Introduction

The Shire of Plantagenet covers 4792 km^2 and supports a population of 4434 people. The area experiences a mediterranean climate with an annual rainfall of 739.1mm. Seasonal temperatures are characterised by warm summers, with maxima averaging in the mid twenties, and mild winters, with maxima in the mid teens. Mean daily maximum and minimum temperatures and rainfalls are shown below (Figure 1).

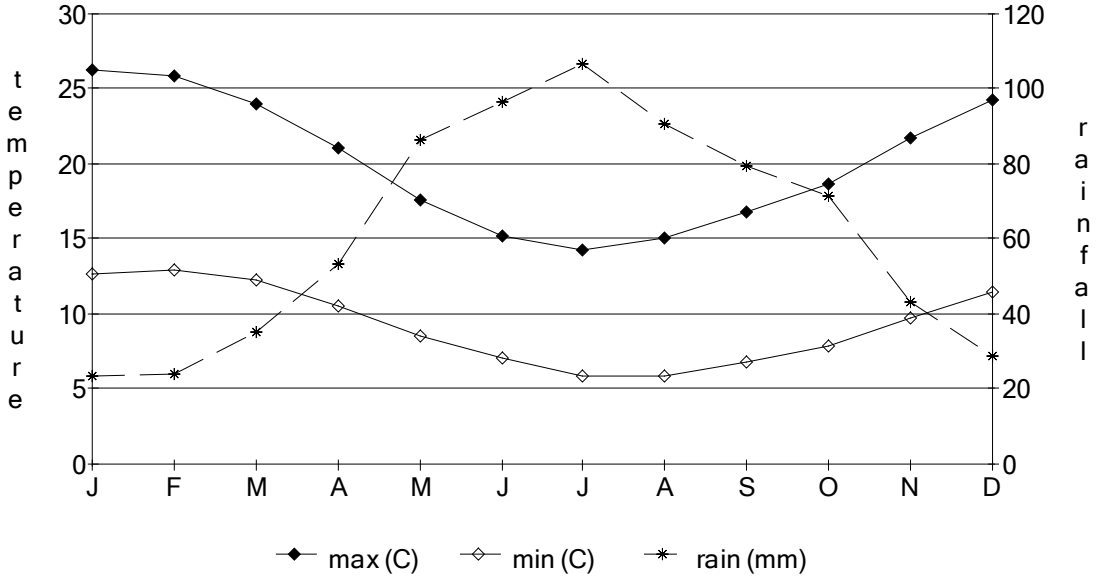

Figure 1. Mean daily maximum and minimum temperature (C) and rainfall (mm) in the Shire of Plantagenet (measured at MT Barker).

Plantagenet is located 360 km south east of Perth in Western Australia's south west land division. 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 include the Stirling Ranges, Porongorup National Park, St Werburghs Chapel, Old Mount Barker Police Station and Stables (Historical Precinct), the wineries and the flora and fauna which abound in the area. Based on WA Herbarium records, over 2000 species of plants have been recorded from the Shire of Plantagenet. This includes more than 70 species of acacia, 23 species of boronia, 38 species of spider orchid and 49 species of eucalypt. By way of comparison, the United Kingdom supports a flora of approximately 2000 species. However, it is of concern to note that 166 species of exotic weeds are also recorded within the shire.

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 isolated and

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 461km^2 of remnant vegetation (13.7% of the shire area minus public land inside the clearing line) remaining in the Shire of Plantagenet. (Beeston *et al*, 1993).

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.

Trees are good - bush is better - 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; (Currently, 321 plant species are declared rare under the wildlife conservation act 1950-1979. Of these, more than 100 are known to be from roadside populations. In fact, roadside plants represent more than 80 per cent of the known populations of 40 of the 'declared rare' species and three of these 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. 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 bench mark 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 are the vital link ……..and a priceless community asset.

Legislation

Uncertainty often exists in the minds of many with regard to the 'ownership' control and management of the roadside *per se*. When a public road is created, a corridor of land is dedicated for a road, i.e. a road reserve. The road formation and its associated infrastructure are accommodated within the road reserve. The remaining area on each side of the road is called the road verge or roadside. It is in the control and management responsibilities of this area (and flora and fauna residing within it) that the uncertainty exists

Public roads other than main roads are dedicated under the ***Local Government Act*** (Part XII). Dedication places care and management of the road (street) in the relevant local government authority. However, under Section 286 of the ***Local Government Act,*** land in a road is the absolute property of the Crown, i.e. still Crown land.

Road reserves may be created in the following ways:

- by approval of a crown subdivisional plans, s.294a of the ***local government act*****.**
- by approval of a freehold subdivisional plan, s.295 (5) of the **local government act.**
- by approval of a survey plan (crown or freehold), s.28 of the ***town planning and development act***.
- by dedication of crown land (often following acquisition under the **public works act**), ss.287 and 288 of the ***local government act***.
- by a local government undertaking work on a private street, s.296 of the ***local government act***.

When a street is dedicated to a public use, it becomes Crown land under the ***Land Act***, pursuant to s.286 of the ***Local Government Act*****.** Care, control and management rest in the relevant local government (s.300 of the ***Local Government Act***) unless the road is declared a highway, main road or secondary road under the ***Main Roads Act***. In the latter case, care, control and management vests in the Commissioner of Main Roads (ss.15 and 26 of the ***Main Roads Act***). Main Roads Western Australia, rather than DOLA, administers those roads placed under their management responsibility.

The ***Local Government Act*** appears to be written in an urban context, and does not refer specifically to the management of the roadside; rather it only refers to the road itself. It is therefore difficult to determine to what extent the Act places the care, control and management of the roadside with the local government authority in the case of dedicated roads. It is, however, suggested that where a local government authority is managing a road (reserve) that authority may undertake reasonable management of the roadside to facilitate the roadway, including making the road safe and convenient to use.

With the proclamation of the ***Wildlife Conservation Act*** **1950** the responsibility for flora conservation, including the control of harvesting of protected flora, this includes seed, was given to the Minister of the Crown responsible for Fisheries and Wildlife and the Department of Fisheries and Wildlife. With the formation of the Department of Conservation and Land Management (CALM) in 1984 and the accompanying ***Conservation and Land Management Act*** **1984** the conservation and management of all native wildlife passed to the Minister responsible for that Department and the Department itself. As a consequence CALM has the authority to exert controls.
Main Roads Western Australia manages Denmark-Mt Barker Rd and the Shire of Plantagenet manages all other roads in this survey.

Assessment Process

Methods

The methods to assess and calculate the conservation value of the roadside reserves are described in Hussey (1991). 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 carried out from October '92 to February '93. The surveyors were:

- Hawkins, D Lamont, N Scott, D Scott, A Burchell, M Kerr, M Crabb, - Marwick, - Russell, E FArr, - Henderson, R Roberts, P Woods, - McGowan, D McMiles, J McMIles, S Anning, - MacPherson, and - Saxon.

The enthusiastic efforts of these surveyors ensured that this project was successfully completed. 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.

Quantify 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.

Mapping

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 Plantagenet was produced. The data used to produce both the map and the following figures and tables are presented in Appendix 3.

The roadside conservation values 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 techniquesor 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 CALM and the Agricultural Department can been 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.

Survey Data Results

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

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

Roadside sections of high conservation value covered 1319.7 km of roadside, 60.2% of the length of roadside surveyed. Medium-high conservation areas accounted for 432.4 km of roadside, 19.7% of the total surveyed. Medium-low conservation roadside covered 137.9km, 6.3% of the total surveyed. Areas of low conservation occupied 303.2km, 13.8% of the roadside surveyed (Table 2, Figure 2).

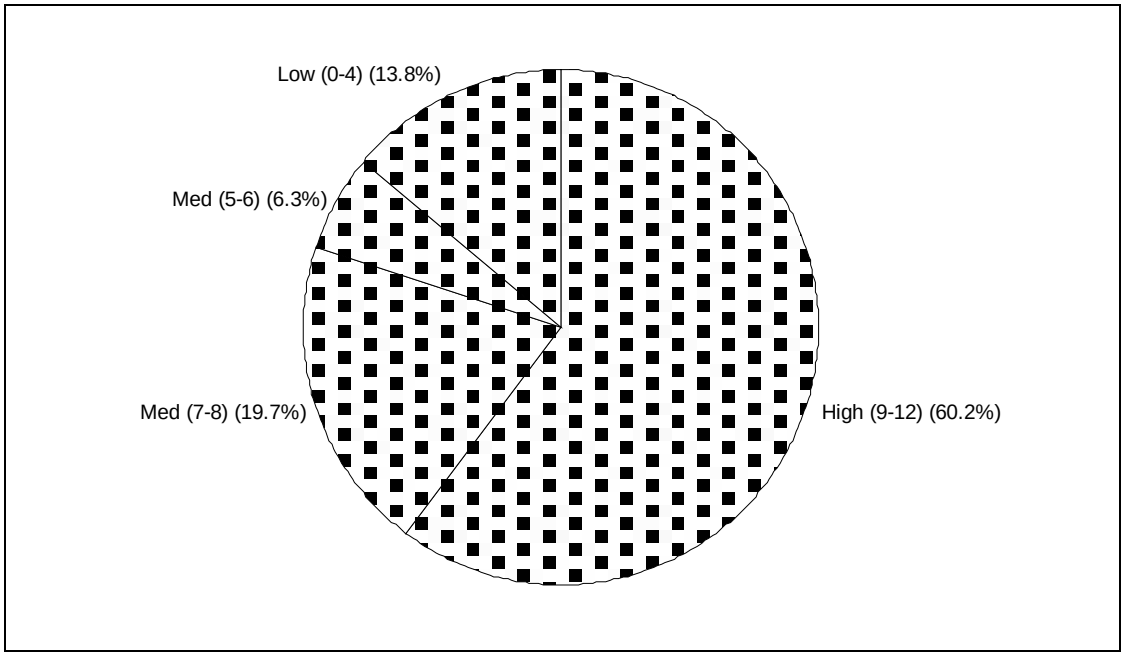

Figure 2: Conservation Status of roadsides in the Shire of Plantagenet.

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 82.5% of the roadside, 12.8% had only one layer and 4.7% had no layers of native vegetation (Table 2, Figure 3).

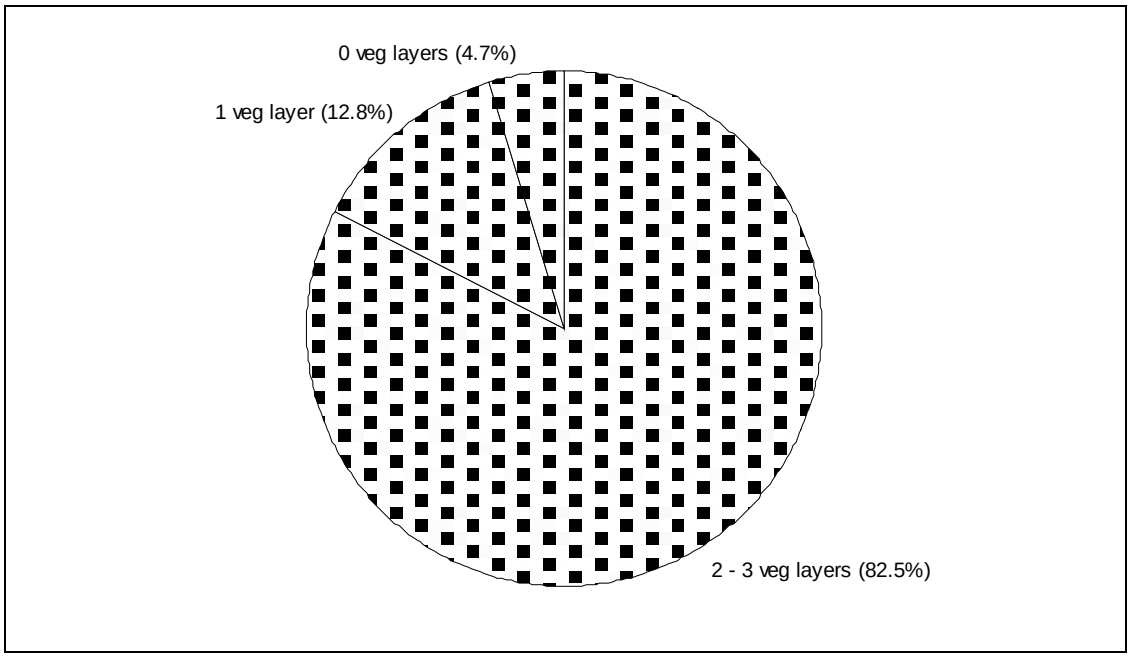

Figure 3: Native Vegetation on Roadside

Roadside vegetation with *Extent of Native Vegetation* value deemed as good, ie with native vegetation cover greater than 80% occurred along 46.1% of the length of roadside surveyed. Survey sections with 20 to 80% cover of native vegetation, accounted for 37% of the roadside. Whilst the

remaining 16.9% had less than 20% native vegetation and, therefore, low *Extent of Native Vegetation* value (Table 2, Figure 4).

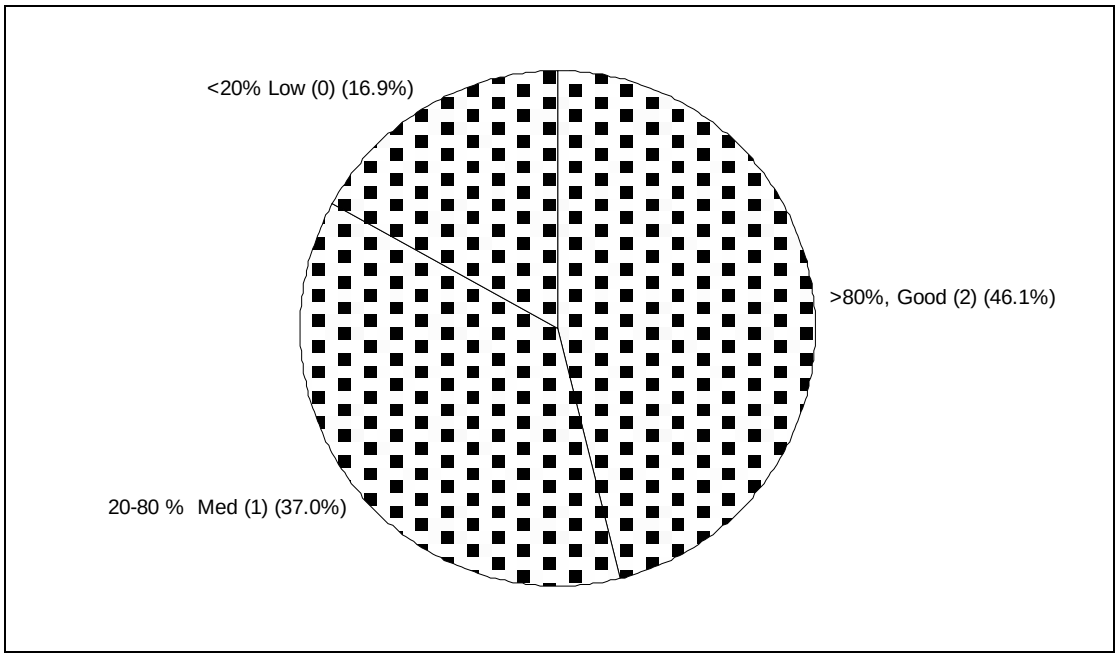

Figure 4: Extent of Native Vegetation

The *Number of Native Species* score provides a measure of the diversity of the vegetation. Survey sections with more than 20 plant species spanned 56% of the roadside. Roadside sections with 6 and 19 plant species accounted for 29.4% of the roadside. The remaining 14.6% of roadside had less than 6 plant species and, therefore, nil contribution to the conservation value scores (Table 2, Figure 5).

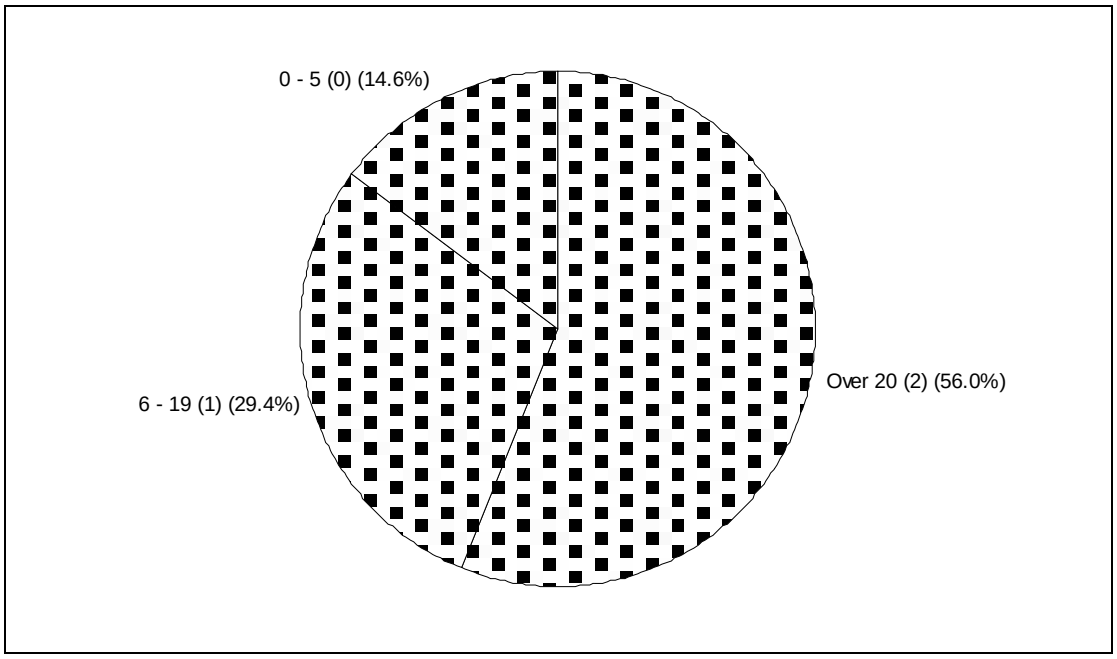

Figure 5: Number of Native Species

53.9% of the roadside surveyed was only lightly affected by weeds. Medium level weed infestation occurred on 30.8% of the roadside. Whilst 15.2% of the roadside was heavily affected by weeds (Table 2, Figure 6).

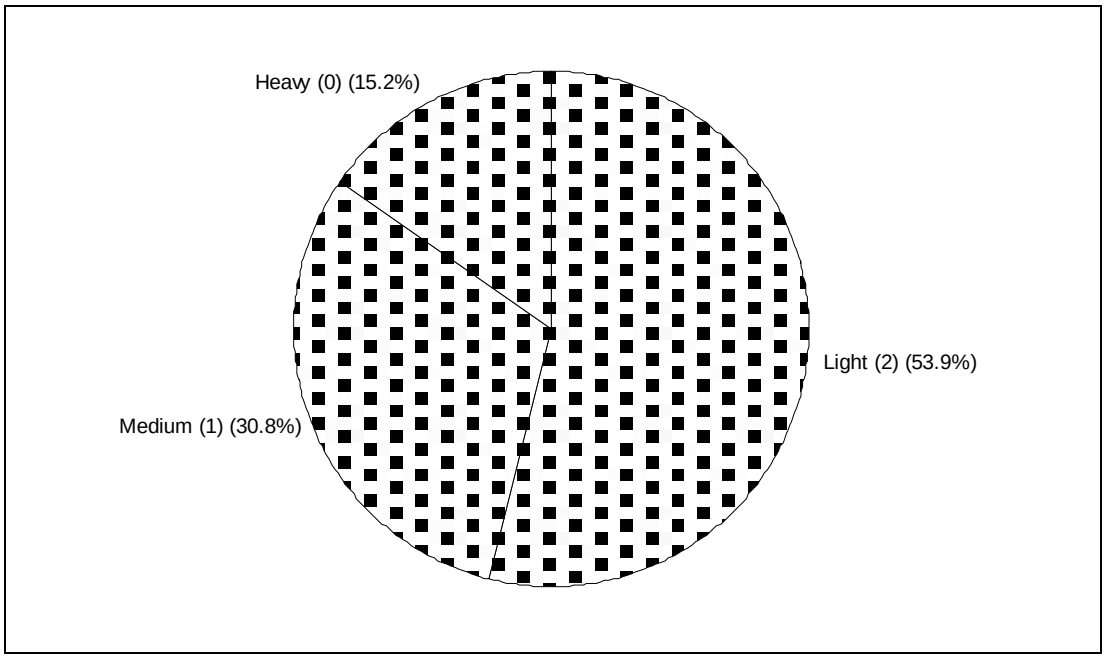

Figure 6: Weed Infestation. Light infestation = weeds less than 20% of ground layer. Medium infestation = weeds 20 to 80% of the ground layer. Heavy infestation = weeds more than 80% of the ground layer.

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 54.9% of the roadside, medium value along 30.4% of the roadside and low value corridor 14.7% (Table 2, Figure 7).

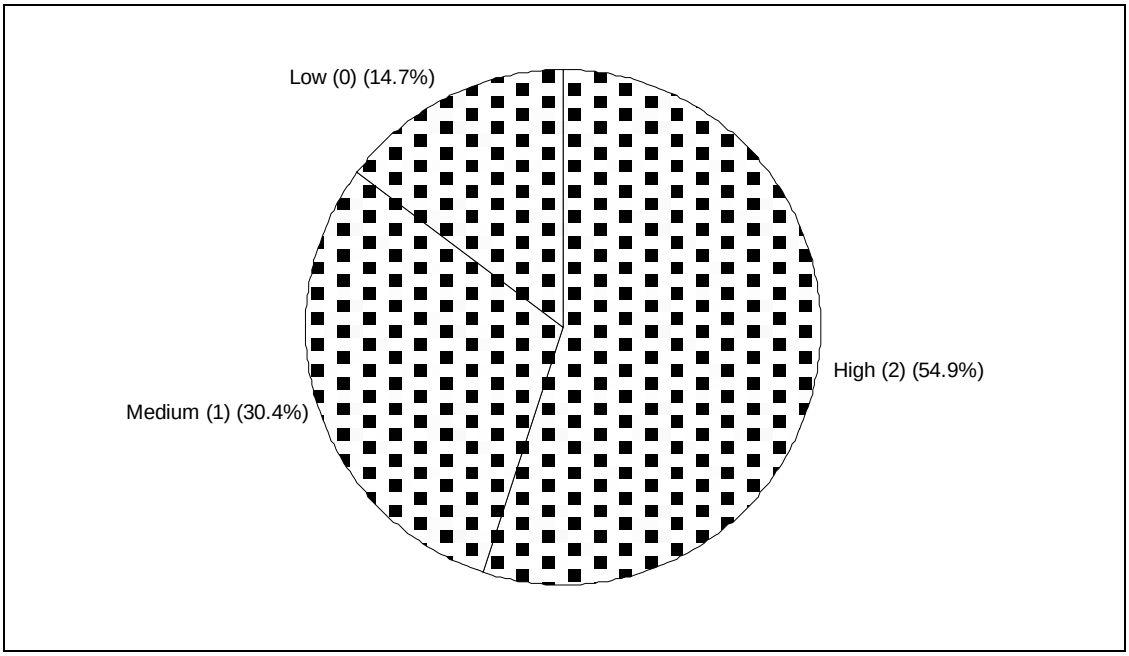

Figure 7: Value as Biological Corridor.

Most land adjoining the roadsides had at least some natural vegetation remaining. A scattered distribution of native vegetation was present on the land adjoining 65.1% of the roadside, whilst 13.5% of roadside was adjoined by land that had not been cleared. 19.2% of the roadside surveyed was adjoined by land that had been totally cleared of its native vegetation. Plantations of non-native trees, railway reserve, drain reserve or urban development adjoined the remaining 2.2% of roadside (Table 2, Figure 8).

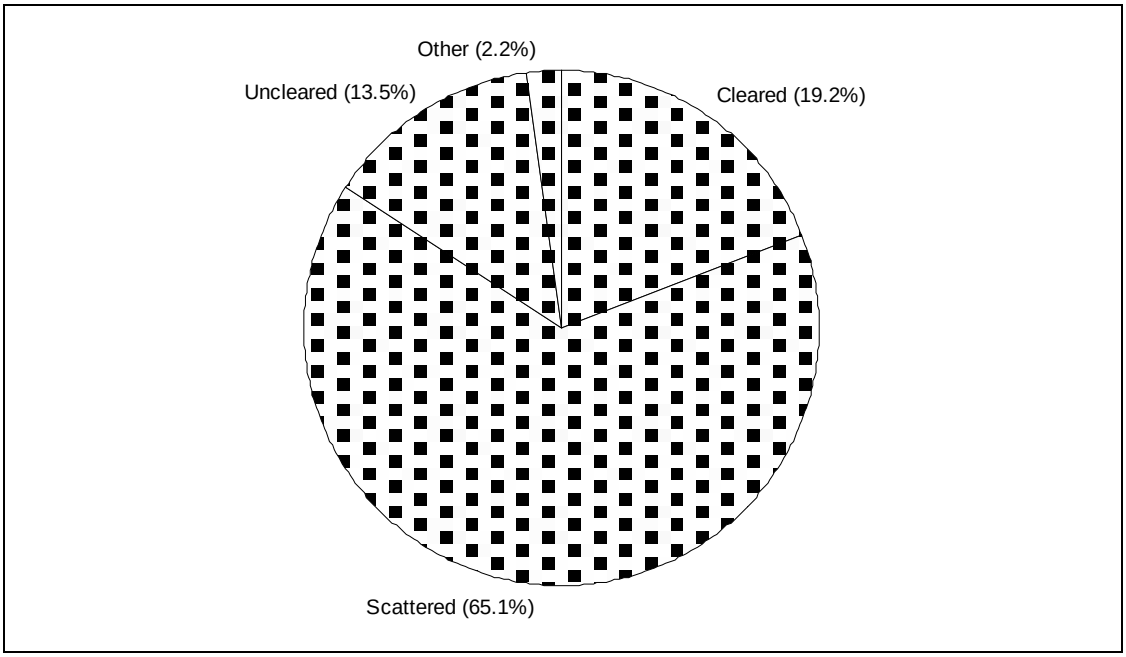

Figure 8: Adjoining Land Use.

Management Techniques

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. 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.

High Conservation Value Roadsides

Management Goal ☞ **Maintain and enhance the native plant communities.**

Management Guidelines 🕮 **Minimal disturbance to existing vegetation**.

because disturbance leads to weed invasion, which downgrades the conservation value, and increases the fire threat.

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.

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 Plantagenet, consideration could be given to strategic roadside weed control programs.

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.

A draft Code of Practice is included in Appendix 4. This document is provided as the basis for developing a Shire of Plantagenet Code of Practice for roadside conservation and Roadside Management Plans. Development of these documents will provide defined parameters for all roadside management works and also provide the local community with an overview of management practices that will ensure the sustainability of native roadside vegetation.

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.

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 to mark these roads as Flora Roads. This has a twofold effect of drawing the attention of tourist 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 register:

- 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.

Special Environmental Areas

A 'Special Environmental Area' is a section of roadside which 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 Westrail also have systems for marking sites near power or rail lines. Examples of these are seen in the figure below (Figure 9).

Figure 9. Shire Special Environmental Area site marker

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 10. 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.

Roadside Management Strategies

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

- **enhance**
  - indigenous vegetation communities
  - fauna habitats and corridors

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

- **minimise**
  - land degradation
  - spread of weeds and vermin
  - spread of soil borne pathogens
  - risk and impact of fire
  - disturbance during installation and maintenance of service assets

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 that 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
  - Horse riding
  - Visual amenity and landscape values
  - Wayside stops
- **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

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.

Weeds

WA Herbarium records indicate that a total of 166 species of weeds have been recorded from within the Shire of Plantagenet. However this should not be considered as a complete list as collectors often over look weed as legitimate botanical specimans.

List of exotic plants (weeds) recorded in the Shire of Plantagenet

Acacia longifolia subsp. longifolia ms	
Acacia melanoxylon	
Acacia pycnantha	
Acaena agnipila	
Acaena echinata	sheep's burr
Acetosella vulgaris	sorrel, sheep's sorrel
Agrostis gigantea	red top bent
Agrostis stolonifera	creeping bent
Aira cupaniana	hairgrass
Allium triquetrum	three-cornered garlic
Allium vineale	crow garlic
Amaryllis belladonna	Easter lily
Anagallis arvensis	pimpernel
Anagallis arvensis var. "unsorted"	
Anthoxanthum odoratum	sweet vernal grass
Arctotheca calendula	caoeweed
Arctotheca populifolia	dune arctotheca
Asparagus asparagoides	bridal creeper
Atriplex prostrata	hastate orache
Avena barbata	wildoats
Borago officinalis	borage
Brachypodium distachyon	false brome
Brassica nigra	black mustard
Brassica tournefortii	wild turnip
Briza maxima	blowfly grass, quaking grass
Briza minor	shivery grass, lesser quaking grass
Bromus diandrus	brome grass, great brome
Bromus hordeaceus	soft brome grass
Bromus madritensis	Madrid brome
Bromus rubens	red brome grass
Cakile maritima	sea rocket
Carduus tenuiflorus	sheep thistle
Centaurea melitensis	maltese cockspur
Centaurium erythraea	common century
Centaurium spicatum	
Centranthus ruber	red valerian
Cerastium glomeratum	mouse-ear chickweed

Chenopodium ambrosioides	Mexican tea
Chenopodium pumilio	goosefoot
Chondrilla juncea	skeleton weed
Cirsium vulgare	spear thistle
Conyza albida	tall fleabane
Dittrichia graveolens	stinkwort
Dittrichia viscosa	
Echinochloa esculenta	Japanese millet
Echinochloa frumentacea	Siberian millet
Ehrharta longiflora	annual veldt grass
Eragrostis curvula	African lovegrass
Festuca arundinacea	tall fescue
Fumaria muralis	wall fumitory
Galium divaricatum	slender goosegrass
Galium murale	bedstraw
Gamochaeta falcata	cudweed
Geranium molle	dove's-foot cranesbill
Gladiolus undulatus	wavy gladoilus
Gynandriris setifolia	thread iris
Holcus lanatus	Yorkshire fog
Holcus setiger	annual fog
Homeria flaccida	one leaf cape tulip
Hordeum geniculatum	Mediterranean barley grass
Hordeum leporinum	barley grass
Hordeum marinum	salt barley grass
Hypochaeris glabra	smooth catsear
Hypochaeris radicata	flatweed
Isolepis prolifera	budding club-rush
Ixia paniculata	
Juncus bufonius	toad rush
Juncus capitatus	
Juncus holoschoenus	
Juncus imbricatus	
Juncus microcephalus	
Juncus oxycarpus	
Kickxia elatine subsp. elatine	sharp-leaved fluellen, pointed toadflux
Lagurus ovatus	hare's tail grass
Lavatera arborea	tree mallow
Lepidium africanum	common peppercress
Lepidium bonariense	peppercress
Lolium perenne	perennial ryegrass
Lolium rigidum	annual ryegrass, Wimmera ryegrass
Lolium temulentum	darnel
Lotus angustissimus	slender birdsfoot trefoil
Lotus suaveolens	hairy birdsfoot trefoil
Lotus uliginosus	greater birdsfoot trefoil

Lupinus angustifolius	narrowleaf lupin
Mentha pulegium	pennyroil
Moenchia erecta	erect chickweed
Monadenia bracteata	South African orchid
Monopsis debilis	
Myosotis sylvatica	forget-me-not
Narcissus tazetta	jonquil
Navarretia squarrosa	Californian stinkweed
Nothoscordum gracile	false onion weed
Oenothera stricta subsp. stricta	common evening primrose
Ornithopus compressus	yellow serradella
Ornithopus pinnatus	slender serradella
Orobanche minor	lesser broomerape
Ottelia ovalifolia	swamp lilly
Oxalis corniculata	yellow wood sorrel, creeping oxalis
Oxalis hirta	
Oxalis incarnata	climbing oxalis
Oxalis perennans	
Oxalis purpurea	four o'clock, large flower wood sorrell, purple wood sorrell
Parentucellia viscosa	sticky bartsia
Pelargonium capitatum	rose pelargonium
Phalaris aquatica	phalaris
Phalaris arundinacea	reed canary seed
Phleum pratense	timothy grass
Phytolacca octandra	ink weed
Poa annua	winter grass
Polycarpon tetraphyllum	fourleaf allseed
Polygala myrtifolia	myrtle-leafed milkweed
Polygonum arenastrum	sand wireweed
Polypogon monspeliensis	coastal barbgrass
Prunella vulgaris	self-heal
Prunus cerasifera	cherry plum
Pseudognaphalium luteo-album	Jersey cudmore
Puccinellia ciliata	puccinellia
Ranunculus muricatus	sharp buttercup
Rapistrum rugosum	turnip weed
Romulea rosea	Guildford grass
Rorippa nasturtium-aquaticum	watercress
Rubus discolor	blackberry
Rumex brownii	swamp dock
Rumex crispus	curled dock
Rumex pulcher	fiddle dock
Rumex pulcher subsp. pulcher	
Sagina apetala	common pearlwort
Senecio diaschides	ragwort

Setaria gracilis	slender pigeon grass
Sigesbeckia orientalis	Indian weed
Silene gallica	French catchfly
Silene gallica var. gallica	
Solanum americanum	glossy nightshade
Solanum laciniatum	kangaroo apple
Sonchus asper	prickly sow thistle
Sonchus asper subsp. glaucescens	prickly sow thistle
Sparaxis bulbifera	
Sparaxis pillansii	harlequin flower
Spergularia rubra	red sand spurrey
Sporobolus indicus	Paramatta grass, rats' tails
Sporobolus indicus var. capensis	
Tragopogon porrifolius	salsify, oyster plant
Trifolium arvense var. arvense	hare's foot clover
Trifolium campestre var. campestre	hop clover
Trifolium cernuum	drooping flowered clover
Trifolium dubium	suckling clover
Trifolium glomeratum	cluster clover, ball clover
Trifolium hirtum	rose clover
Trifolium pratense var. sativum	red clover
Trifolium resupinatum var. resupinatum	shaftal clover
Trifolium subterraneum	subterraneum clover
Trifolium tomentosum var. tomentosum	woolly clover
Typha orientalis	bulrush, cumbungi
Ursinia anthemoides	ursinia
Vaccaria hispanica	cowcockle
Vellereophyton dealbatum	white cudweed
Verbascum creticum	
Verbascum virgatum	green mullein, twiggy mullein
Veronica arvensis	wall speedwell
Vicia hirsuta	hairy vetch
Vulpia bromoides	squirrel's tail fescue
Vulpia myuros	silver grass, rat's tail fescue
Vulpia myuros var. myuros	
Wahlenbergia capensis	cape bluebell
Watsonia borbonica	
Watsonia meriana var. bulbillifera	

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Hussey, B.M.J. (1991). The flora roads survey - volunteer recording of roadside vegetation in Western Australia. In *Nature Conservation 2: The Role of Corridors*, ed by Saunders, D.A and Hobbs, R.J. Surrey Beatty & Sons, 1991.

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

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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 2

Standard Survey Sheet

APPENDIX 3

Raw data used to calculate the conservation values

APPENDIX 4

Draft Code of Practice

APPENDIX 5

Plant species in the Shire of Plantagenet

APPENDIX 6

Roadside Survey Instruction Booklet