transparencies, 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.

As well as providing a road reserve planning and management tool, the survey data can also be used for:

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



5.0 SURVEY DATA RESULTS

A summary of the general roadside conditions in the Shire of Woodanilling is presented in Table 2. The survey data have been collated 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 (Table 2).

Conservation Status (km)			Native Vegetation on Roadside (km)			Weed Infestation (km)		
High (9-12)	165.2	17.3%	2 - 3 veg	258.6	27.1%	Light (2)	253.5	26.5%
Med (7-8)	261.5	27.4%	1 veg layer	674.7	70.6%	Medium	634.4	66.4%
Med (5-6)	439.3	46.0%	0 veg	22.2	2.3%	Heavy (0)	67.6	7.1%
Low (0-4)	89.5	9.4%						
			Total	955.5	100.0%	Total	955.5	100.0%
Conservation Values (km)			Extent of Native Vegetation (km)			Value as Biological Corridor (km)		
0	0.0	0.0%	>80%, Good	48.5	5.1%	High (2)	305.8	32.0%
1	12.3	1.3%	20-80 % Med	788.3	82.5%	Medium	480.6	50.3%
2	21.9	2.3%	<20% Low	118.7	12.4%	Low (0)	169.1	17.7%
3	19.1	2.0%						
4	36.2	3.8%	Total	955.5	100.0%	Total	955.5	100.0%
5	132.2	13.8%						
6	307.1	32.1%	Number of Native Species (km)			Adjoining Land Use (km)		
7	194.7	20.4%						
8	66.9	7.0%	Over 20	162.7	17.0%	Cleared	15.4	1.6%
9	73.5	7.7%	6 - 19 (1)	710.2	74.3%	Scattered	889.3	93.1%
10	61.3	6.4%	0 - 5 (0)	82.7	8.7%	Uncleared	50.2	5.3%
11	30.4	3.2%				Other	0.7	0.1%
12	0.0	0.0%	Total	955.5	100.0%	Urban		
Total	955.5	100.0%				Railway	0.7	
						Drain		
						Plantation		
						Total	955.5	100.0%
Period of survey: Nov 97 - April 98								

Table 2: Summary of roadside conditions along roads in the Shire of Woodanilling. As roadsides occur on both sides of the road, roadside distances (km) are equal to twice the actual distance of road travelled.

Conservation Status of Roadsides

Roadside sections of high conservation value covered 165.2 km of roadside, 17.3% of the length of roadside surveyed. Medium-high conservation areas accounted for 261.5km of roadside, 27.4% of the total surveyed. Medium-low conservation roadside covered 439.3km, 46% of the total surveyed. Areas of low conservation occupied 89.5km, 9.4% of the roadside surveyed (Table 2, Figure 2).

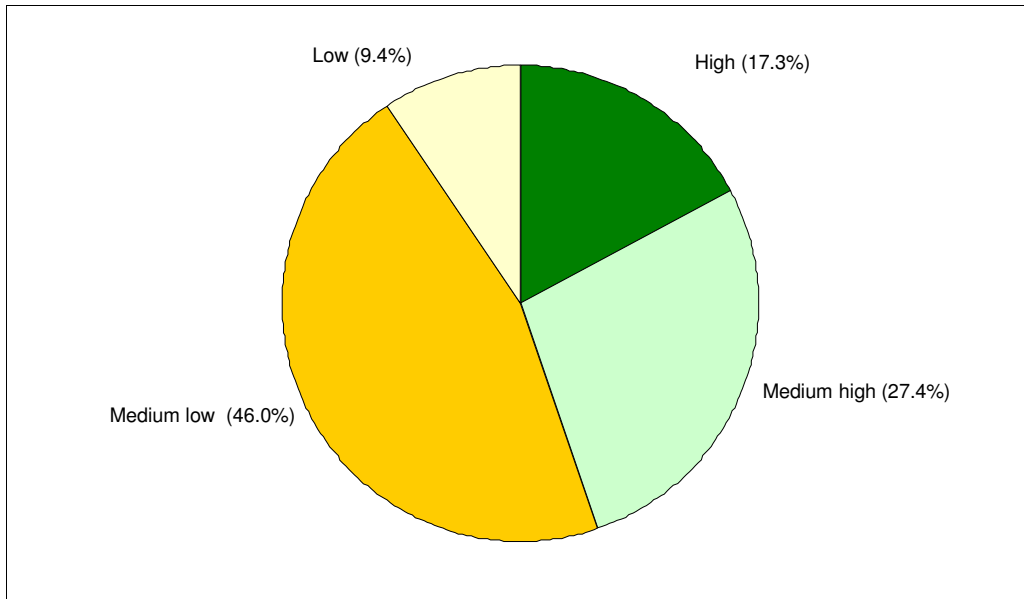


Figure 2: Conservation Status of roadsides in the Shire of Woodanilling.

The *Native Vegetation on Roadside* value is determined from the number of native vegetation layers from either the tree, shrub or ground layers. Sections with at least two layers of native vegetation covered 27.1% of the roadside, 70.6% had only one layer and 2.3% had no layers of native vegetation (Table 2, Figure 3).

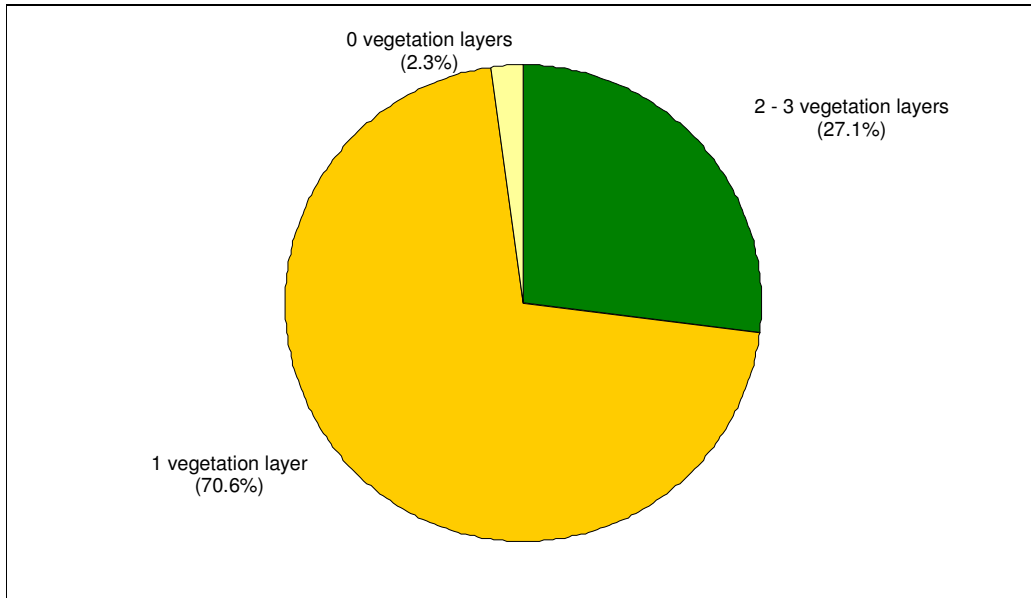


Figure 3: Native Vegetation on Roadside.

Roadside vegetation with a good *Extent of Native Vegetation* value, ie with native vegetation cover greater than 80%, occurred along 5.1% of the length of roadside surveyed. Survey sections with 20 to 80% cover of native vegetation, accounted for 82.5% of the roadside. The remaining 12.4% had less than 20% native vegetation and, therefore, low *Extent of Native Vegetation* value (Table 2, Figure 4).

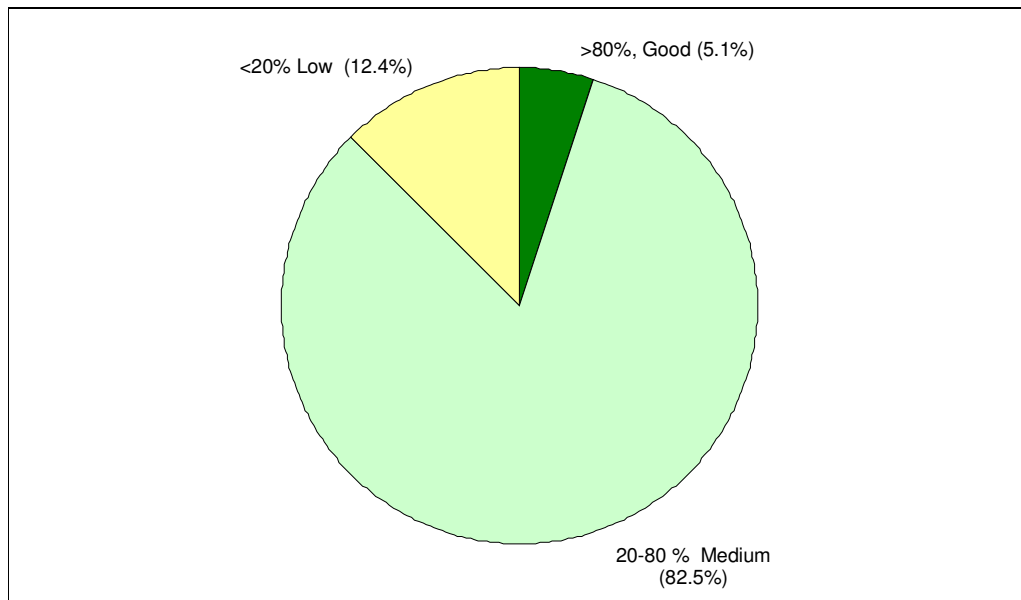


Figure 4: Extent of Native Vegetation.

The *Number of Native Species* score provides a measure of the diversity of the vegetation. Survey sections with more than 20 plant species spanned 17% of the roadside. Roadside sections with between 6 and 19 plant species accounted for 74.3% of the roadside. The remaining 8.7% of roadside had less than 6 plant species and, therefore, nil contribution to the conservation value scores (Table 2, Figure 5).

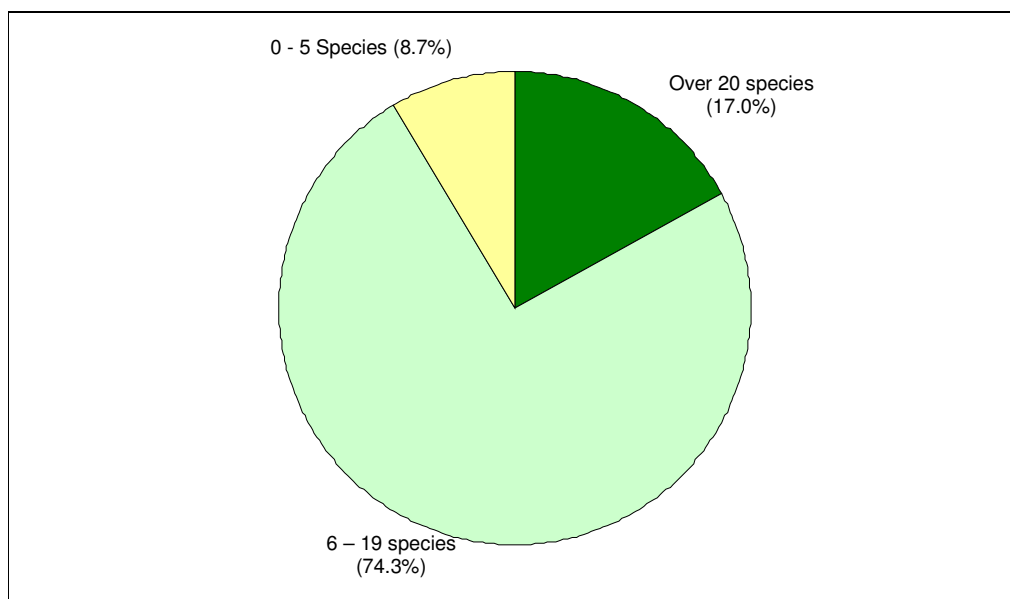


Figure 5: Number of Native Species.

26.5% of the roadside surveyed was only lightly affected by weeds. Medium level weed infestation occurred on 66.4% of the roadside. Whilst 7.1% of the roadside was heavily affected by weeds (Table 2, Figure 6).

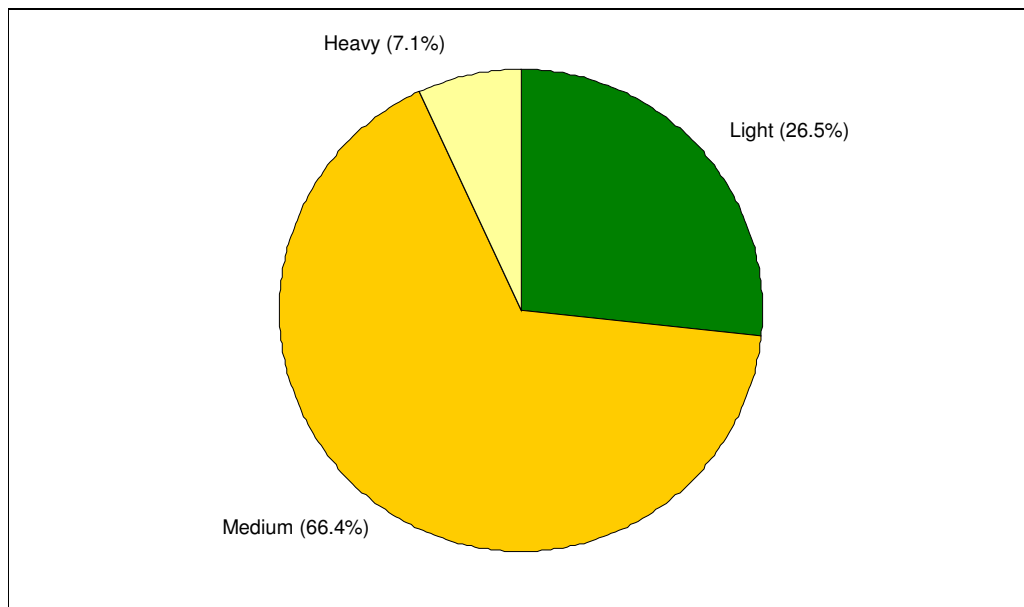


Figure 6: Weed Infestation. Light infestation = weeds less than 20% of ground layer. Medium infestation = weeds 20 to 80% of the ground layer. Heavy infestation = weeds more than 80% of the ground layer.

The *Value as a Biological Corridor* score is largely dependent upon the diversity of habitat and whether the corridor connects areas of uncleared land. High value biological corridor (as determined by the roadside surveyors) was present along 32% of the roadside, medium value along 50.3% of the roadside and low value corridor 17.7% (Table 2, Figure 7).

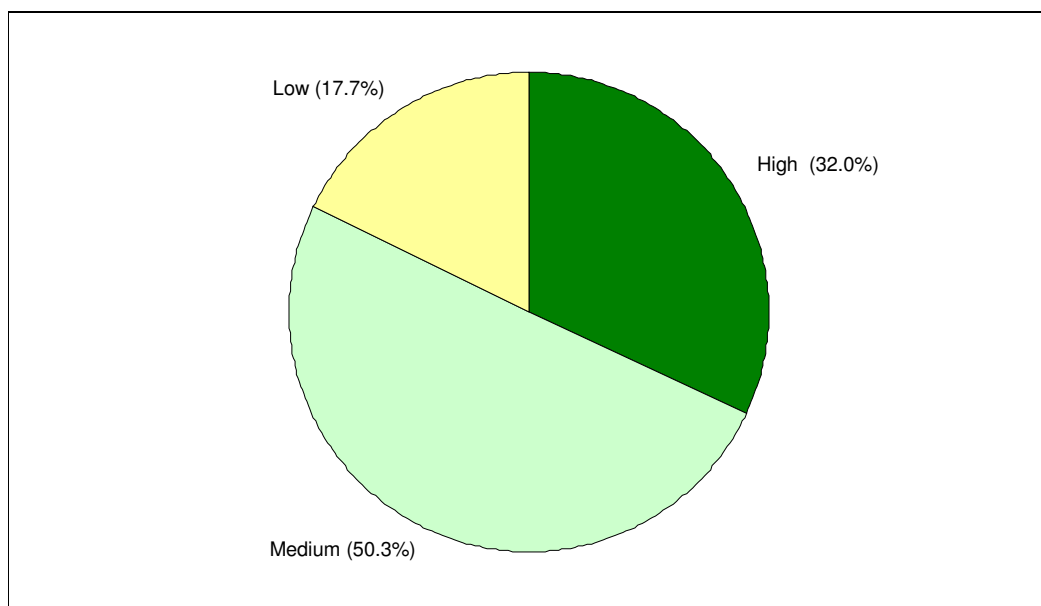


Figure 7: Value as Biological Corridor.

Most land adjoining the roadsides had at least some natural vegetation remaining. A scattered distribution of native vegetation was present on the land adjoining 93.1% of the roadside, whilst 5.3% of roadside was adjoined by land that had not been cleared. 1.6% of the roadside surveyed was adjoined by land that had been totally cleared of its native vegetation. Railway reserve adjoined the remaining 0.1% of roadside (Table 2, Figure 8).

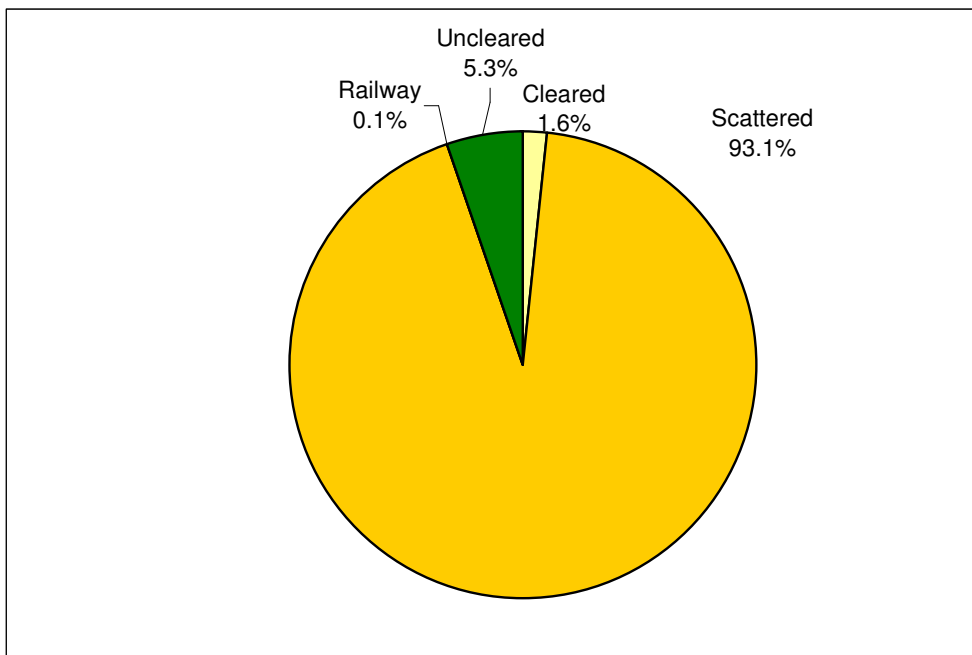






Figure 8: Predominant Adjoining Land Use.




6.0 MANAGEMENT TECHNIQUES

The primary aim of road management is the creation and maintenance of a safe, efficient road system. However, the following management procedures should be adopted.

The following section provides management recommendations that will assist in retaining and enhancing roadside conservation value. These guidelines are taken from the Roadside Conservation Committee's Roadside Manual and or the Roadside Handbook. The Executive Officer of the Roadside Conservation Committee is also available to assist on all roadside conservation matters and can be contacted on (08) 9334 0423.

High Conservation Value Roadsides:		
Management Goal		Maintain and enhance the native plant communities.
Management Guidelines		Minimise disturbance to existing vegetation. Disturbance leads to weed invasion, which downgrades the conservation value, and increases the fire threat.

Medium Conservation Value Roadsides:		
Management Goal		Maintain native vegetation wherever possible, and to encourage its regeneration.
Management Guidelines		Minimise disturbance to existing vegetation.
		With the information available on weed infestation on roadsides within the Shire of Woodanilling, consideration could be given to strategic roadside weed control programmes.

Low Conservation Value Roadsides		
Management Goal		Retain remnant trees and shrubs and encourage their regeneration.
		Encourage revegetation projects using indigenous plants.
Management Guidelines		Minimise soil disturbance to reduce weed invasion. Encourage revegetation projects by adjacent landholders.

6.1 Minimal Disturbance

Minimal disturbance can be achieved by:

- adopting a road design that occupies the minimum space;
- diverting the line of a table drain to avoid disturbing valuable flora;
- pruning branches, rather than removing the whole tree or shrub;
- not dumping spoil on areas of native flora;
- observing dieback control measures as required;
- apply the Fire Threat Assessment (Roadside Manual chapter 9) 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;
- encourage adjacent landholders to set back fences to allow roadside vegetation to proliferate;
- encourage adjacent landholders to plant windbreaks or farm tree lots adjacent to roadside vegetation to create a denser wind or shelterbelt;
- encourage revegetation projects by adjacent landholders.

6.2 Code of Practice

A Code of Practice has been developed through collaboration with Main Roads WA, the WA Local Government Association and the Roadside Conservation Committee. It is anticipated that this document will be accepted as an industry standard for all working within, or interested in roadsides conservation. This document provides defined parameters for all roadside management works and also provides the local community with an overview of management practices that will ensure the sustainability of native roadside vegetation. Please contact the RCC Executive Officer on 9334 0423 for further information.

6.3 Tree Roads

Tree roads are defined as those roadsides with a sufficient density of mature trees to create an attractive tunnel effect. Besides the aesthetic benefits, these areas also provide valuable habitat for birds and other arboreal fauna. Since mature trees are slow growing and hard to replace, care should be taken to conserve these avenues wherever possible. The points following should be considered when working on Tree Roads:

- prune offending branches rather than remove the whole tree;
- cut branches off close to limb or tree trunk;
- divert line of table drain to avoid disturbing tree roots;

- import fill to build up formation, rather than using side-borrow from roadside;
- when using herbicide for weed control on the roadside do not use a soil residual type, such as Siomazine or Atrazine. Eucalypts are especially sensitive to these;
- encourage the adjoining landholders to plant shelter belts on their property that will complement the roadside vegetation.

6.4 Flora Roads and Roads Important for Conservation

Flora Roads are significant sections of road having a special conservation value due to the vegetation growing on the road reserve. Signs are available from the RCC to mark these roads as Flora Roads. This has a twofold effect of drawing the attention of tourists to the high conservation 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 Engineer or Environmental Officer establish a Register of Roads Important for Conservation. The following guidelines should be considered prior to establishing this registrar:

- 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, i.e. trees, shrubs and groundcovers (herbs or native grasses). 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, may provide a source of local seed for revegetation projects and acts as a wildlife habitat for the protection of fauna;
- rare or endangered plants may occur on the roadside;
- it may provide nest sites and refuges for native animals. Dense vegetation provides habitat for avifauna and invertebrates.

6.5 Special Environmental Areas

A 'Special Environmental Area' is a section of roadside that has such significance that it requires special protection. Reasons for establishing 'Special Environmental Areas' can include:

- 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 Figures 9 & 10 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 WestNet rail also have systems for marking sites near power or rail lines. Examples of these are seen in the picture below.



Special Environment Area Site marker

6.6 Special Environmental Area Register

To ensure that knowledge of rare flora and other sites does not get lost due, perhaps, to staff changes, a 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 in the area being initiated in the area.

The *Special Environmental Area Register* should be consulted by the appropriate person prior to starting work on any particular road, to ensure that inadvertent damage does not occur. All Special Environment Area sites should be marked on the Shire map, which records Roadside Conservation Value

Local Government is encouraged to permanently mark Special Environmental Areas to prevent inadvertent 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.

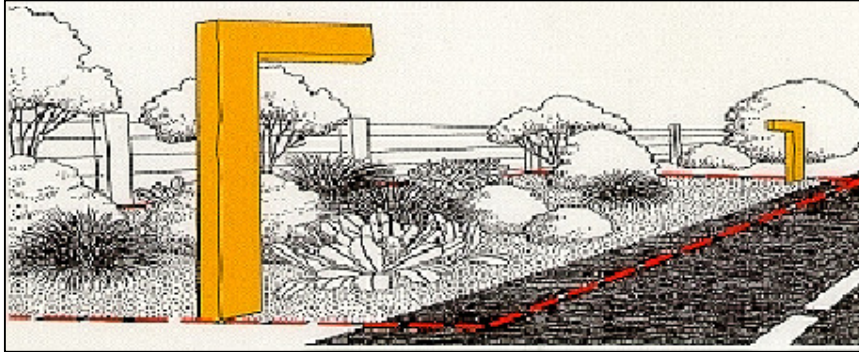


Figure 9- Marking sites in the field

When notified of a population needing marking, the Local Authority should contact the appropriate C.A.L.M. Regional or District office for assistance to ensure the exact site location and correct positioning of marker posts.

7.0 ROADSIDE PLANNING, STRATEGIES AND ACTION PLANS

7.1 Planning

The RCC is able to provide good 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.

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.

The objective of all roadside management planning should be to:

❖ **Protect**

- native vegetation
- rare or threatened flora or fauna
- cultural and heritage values
- community assets from fire

❖ **Maintain**

- safe function of the road
- native vegetation communities
- fauna habitats and corridors
- visual amenity and landscape qualities
- water quality

❖ **Enhance**

- indigenous vegetation communities
- fauna habitats and corridors

❖ **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

7.2 Strategies

The development of a strategy enables potentially competing uses to coexist and ensures that roadsides have a coordinated approach to management. When producing regional strategies the RCC suggests that:

- organisational support from local government is essential from the outset;
- strategies should take no longer than 12 months to produce (including a period for community comment);
- communities need to be provided with background information to make formal decisions.

Management strategies should be produced to address local issues, rather than be to a standard format. Issues can be categorised as:

❖ **Functional**

- Firewood collection and timber harvesting
- Fire prevention
- Installation and maintenance of services
- Road construction and road widening
- Road maintenance
- Stockpile and dumpsite management
- Vegetation removal
- Vehicle and machinery activity
- Water Supply Catchments

❖ **Cultural and Recreational**

- Cultural and heritage values
- Visual amenity
- Landscape values
- Wayside stops
- Horse riding

❖ **Landcare**

- Apiculture
- Insect Pests
- Pest animals
- Ploughing, cultivating or grading
- Revegetation and site rehabilitation
- Weeds

❖ **Conservation**

- Protecting and conserving remnant native vegetation
- Rare, threatened or significant flora and fauna
- Regeneration of native plant communities
- Roadside marking of special environmental areas
- Unused road reserves
- Wetlands
- Wildlife habitat
- Wildlife corridors

7.3 Roadside Action Plans

A Roadside Action Plan is prepared for an individual road and contains a works program that will enable conservation values and other road uses to be managed compatibly. Roadside Action Plans are based on the guidelines that are produced as part of the roadside strategy.

The RCC suggests that Roadside Action Plans be:

- short term documents (to be reviewed within 2 years);
- prepared on a need basis;
- prepared after consultation with major stakeholders;
- a maximum of 2 pages per road;
- names a person or agency responsible for implementing the management recommendations.

References

Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001.). *Native Vegetation in Western Australia, Technical Report 249*. Department of Agriculture, Western Australia, South Perth.

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Roadside Conservation Committee. (1990). *Roadside Manual* Roadside Conservation Committee, Como WA

Lamont D A (1998) *Western Australian Roadside Handbook*, Environmental guidelines for road construction and maintenance workers. Roadside conservation Committee, Kensington, Western Australia.

APPENDIX ONE

Definitions of remnant vegetation types, Beeston et al (1993).

Vegetation classed as "**remnant vegetation**" has one or more of the following characteristics (Beeston et al., 1993):

- * Most closely reflects the natural state of vegetation for a given area.
- * Has an intact understorey (if forest or woodland).
- * Has minimal disturbance by agents of human activity.

Vegetation classed as "**modified vegetation**" has one or more of the following characteristics:

- * Degraded understorey (ie reduction in the number of native species, includes weeds).
- * Obvious human disturbance-clearing, mining, grazing, weeds.
- * Affected by salt.
- * Narrow corridors of vegetation (usually along roads and railway lines or windbreaks), which are more likely to be affected by edge effects.

Vegetation classed as "**scattered vegetation**" has:

- * No understorey
- * Parkland cleared ie are scattered single trees.
- * No significant signs or chance of regeneration.

APPENDIX 3

Raw data used to calculate the conservation values

APPENDIX 4

Plant species in the Shire of Woodanilling

<i>Acacia acuminata</i> subsp. <i>acuminata</i> ms	<i>Astroloma pallidum</i>
<i>Acacia ataxiphylla</i> subsp. <i>ataxiphylla</i> ms P3	<i>Atriplex cinerea</i>
<i>Acacia erinacea</i>	<i>Austrodanthonia caespitosa</i>
<i>Acacia incurva</i>	<i>Austrostipa hemipogon</i>
<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>	<i>Baeckea crispiflora</i>
<i>Acacia leptospermoides</i> subsp. <i>leptospermoides</i>	<i>Baeckea floribunda</i>
<i>Acacia lullfitziorum</i> ms P3	<i>Baeckea preissiana</i>
<i>Acacia microbotrya</i>	<i>Baeckea pygmaea</i>
<i>Acacia pulchella</i>	<i>Banksia meisneri</i> subsp. <i>meisneri</i>
<i>Acacia pulchella</i> var. <i>glaberrima</i>	<i>Banksia nutans</i> var. <i>cernuella</i>
<i>Acacia pycnocephala</i>	<i>Banksia prionotes</i>
<i>Acacia saligna</i>	<i>Banksia sphaerocarpa</i> var. <i>caesia</i>
<i>Acacia squamata</i>	<i>Banksia violacea</i>
<i>Acacia stenoptera</i>	<i>Billardiera lehmanniana</i>
<i>Acacia varia</i> var. <i>crassinervis</i>	<i>Blennospora drummondii</i>
<i>Acacia varia</i> var. <i>parviflora</i>	<i>Boronia scabra</i> subsp. <i>scabra</i> ms
<i>Actinostrobos arenarius</i>	<i>Boronia spathulata</i>
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	<i>Borya scirpoidea</i>
<i>Allocasuarina humilis</i>	<i>Bossiaea eriocarpa</i>
<i>Allocasuarina microstachya</i>	<i>Brachysema celsianum</i>
<i>Allocasuarina thuyoides</i>	<i>Caesia occidentalis</i>
<i>Amphipogon turbinatus</i>	<i>Caladenia caesarea</i> subsp. <i>caesarea</i> ms
<i>Amyema miquelii</i>	<i>Caladenia cairnsiana</i>
<i>Amyema preissii</i>	<i>Caladenia dilatata</i>
<i>Andersonia brevifolia</i>	<i>Caladenia dorrienii</i> R
<i>Andersonia carinata</i> P2	<i>Caladenia falcata</i>
<i>Andersonia nymphaea</i> ms	<i>Caladenia flava</i>
<i>Andersonia parvifolia</i>	<i>Caladenia longicauda</i> subsp. <i>eminens</i> ms
<i>Anigozanthos humilis</i>	<i>Caladenia longiclavata</i>
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	<i>Caladenia luteola</i> ms P2
<i>Aphelia brizula</i>	<i>Caladenia pendens</i> subsp. <i>pendens</i> ms
<i>Aphelia cyperoides</i>	<i>Caladenia reptans</i> subsp. <i>reptans</i> ms
* <i>Asparagus asparagoides</i> (bridal creeper)	<i>Caladenia uliginosa</i> subsp. <i>uliginosa</i> ms
<i>Astroloma</i> aff. <i>epacridis</i>	<i>Caladenia x cala</i> ms
<i>Astroloma cataphractum</i> ms	<i>Caladenia xantha</i> ms
<i>Astroloma epacridis</i>	<i>Calectasia grandiflora</i>

Calothamnus huegelii	Cyanostegia lanceolata
Calothamnus lateralis	Dampiera haematotricha subsp. haematotricha
Calothamnus planifolius	Dampiera juncea
Calothamnus preissii	Dampiera lavandulacea
Calothamnus quadrifidus var. "unsorted"	Daviesia incrassata subsp. incrassata
Calytrix leschenaultii	Daviesia incrassata subsp. incrassata ms
Calytrix simplex subsp. suboppositifolia	Daviesia longifolia
Calytrix tetragona	Dianella revoluta var. divaricata
Cassytha glabella forma dispar	Dillwynia sp.A Perth Flora(R.Coveny 8036)
Cassytha melantha	* Dittrichia graveolens (stinkwort)
Caustis dioica	Diuris corymbosa
Centrolepis polygyna	Diuris laxiflora
Chamaescilla corymbosa	Dodonaea caespitosa
Chamaescilla spiralis	Dodonaea ericoides
Cheiranthra preissiana var. preissiana	Dodonaea humifusa
Chenopodium glaucum	Dodonaea pinifolia
Chloanthes coccinea	Dodonaea trifida P3
* Chrysanthemoides monilifera subsp. monilifera (boneseed)	Drosera erythrorhiza subsp. squamosa
Cicendia filiformis	Drosera menziesii
Comesperma volubile	Drosera subhirtella
Conospermum caeruleum subsp. spathulatum	Dryandra acanthopoda P2
Conospermum cinereum ms	Dryandra armata
Conospermum croniniae	Dryandra armata var. armata
Conospermum filifolium subsp. filifolium	Dryandra armata var. ignicida
Conospermum multispicatum	Dryandra conferta
Conospermum stoechadis	Dryandra conferta conferta ms
Conostylis aurea	Dryandra cuneata
Conostylis laxiflora	Dryandra cynaroides P4
Conostylis pusilla	Dryandra drummondii subsp. hiemalis P3
Conostylis setigera subsp. dasys R	Dryandra fraseri var. fraseri
Conostylis setigera subsp. setigera	Dryandra lepidorhiza P1
Conostylis setosa	Dryandra lindleyana var. lindleyana
Crassula exserta	Dryandra nivea subsp. nivea
Cryptandra arbutiflora var. arbutiflora	Dryandra nivea subsp. nivea ms
Cryptandra leucopogon	Dryandra octotriginata
Cryptandra pungens	Dryandra porrecta P4
Cyanicula gemmata ms	Dryandra preissii P4
Cyanicula ixioides subsp. candida ms P2	Dryandra rufistylis P2
Cyanostegia corifolia	Dryandra stuposa
	Dryandra tenuifolia

Dryandra tenuifolia var. reptans	Gompholobium knightianum
Elythranthera emarginata	Gompholobium marginatum
Eremaea pauciflora	Gompholobium polymorphum
Eremaea pauciflora var. pauciflora	Gompholobium tomentosum
Erymophyllum tenellum	Grevillea fasciculata
Eucalyptus aff. latens	Grevillea hookeriana
Eucalyptus angustissima	Grevillea newbeyi P3
Eucalyptus argyphaea	Grevillea pilulifera
Eucalyptus calycogona var. calycogona	Grevillea uncinulata
Eucalyptus conglobata	Grevillea uncinulata subsp. uncinulata
Eucalyptus drummondii	Haemodorum spicatum
Eucalyptus flocktoniae	Hakea baxteri
Eucalyptus horistes	Hakea corymbosa
Eucalyptus hypochlamydea	Hakea lehmanniana
Eucalyptus incrassata	Hakea prostrata
Eucalyptus kochii subsp. kochii	Halosarcia lepidosperma
Eucalyptus kochii subsp. plenissima	Helichrysum leucopsidium
Eucalyptus longicornis	* Heliotropium europaeum (common heliotrope)
Eucalyptus loxophleba	Hemiandra pungens
Eucalyptus loxophleba subsp. gratiae	Hibbertia acerosa
Eucalyptus perangusta	Hibbertia commutata
Eucalyptus pluricaulis subsp. porphyrea	Hibbertia enervia
Eucalyptus redacta subsp. thamnoides ms	Hibbertia microphylla
Eucalyptus sargentii	Hibbertia polystachya
Eucalyptus spathulata	Hibbertia quadricolor
Eucalyptus spathulata subsp. grandiflora	Hibbertia rhadinopoda
Eucalyptus spathulata subsp. spathulata	Hibbertia spicata
Eucalyptus uncinata	* Hordeum geniculatum (Mediterranean barley grass)
Eucalyptus vegrandis	Hovea pungens
Eucalyptus xanthonema subsp. xanthonema	Hyalosperma cotula
Eutaxia densifolia	Hypocalymma angustifolium
Eutaxia parvifolia	Hypolaena exsulca
Franklandia fucifolia	Isolepis setiformis
Gastrolobium calycinum	Isopogon buxifolius
Gastrolobium spinosum	Isopogon buxifolius var. spathulatus
Gastrolobium trilobum	Isopogon teretifolius subsp. teretifolius ms
Gastrolobium truncatum	Isotoma hypocrateriformis
Glischrocaryon aureum	* Ixia maculata (yellow ixia)
Gnephosis drummondii	Jacksonia alata
Gnephosis tenuissima	

Jacksonia condensata	Mirbelia subcordata
Jacksonia sp.Collie(C.J.Koch 177) P1	Mirbelia trichocalyx
Jacksonia sternbergiana	* Monopsis debilis
Juncus radula	Myriocephalus occidentalis
Kennedia prostrata	Nemcia obovata
Lambertia ilicifolia	Neurachne alopecuroidea
Lambertia inermis	Nicotiana rotundifolia
Lambertia inermis var. drummondii	Olearia rudis
Lawrencella rosea	Opercularia vaginata
Laxmannia brachyphylla	Oxalis purpurea
Laxmannia minor	Patersonia juncea
Laxmannia ramosa subsp. ramosa	Patersonia occidentalis
Lechenaultia biloba	* Pennisetum setaceum (fountain grass)
Lechenaultia formosa	Persoonia quinquenervis
Lechenaultia tubiflora	Petrophile ericifolia subsp. ericifolia ms
Lepidosperma longitudinale	Petrophile longifolia
Lepilaena australis	Petrophile media
Leptomeria lehmannii	Petrophile seminuda
Leptospermum erubescens	Petrophile serruriae
Lepyrodiopsis glauca	Petrophile squamata subsp. squamata
Leucopogon assimilis	Petrophile teretifolia
Leucopogon fimbriatus	Phebalium tuberculosum
Leucopogon ozothamnoides	Philydrella pygmaea
Linum marginale	Phyllangium palustre P1
Lobelia rhombifolia	Phyllangium paradoxum ms
Logania flaviflora	Phyllota gracilis P3
* Lolium perenne x rigidum (ryegrass)	Pimelea angustifolia
Lomandra rupestris	Pimelea ciliata subsp. ciliata
Lyginia barbata	Pimelea imbricata
Lysinema ciliatum	Pimelea imbricata var. "unsorted"
Melaleuca bracteosa	Pimelea imbricata var. piligera
Melaleuca carriei ms	Pimelea preissii
Melaleuca halmaturorum	Platysace effusa
Melaleuca pungens	Platysace juncea
Melaleuca seriata	Podolepis canescens
Melaleuca spathulata	Podolepis capillaris
Melaleuca uncinata	Podolepis gracilis
Melaleuca viminea	Podolepis lessonii
Melaleuca viminea subsp. viminea	Praecoxanthus aphyllus ms
Mirbelia spinosa	Prasophyllum ovale

Prasophyllum plumiforme	Stylidium rhipidium P1
Ptilotus declinatus	Stylidium squamellosum
Ptilotus manglesii	Stypandra glauca
Pultenaea tenuifolia	Synaphea hians P3
Regelia cymbifolia P4	Synaphea spinulosa
Regelia inops	Templetonia sulcata
Rhodanthe citrina	Tetratheca virgata
Rhodanthe corymbosa	Thelymitra crinita
Rhodanthe manglesii	Thelymitra fuscolutea
Rhodanthe pygmaea	Thelymitra macrophylla
Ricinocarpos tuberculatus	Thomasia macrocalyx
Ruppia megacarpa	Thysanotus acerosifolius P1
Ruppia tuberosa	Thysanotus brevifolius P2
Sarcocornia blackiana	Thysanotus cymosus P3
Sarcocornia quinqueflora	Thysanotus patersonii
Scaevola aff. sericophylla	Thysanotus thyrsoides
Scaevola lanceolata	Thysanotus triandrus
Scaevola pulvinaris	Tribonanthes longipetala
Schoenus capillifolius P2	Tricoryne elatior
Schoenus plumosus	Triglochin lineare
Schoenus sp. Beaufort (G.J. Keighery 6291) P1	* Vaccaria hispanica (cowcockle)
Schoenus subflavus subsp. subflavus	Velleia trinervis
Schoenus trachycarpus	Verreauxia reinwardtii
* Solanum hoplopetalum (Afghan thistle)	Verticordia acerosa var. preissii
Sollya heterophylla	Verticordia brevifolia subsp. brevifolia P1
* Sparaxis bulbifera	Verticordia chrysanthella
Sphaerolobium drummondii	Verticordia densiflora var. densiflora
Sphaerolobium medium	Verticordia endlicheriana var. endlicheriana
Stackhousia monogyna	Verticordia fimbriolepis subsp. fimbriolepis R
Stylidium calcaratum	Verticordia grandiflora
Stylidium caricifolium	Verticordia habrantha
Stylidium dichotomum	Verticordia huegelii var. stylosa
Stylidium emarginatum subsp. exappendiculatum P2	Verticordia insignis subsp. compta
Stylidium guttatum	Verticordia lindleyi subsp. purpurea P4
Stylidium lepidum P3	Verticordia multiflora subsp. multiflora P4
Stylidium leptophyllum	Verticordia pennigera
Stylidium luteum subsp. clavatum	Verticordia plumosa
Stylidium miniatum	Verticordia plumosa var. brachyphylla
Stylidium pseudohirsutum P3	Verticordia roei subsp. roei
	Verticordia serrata var. serrata

Verticordia subulata

Wilsonia rotundifolia

Xanthorrhoea brevistyla P4

Xanthorrhoea drummondii

Xanthosia ciliata

* = Exotic weed species
D = Declared rare species
P = Priority species