1 The Natural Vegetation Of The Lexton Landcare Area

1.1 Summary

The Lexton Landcare Area occupies approximately 40, 000 hectares of land north and south of the Great dividing Range, to the North West of Ballarat (Figure 1). Within the area approximately 3, 500 ha. Of land still carries relatively intact native vegetation communities (mostly on Public land) and a further approximately 2, 500 ha. Carries vegetation consisting largely of the dominant trees over a much-modified understorey. Despite the degraded nature of much of this remnant vegetation, it is a valuable resource as shelter, wildlife habitat, landscape, conservation and as a source of propagation material for revegetation work.

Based on the units defined by the Land Conservation Council (1980) the following vegetation communities are represented:

Eucalyptus obliqua open forest
E. rubida open forest
E. macrorhyncha/E. goniocalyx open forest
E. macrorhyncha/E. polyanthemos open forest
E. microcarpa Woodland
E. camaldulensis Woodland
Grassland
Sedgeland

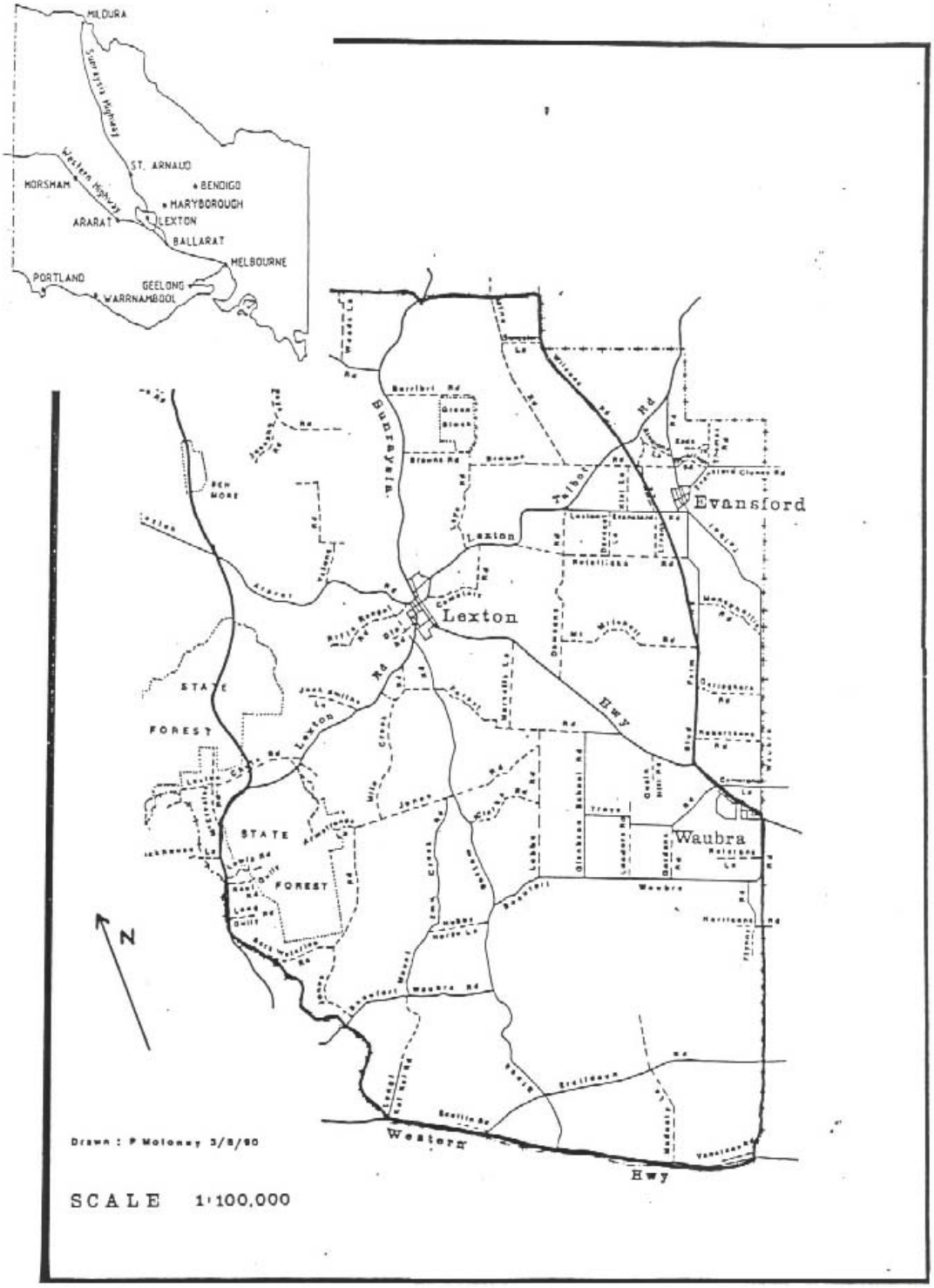

Figure 1 – Lexton Landcare Area

1.2 Introduction

1.2.1. Historical perspective

The nature of the natural vegetation of Western Victoria at the time of European settlement can only be gleaned from the diaries of settlers and the journals of travellers such as Sit Thomas Mitchell (1938) and Augustus Robinson (Presland 1977).

The hills of palaeozoic origin and the volcanic uplands to the west of Ballarat carried a variety of open forest communities, whereas the basalt plains consisted largely of tussock grasslands apart from swamp gums and red gums along watercourses and around lakes and swamps.

The plains were taken up for grazing at an early stage and, as a result have been highly modified, with many of the native species being replaced by exotic pasture species and weeds. The volcanic hills were also extensively cleared for agriculture, as were extensive areas of the Palaeozoic hills. Some of this latter land was set aside for timber or water production and other areas were regarded as too poor for agriculture.

1.2.2. The legacy

As a result of clearing for agriculture, grazing and poor management of timber extraction, only remnants of the original vegetation remain in the Ballarat area. Most occurs on scattered blocks of Public lands and roadside reserves, but degraded remnants also occur on private land. The remnants on private land are largely confined to steep slopes, watercourses and around swamps.

1.2.3 Values of remnant vegetation

The values of natural vegetation include:

(i) reflection of environmental factors;
(ii) aesthetic values;
(iii) protection of soil;
(iv) protection of stock;
(v) timber production;
(vi) recreation;
(vii) protection of water quality;
(viii) fauna and flora conservation;
(ix) source of propagation material of local provenance.

There is a high degree of interaction between these values.

1.2.4. Roadside vegetation

As noted in 1.2.2 much of the native vegetation of Victoria which remains is on roadside reserves. Native vegetation which remains on roadsides has a number of values. It adds to the value of roadsides in both ecological and economic terms.

In ecological terms the values are in the conservation of both flora and fauna. This is particularly important where much of the original vegetation of an area has been removed, as is the case in the Lexton area. Linear patches of vegetation operate as ‘corridors’ allowing movement of animals between blocks of land where native vegetation still exists. The shape of linear reserves is far from ideal in terms of conservation because of their high boundary: area ration. However, it they are all that remains of the natural vegetation of an area, linear reserves achieve very high significance, particularly if they include populations of species that have restricted occurrence.

In economic terms, the vegetation along roadside has a range of benefits, including:-

- Providing windbreaks to – shelter stock
  Slow or divert fire
  Protect buildings
  Protect crops from extreme conditions;
- Providing shade for buildings;
- Protection of soil from erosion;
- Relieving monotony for travellers;
- Providing resting places on main roads for travellers;
- Harbouring birds and insects which control insect pests.

These issues are discussed further by Grieves and Lloyd (1984) and Westbrooke (1989).

Much native vegetation on roadsides has been lost through ill-advised clearing, frequent burning, provision and maintenance and public utilities, provision of fire breaks, etc. All types of disturbance tend to lead to the invasion of roadsides by weeds which are not only poor providers of the values noted above, but pose many additional problems such as harbouring of vermin, disease organisms, agricultural weeds and posing a fire hazard.

Whilst it may be necessary in some areas to clear native vegetation from roadsides for safety reasons or to provide amenities, clearing can frequently be avoided or confined to areas which have lower conservation value. In the past road users and managers have not had access to the information to make considered decisions to balance conservation of vegetation with other roadside values. In recent years, however, much more emphasis has been placed on conservation values and is essential that roadsides of high conservation value be identified, so that they can be considered in planning works and so that specific management proposals can be developed to protect them.

With the increasing recognition of the need for such information a number of survey schemes have been developed, notably those of Mollenmans (1982) in South Australia, Scott (1981) in Western Australia and Grieves and Lloyd (1984) in Victoria. The suitability for each particular scheme depends, on the nature of the environment, on the skills of the person applying the method and on the demands and time constraints for a particular study. In all cases the aim is to categorise roadsides into high, medium and low conservation value and there is general agreement as to the major attributes which contribute to this, i.e.:

- Extent and integrity of native vegetation;
- Degree of disturbance;
- Degree of invasion by exotic species;
- Extent of regeneration of native vegetation;
- Potential for future regeneration;
- Potential for continued maintenance of current condition;
- Aesthetic value;
- Presence of significant flora and fauna.
  (Fauna are not generally assessed because of practical difficulties, but it can be assumed that the more intact the native vegetation the better the site for fauna conservation).

A number of studies of roadsides in Shires within Victoria have been conducted but they have varied in aims, scope and depth. These have included studies within the Shire of Ripon (Fletcher 1986), Shire of Wannan (Ritchie 1988) and the La Trobe Region (Anon undated).

Given the many demands on roadsides it is essential that those of high conservation value be identified, so that they can be considered in planning works and so that specific management proposals can be developed to protect them.

1.3 Methods

1.3.1. Vegetation cover

A combination of aerial photograph interpretation was used to assess the vegetation cover of the area. Remnant vegetation was assessed in two structural categories i.e.

Forest or woodland with developed ground and understorey layers.
Woodland and open woodland with limited or absent native understorey.

1.3.2. Roadside vegetation assessment

The method used in this study was based on the developed Westbrooke (1989) for a study of the Shire of Lowan. Given the time constraints of the study, the technique needed to be both reliable and rapid. The factors that contribute to the current and potential value of roadsides for conservation were considered. Parameters were chosen that could readily assessed visually.

The following parameter were seen to be of high significance and readily assessable.

(i) Overall Width of Road

The overall width of the road reserve is significant in that whatever the status of the road, the wider the reserve the greater the potential for native vegetation to be retained.

This parameter was categorised as < 20m, 20m-40m, 60m<.

(ii) Maximum Width of Roadside Verge

The road is variously placed within the overall road reserve and the maximum width from road to reserve boundary is significant for providing potential for viable native vegetation.

This parameter was categorised as <7m, 7m-15m, 15m<.

(iii) Status of Road

In the long term, pressure of alternative use of roadsides will relate to the status of the road. For example, a main road likely to come under far greater pressure from road widening, easements, etc. than a minor track. Status was assessed based largely on road surface with the exception that sealed roads were divided into Road Construction Authority roads and Shire roads (main road/secondary road). Unsealed roads were categorised as gravel roads, tracks or unused.

(iv) Condition of Roadside Vegetation

The current condition of the roadside vegetation was assessed subjectively into seven categories:

(a) Pristine – undisturbed native vegetation. Theoretically unobtainable on a roadside and only found alongside tracks in the Big Desert region.

(b) Near Natural – visually mature vegetation in natural state, though some exotic species may be present.

(c) Semi-natural – vegetation retaining natural character, but one ore more of the natural layers may be reduced or altered.

(d) Remnant – vegetation largely modified, but some individual native tree and shrub species present.

(e) Fully modified – roadside vegetated totally with exotic species.

(f) Degraded – roadside largely without vegetation due to major disturbance.

(g) Town – roadsides within townships where street and/or mown verges and footpaths are present.

(v) Vegetation Structure

An assessment of the number of strata of vegetation present compared to the expected number of strata for the particular vegetation association present (or expected).

(vi) Hazards

A record of the presence of various features which would reduce long term conservation potential, i.e. presence of: noxious weeds

- Significant erosion/salinity
- Fire break (ploughed fire breaks in particular lead to the introduction of exotic species)
- Utilities – such as S. E. C. easements, gravel dumps.

(vii) Landscape Value

A subjective assessment of landscape value as high, medium or low.

(viii) Regeneration

An assessment of the level of regeneration of major tree and shrub species. This probably reflects the grazing pressure existing on the roadside.

- Vegetation type was recorded by not scored.

Figure 2 shows a sample assessment sheet. It includes provision for data to accurately locate the road section being assessed.

Application of assessment technique

All roads in the Landcare area were traversed and assessed. The assessment sheet results in a score which ranges from 1-18. Sections of road scoring from 1-7 were categorised as LOW conservation and value, 8-12 as MEDIUM conservation value and 13-18 as HIGH conservation value.

All roads rated as having high or medium conservation value were recorded on Map 1.

1.4 Results

1.4.1. Native vegetation of the Lexton Landcare area

(a) Occurrence

The distribution of remnant native vegetation with the Lexton Landcare area is shown on Map1.

(b) Vegetation Communities

Nine broad vegetation units can be identified with the Lexton Landcare area:

E. obliqua open forest
E. rubida open forest
E. macrorhyncha/E. goniocalyx open forest
E. macrorhyncha/E. polyanthemos open forest
E. microcarpa Woodland
E. camaldulensis Woodland
Grassland
Sedgeland
Wetlands

Figure 2 – Sample assessment sheep – rapid survey

LOCATION				**DIRECTION**		**LOCATION POINTS**		**DIS**		
				START	**FINISH**	**1**				
OBS		**DATE**				**2**				
SITE REF						**3**				
NOTES										
LENGTH		**TOTAL # WIDTH**		**VEGETATION TYPE**			**HIGH**	**MED**	**LOW**	
MAXIMUM RESERVE WIDTH *						**LANDSCAPE VALUE**				
STATUS						**REGENERATION**				
Main Road	(1)					**SIGNIFICANT SP.**				
Secondary Road	(2)									
Gravel Road	(3)									
Track	(4)									
Unused	(5)									
SITE CONDITION										
Pristine	(6)									
Near Natural	(5)					**SCORE**				
Semi Natural	(4)					High Landscape (1)				
Remnant	(3)					High Regeneration (1)				
Fully Modified	(2)					Total Width (1-3)				
Degraded	(1)					Reserve Width (1-3)				
Town	(1)					Status (1-5)				
VEGETATION STRUCTURE (-1/missing strata)				Plantations		Condition (1-6)				
Trees				Pasture		Structure (-1/3)				
Shrubs				Weeds		Hazards (-1/5)				
Herbs				Minimal Vegetation		Total				
HAZARDS				**RECOMMENDATION**						
Noxious Weeds	(-1/2)									
Erosion	(-1)									
Salinity	(-1)									
Firebreak	(-1)									
Utility	(-1)									

\# Total Width 20 m = 1 40 m = 2 60+ m = 3

* Maximum Reserve Width <7 m = 1 7-15 m = 2 15 m< = 3

(i) *E. obliqua* open forest

An open forest to 24 m. dominated by *E. obliqua* , Messmate. A number of other eucalyptus are associated including *E. radiata*, Narrow-leaved Peppermint, *E. aromapholoia*, Scent, E. *dives,* Broad-leaved Peppermint, *E. rubida*, Candlebark, and *E. ovata*, Swamp Gum. *Acacia melanoxylon,* Blackwood, and *A. dealbata,* Silver Wattle, occur as a tall shrub layer to 10 m. and the ground layer is dominated by *Poa labilliardieri*, Tussock Grass, *Pteridium esculentum*, Bracken and *Xanthrohoea australis*, Grass Tree. A range of sclerophyllous shrubs, particularly peas and heaths also occur.

The community occurs on palaeozoic sediments within the region, with the most significant occurrences being in the Waterloo and Ben Major State Forests.

(ii) *E. rubida* open forest

An open forest to 25 m dominated by *E. rubida,* Candlebark Gum, associated with *E. melliodora,* Yellow Box, and *E. radiata,* Narrow-leafed Peppermint. Blackwood and Silver Wattle occur as a tall understorey over a ground layer of Tussock Grass, Bracken and a range of sclerophyllous shrubs.

The community occurs in more sheltered sites within the Ben Major and Waterloo State Forests.

(iii) *E macrorhyncha/ E. goniocalyx* open forest

An open forest to 15m dominated by *E. macrorhyncha,* Red Stringybark and *E. goniocalyx*, Long leaf box, with Scent-bark, Yellow Boa, Broad-leaf Peppermint and Candlebark associated. There is a sparse understorey of sclerophyllous shrubs and Tussock Grass. Frequently occurring species include *A. paradoxa,* Hedge Wattle, *A. genistifolia,* Spreading Wattle, Helichrysum *obcordatum*, Grey Everlasting and *Davesia virgata*, Narrow-leaf Bitter-pea. The community is best represented in the Ben Major and Waterloo State Forests but also occurs within Langi Kal Kal.

(iv) *E. macrorhyncha/ E. polyanthemos* open forest

A low open forest to 15 m dominated by *Eucalyptus macrorhyncha*, Red Stringybark and *E. polyanthemos*, Red Box with some *E. goniocalyx,* Long-leaf Box*, E. melliodora,* Yellow Box associated. The understorey is dominated by Tussock Grass and wattles, in particular *A. paradoxa,* Hedge wattle, *A. acinacea* Gold-dust Wattle and *A. pycnantha*, Golden Wattle.

The community is best represented in the Caralulup State Forest to the north of Lexton.

(v) *E. microcarpa* woodlands/open forest

A woodland and open forest dominated by *E. microcarpa*, Grey Box, with a range of associated eucalyptus including Red Box, Yellow Box, Yellow Gum, Red Stringybark, Long-leaf Box and Red Ironbark. The understorey of Tussock Grass and wattles is similar to that of community (iv) described above.

It occurs along the community (iv) in the Caralulup State Forest north of Lexton.

(vi) *E. camaldulensis* woodland

A *E. camaldulensis*, River Red-gum, woodland occurs along creeks and around swamplands in the area.

(vii) Native grassland

Small areas of grassland occur throughout the area, but it is difficult to ascertain whether these are in fact natural grasslands or the understorey of previously cleared woodland communities.

Patches of *Themeda triandra*, Kangaroo Grass were identified in this study on roadsides in the Trawalla/Langi Kal Kal area.

(viii) Sedgeland

Two sedgeland of particular significance were identified in the area:

Elecharis sphacelata, Tall Spike-sedge sedgeland in Cockpit Lagoon.

Cahnia radula, Thatch Saw-sedge sedgeland adjacent to Yalong road to the east of Ben More, near Lexton.

1.4.2 Roadside Assessment

Of the total road length in the area approximately 25 km were assessed as being of high conservation value and 45 km of medium conservation value. These roads are shown in Map 1.

1.5 Discussion

1.5.1 Factors affecting the decline of plants

Leigh, Boden and Briggs (1984) state that agriculture and grazing have had the most profound effect on native vegetation.

In the Lexton area, as elsewhere, the pattern of land use had been free range grazing of natural vegetation, followed by selective scrub and tree clearing. This has been followed by clearing and sowing with introduced pasture species (this includes the addition of fertiliser) or cleaning for crops. The vegetation that remains is largely confined to scattered blocks of public land. Unfortunately, even here the vegetation had come under considerable pressure and nowhere could it be considered to be in pristine condition. Despite this these vegetation remnants may provide the only refuge for the native flora of those communities extensively cleared for agriculture.

1.5.2 Vegetation on Public Land.

The best examples of native vegetation with an intact understorey occur on blocks of Public land in the study area. These are of great significance as a reference point for attempts at re-establishment or rehabilitation of native vegetation on both Public and private land in the area. Also they provide a source of seed of local provenance for such projects. Even small blocks of Public land may be critical in this regard. For example the Caralulup state Forest to the north of Lexton, whilst not in pristine together contains representative examples of 'box' eucalyptus together with a wide range of understorey species. (see Appendix 1) this site is of particular significance since much of the cleared land in the north of the area would previously have carried this vegetation.

1.5.3. Roadside vegetation.

(I) Hazards to roadside vegetation

- A number of factors adversely effect the vegetation which remains on roadsides. These include:
- Establishment of roads including survey and construction;
- Realignment of roads leaving areas which are usually colonised by exotic species;
- Further clearing of tress;
- Altered moisture regimes – either concentrating run-off or diversion of water;
- Roadside litter resulting in nutrient enrichment followed by invasion by exotic species;
- Disturbance for fire breaks including ploughing, slashing fire and herbicides;
- Grazing by domestic stock particularly during drought.

Most of the above have the effect of assisting the replacement of native ground vegetation with exotic species.

In the Lexton area most of these factors have applied in the past or are relevant now. The area has an extensive road network, the establishment of which would have entailed considerable disturbance. The major highways of course suffer most in terms of road maintenance and improvement. Despite its width the Western Highway does not rare high conservation value for any part of its length where it abuts the area.

Secondary roads have little chance of retaining high vegetation conservation values unless the road reserve is wide. Increased community awareness of the detrimental effects on soil erosion, etc. is essential to halt further loss of roadside vegetation.

Where there is a formed road table drains result in redistribution of moisture and increased nutrient in these sites and this, together with the soil disturbance, leads to the establishment of weeds. Thus, the influence of road extends further than the bitumen or gravel. The problem in made worse if there is dumping of rubbish or soil along the roadside. The former does not appear to be a major problem in this area.

Fire prevention work as in most Shires in Victoria had a significant impact on vegetation. The regions fire prevention plan provides for a system of strategic and tactical fire breaks along most of the main

road network. Along these roads, clearance to not less than 3 meters from the guide posts is prescribed along with fuel reduction of the road reserve. Of the available options for fire prevention work on roadsides, fuel reduction burning in autumn is the one which will have the lease impact on native vegetation.

Grazing has certainly, in the past, had a major detrimental effect on roadside vegetation, but there is evidence that with the reduced use of roads as stock routes, the woody vegetation at least is regenerating on many roads. The severe effects of grazing on understorey and ground layer vegetation can however be seen on minor roads which have been fenced off for grazing. Despite minimal use and no disturbance through road making and maintenance, these roads invariably have very low conservation value. These roads otherwise should be key areas where native vegetation can be conserved and unless these roads are to be totally alienated, grazing should cease, to allow natural regeneration to occur.

All the above disturbances contribute to the invasion of native vegetation by exotic weeds. As noted earlier, roadsides are far from ideal as conservation reserves because of their high boundary to area ratio but, because of the extensive removal of native vegetation elsewhere they are an invaluable resource which steps must be taken to protect.

Despite the extensive clearing and long history of pastoral use, certain roadsides in the area still have significant areas of native vegetation.

(II) Recommendations for roadside management

The following general guidelines should be followed in an effort to maintain existing roadside conservation values and to lead to extending those areas where there is a potential regeneration:

(i) That Council recognises the conservation value of roadsides for:

- Maintenance of native flora
- Linking flora habitats
- Wildlife corridors and wildlife habitat;
- A seed source for maintaining local provenance;
- Windbreaks for adjoining landowners;
- Windbreaks for fire control;
- Salinity and erosion control;

(ii) No grazing permits be issued for road reserve where native vegetation could be grazed or where there is potential for natural regeneration.

(iii) Prior to any roadworks being carried out, there should be consultation to:

(a) minimise vegetation loss;
(b) plan revegetation following completion of roadworks. This should aim to restore as near as possible to the natural state.

(iv) In grading roads, an effort be made to avoid burying vegetation (this having the effect of encouraging weed invasion and creating fir hazards). Soil should be disposed of in an environmentally acceptable site.

(v) Council initiate training of outside staff in vegetation importance and protection.

(vi) Roads be kept where possible to existing alignments.

(vii) Roadmaking material dumps be in areas already devoid of native vegetation.

(ix) Consideration to be given to a long-term plan for the revegetation of roadsides.

Priority should be given to revegetation of areas which link areas or roadsides with natural vegetation. Only indigenous species, preferably of local provenance be used in roadside plantings.

(ix) Fire protection work be by fuel reduction burning in Autumn wherever possible.

Landowners be encouraged to assist by ploughing or slashing fire breaks inside fence lines.

(x) The S.E.C. be altered to areas of special conservation significance.

(xi) No clearing of roadsides for cropping.

(xiii) No firewood collection allowed from roadsides.

1.5.4 Vegetation on private land

The limited area of remnant vegetation on private land the area is due to the suitability of the soils for agriculture. Virtually all the remnant vegetation that remains on private land has been grazed and as a result the native understorey is severely depleted or absent.

There are still m any threats to remnant vegetation within the study area including ongoing effects of grazing, lack of regeneration, weed invasion and land degradation (Brechwoldt, 1986).

Revegetation of land in the Lexton Landcare area is desirable for the following reasons:

(i) to lower watertables to reduce secondary salinisation
(ii) to vegetate ground water recharge areas
(iii) to reverse the widespread tree decline
(iv) to stabilise stream banks and drainage lines
(v) to stabilise soils to prevent or arrest soil erosion
(vi) to provide windbreaks for stock protection and shade
(vii) to improve belts of shrubs/low trees to slow down fires
(viii) to provide for honey production
(ix) to conserve depleted native species
(x) to improve habitat for wildlife
(xi) to provide habitat corridors to allow the movement, colonisation or recolonisation of animal species.

It is clearly also important that there be no further loss of remnant vegetation.

It is strongly recommended that only indigenous species from the regional flora be used for the revegetation requirements listed above. This would simultaneously fulfill economic and conservation objective and also maintain an ecologically consistent landscape. These indigenous species are also best suited to the environmental conditions and are thus better able to cope with pathogens and predators with which they have evolved.

There are many indigenous species suitable for revegetation in the area and Gowers (1991) provides a valuable guide to suitable species for specific land units. Ballarat University College is currently developing a regional arboretum to further assist landowners in choice of suitable species.

It should be noted that in many situations the best means of re-establishment of native vegetation is to allow natural regeneration by fencing off remnant trees.