

Tamworth Greening Plan

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January 2003*



Acknowledgements

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I would also like to thank Alf Haskins for his help with the vegetation community survey

The project was funded by the Environmental Trust and involved collaboration between Greening Australia and the Tamworth City Council.

“I would like to personally thank everyone involved in the project for their support and commitment. Without this the Tamworth Greening Plan would not have come to fruition.”

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Summary

Tamworth has had a similar vegetation history to many of the towns within the Northwest. The majority of the native vegetation was cleared for agriculture leaving isolated remnants on country that was unsuitable for farming such as riversides and hilltops.

The current vegetation is largely restricted to the hills northeast of town, a large proportion of which exists on crown land. The main problem in the Tamworth area is the lack of healthy vegetative communities to the southwest of the Peel River. The priority of the Greening Plan is protection of the remaining vegetation with the secondary objectives being to establish connective native vegetation corridors and raise community environmental awareness.

There are many benefits to an interconnected bushland network across the Tamworth landscape. In brief these benefits include allowing the passage of native wildlife, increasing the productivity of surrounding land and improving the aesthetics of the surrounding landscape.

For ease of interpretation the Tamworth environment was broken up into four main areas. The following table provides a summary of the main recommendations for investigation

Issue	Recommendation
<i>Bushland Protection</i>	Investigate establishing 'Green Areas'
	Development of an incentive program to encourage private land holders to conserve & enhance areas of existing native vegetation.
	Maintain and enhance the link through Oxley Vale
<i>Native Revegetation</i>	Encourage the establishment of native vegetation corridors and shelterbelts across the landscape.
	Investigate establishing future 'Green Areas'
	Development of a program to encourage people within the town to plant native species.
	Promotion of the importance of site maintenance as a major factor in the success of any environmental project.
	Encourage native seed collection & investigation into the development of a seed bank.
<i>Riparian Areas</i>	Staged removal of willows & other exotic vegetation from along the river
	Native plantings along the river in place of weeds
<i>Urban Areas</i>	Encourage more native street vegetation
	Promote the benefits of 'Wildlife Gardens'
	Opportunistic planting of native vegetation in appropriate places through town eg open spaces, parks & riversides.

The additional area of concern identified was that of community environmental education. By increasing the level of awareness and interest in the environment a higher level of community support will often be given to related projects. Community support is a vital part in the success of any environmental project. Thus the concept of investigating the possibility of establishing an environmental education program is also a recommendation of this plan.

Prior to reading this document the following points should be noted:

- This document was produced by a community advisory committee with the aid of Greening Australia and the Tamworth City Council.
- It is to be utilised as a guide for groups and individuals undertaking environmental work, and a supporting document for funding applications.
- Implementation of recommendations within the plan will be on a voluntary basis
- It is not a legal document.
- It does not affect the Tamworth City Council Local Environmental Plan 1996
- Maps are only indicatives and inaccuracies exist in the extent of vegetation cover
- It is intended that the areas identified as ideal for revegetation should have the level of vegetation increased, not that the entire area be planted out (it is recognised that this would not be practical for landowners in most situations).
- Although the scope of the plan is limited to the Tamworth City Council Local Government Area it is also important to consider vegetation patterns over a broader area and “look beyond the political boundaries”.

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1 Introduction

1.1 What is the Tamworth Greening Plan

A Greening Plan is a community produced plan. It is a systematic and long-term approach to bushland and native vegetation management with a focus on the preservation and protection of biodiversity. Biodiversity is short for biological diversity and refers to the “variety of all life forms – the plants, animals, micro-organisms, the genes they contain and the ecosystems of which they are a part” (Farrier et al, 1999). The decline in biodiversity of Australia’s native species is the result of a variety of factors acting in unison, however habitat loss and fragmentation are often considered the most significant (Fahrig 1997, NSW).

The focus of past conservation and environmental work in urban areas has been on an individual site basis. The concept of a Greening Plan is to extend beyond this to consider the entire landscape, its connectivity and the issues that affect it. The protection of urban vegetation is important because many towns within the northwest contain small remnants of native vegetation. These remnants exist as “islands” in urban areas and are the only direct point of contact many residents have with the native environment that existed in their township before urban development. Consequently the enhancement of these areas will have tremendous conservation, educational and historical significance.

The concept of a Greening Plan is to provide native vegetation management options on a variety of levels within the council area. The focus will be on the management requirements of small areas of remnant bushland while providing a strategy of the wider revegetation and management of native vegetation within the region.

The Tamworth Greening Plan covers the Tamworth Local Government area. However efforts were made to incorporate this plan with the wider vegetation patterns that exist within the northwest.

1.2 Aims and Objectives

Aim

The main aim of the Tamworth Greening Plan is to develop a proactive management plan for the native vegetation within the Tamworth City Council area.

Objectives

1. To protect and enhance areas of existing native vegetation.
2. To consolidate remnants and establish corridors of native vegetation
3. To protect and enhance riparian corridors
4. To raise community awareness with regards to the Tamworth environment
5. To encourage opportunistic planting of native endemic species within urban areas.

1.3 Development

The development of the Tamworth Greening Plan was funded by the Environmental Trust and involved the collaboration of Greening Australia and the Tamworth City Council. A community advisory committee was responsible for the development of the plan, which contains a record of the distribution and characteristics of Tamworth's remnant vegetation, plus a related set of recommendations to preserve and enhance these areas.

This plan is not a legal document. It is a set of recommendations that can be utilised on a voluntary basis for future works by property owners, community groups and councils alike, to ensure that environmental work undertaken will benefit not only individual sites but also the entire council area.

There are several important points to note before reading this document. These are

1. The maps contained within this document are only designed to give a general indication of the concepts explained within the text. The vegetation maps were developed from aerial photos and related roadside vegetation surveys hence some inaccuracies may occur. The time available to undertake an in depth survey was not available to this committee. In addition the role of figure 6 is to provide a visual representation of potential corridor directions. It is not the recommendation that entire areas be planted out, instead it is a suggestion that the design of corridors/shelterbelts work at establishing this link.
2. This plan regularly refers to the use of native vegetation; this refers ideally to the use of local native vegetation germinated from seed sourced in the area.

1.4 Relevance to Tamworth

The development of the Tamworth Greening Plan helps to satisfy the targets and recommendations of many plans and strategies on both a local, regional, national and international level. The Tamworth City Council recognised in their State of the Environment Report (2001) that the identification of valuable corridors or potential areas for revegetation between remnants was of significant importance and required further investigation. On a regional level the implementation of the Greening Plan will also help to achieve the targets set out by the 'Namoi Catchment, a blueprint for the future' specifically with regards to biodiversity and riverine ecosystems (Namoi Catchment Management Board, 2001).

The importance of biodiversity management is also recognised as an essential part of the legal and political context which local government operates. Biodiversity is formally recognised in the following national and international plans.

- United Nations Convention on Biodiversity
- National Local Government Biodiversity Strategy
- NSW Biodiversity Strategy
- National Strategy for the Conservation of Australia's Biodiversity
- National Objectives and Targets for Biodiversity Conservation 2001-2005

2 Importance of Corridors

Clearing vegetation is listed as a key threatening process under the Threatened Species Conservation Act (1995). Thus it is a recognised cause of the decline of species number and diversity in Australia directly through habitat destruction and indirectly through habitat fragmentation and isolation.

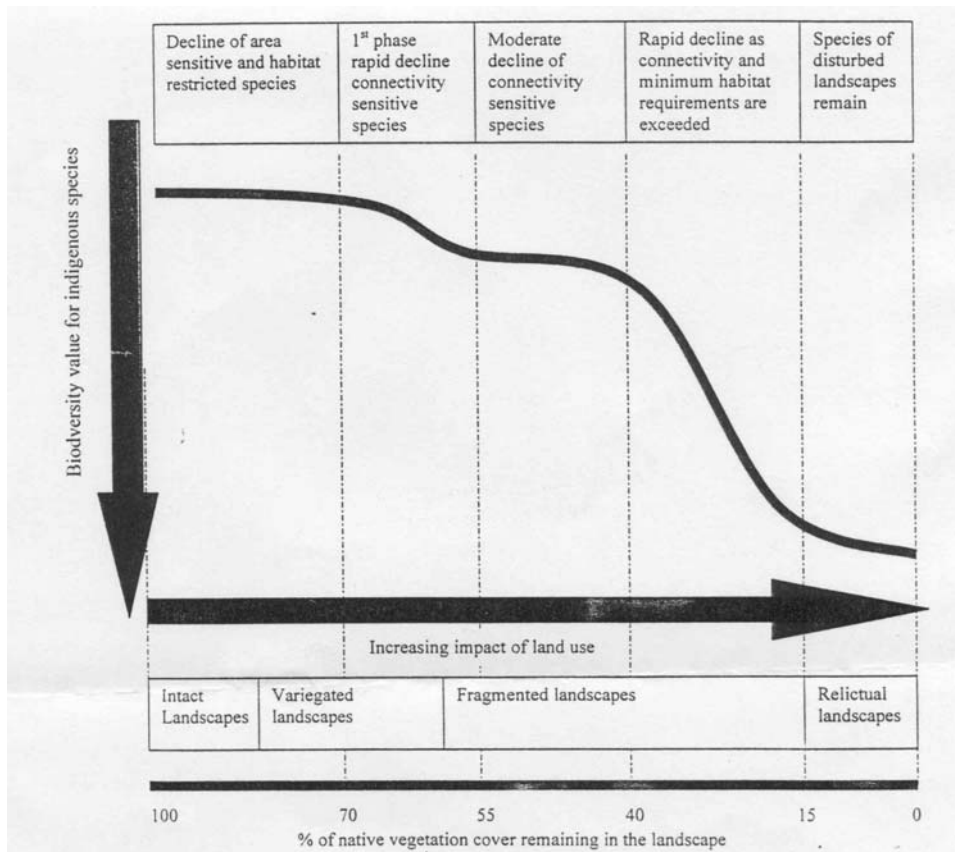


Figure 1
Diagrammatic Representation of Biodiversity Loss in Relation to Habitat Loss

Fragmentation means that even though the species may have direct access to resources these resources are severely limited. Isolation reduces the availability of food, shelter and territory. Areas can become overcrowded thus impacting on vegetation health or stimulating interbreeding that can lead to mutation, sterility and the eventual extinction of the species from that area.

Maintaining, protecting and enhancing native bushland has many benefits additional to protecting our native wildlife. Native vegetation:

- helps to regulate the watertable thus reducing the risk of dry land salinity problems.
- provides valuable shade and shelter to stock.
- increases the aesthetic appearance of the landscape
- filters runoff providing better water quality in rivers and streams

A bushland environment also provides habitat for a large variety of native fauna that can provide valuable pest control services. This can provide an enormous benefit for land-holders, for example

- Magpies eat large numbers of scarab larvae which are pests of pastures;
- Some native wasp species parasitise scarab larvae;
- Egrets consume many insects;
- Many birds eat the insects which graze native trees – including farm shelterbelts and shade tree;
- In eucalypt woodland native spiders help control insect populations;
- Ibis eat large numbers of grasshoppers and mice;
- Ladybirds prey on aphids

(Johnston & Don, 1990)

The popular solution to the fragmentation of native bushland is to consolidate these pockets of bushland through vegetation linkages, or corridors. Corridors are vitally important in Australia because a large percentage of our native species are nomadic, seasonal movers or require territories covering a variety of environments. Certain species may require access to winter flowering plants or extra territory in dry conditions as resources such as water and feed become scarce.

It is recognised however that corridors are not the all-encompassing solution and there are many other environmental issues that should be addressed in conjunction with establishing a corridor system. The Greening Plan hopes to recognise and address those issues that affect the Tamworth area.

3 Tamworth Urban Area

3.1 Vegetation History

“The hills were very stony, but well-grassed and quite clear and open with many fine cypresses on their higher ridges and slopes. While on the lower level the rich and spacious valley itself was excellent with a good array of timber specially apple tree, box and gum.”

John Oxley, 1818

John Oxley also described the plains as being covered in grass with only occasional clumps of timber. He identified *Panicum sp.*, plains grasses and native saltbushes. The Aborigines firing practices maintained the open woodland environments. At present there are few areas of plains grasses left and no saltbush, with the area now being dominated by dry land cropping systems (Banks, 2001).

European settlement began in 1827, and continued uncontrolled until 1834 when the first systematic occupation of land began (Oxley Park-Victoria Park & Botanical Gardens Plan of Management). Prior to 1900 the majority of land was held in very large runs, with these areas being sub-divided post 1900s. Even at this time the NSW State Government recognised that many of these blocks were too small to be economically sustainable, thus the patchwork of small blocks were cleared and worked continually. An overview of historical photographs show that the most significant rate of clearing was undertaken in this period, the result being that present day mature trees are only post-1950s regeneration (Banks, 2001).

The present land use in the Tamworth City Council local government area includes a variety of activities such as grazing livestock, cropping, particularly along the irrigated river floodplains, residential and recreation. The surrounding land is dominated by mixed farming and grazing systems.

3.2 Plans and Policies

The following is a list of the existing plans and policies that have some effect on the Tamworth environment.

- Peel River Plan
- Street Tree Master Plan
- Salinity and Groundwater Management Plan
- Stormwater Management plan
- The majority of the hills behind Tamworth are zoned for Environmental Protection under the Tamworth Local Environmental Plan 1996. This requires the conservation of land possessing a high scenic amenity and no development can proceed without consent (Tamworth City Council, 1996).

3.3 Existing Vegetation

Due to agriculture being the main land use in the Tamworth area the majority of local vegetation on the flatter country has been cleared. To the west of the Peel River only small isolated remnants of native woodland remain, existing primarily on private land. To the east however, large remnants remain on the more rugged hills, much of which is crown land (figures 3 & 4), some of which, including Oxley Park, is managed by Council. The remnant vegetation existing along the Peel River is limited to a very narrow corridor consisting mainly of mature trees scattered among willows. Some revegetation within Tamworth has been undertaken.

Using the zoning within the Tamworth Local Environmental Plan (1996) the land within the Tamworth City Council area can be roughly broken into three categories; rural, urban and recreation (figure 2). The largest proportion of land lies within the rural category (142.60km²) this includes flood-labile, rural residential, future investigation and environmental protection. It is within this category that the majority of the remnant vegetation exists. The urban category consists of residential, business, airport and industrial, which give a total of 29.74km². The remaining category, recreation (12.52km²), consists of urban parks, sporting fields and reserves, including Oxley Park.

The main issue in the Tamworth area is the lack of connection between areas of remnant vegetation. The NSW National Parks and Wildlife Service estimates that 86% of Tamworth's local government area has less than 20% vegetation cover (SoE, 2001). The large corridor of bushland on the hills behind Tamworth is only connected to the Peel River through a narrow strip of vegetation through Oxley Vale. There is no direct connectivity between the scattered bushland across the farmland (figure 3).

3.4 Vegetation Communities

The vegetation community's distribution identified in figure 5 was compiled through a roadside vegetation survey. As a result it was not possible to be close to many of the vegetated areas situated on private land. In these cases an assumption was made in relation to what was already known of the landscape.

The vegetation communities of the Tamworth City Council area were observed to follow the general pattern detailed below. Immediately along the Peel River and Goonoo Goonoo Creek the River Red Gum (*Eucalyptus camaldulensis*) and the River Oak (*Casuarina cunninghamiana*) were the dominant vegetation, changing to Yellow Box (*Eucalyptus melliodora*) woodlands on the surrounding floodplains and drainage lines; River Red Gums also extended into these areas. On the higher hillier ground the White Box (*Eucalyptus albens*) woodland became dominant, the only exception to this being the Grey Box (*Eucalyptus moluccana*) community along the Werris Creek Road. The White Box community on the hills behind Tamworth contained a denser canopy cover, than that observed on the flatter areas, creating an open forest environment in addition to containing a higher proportion of shrubs in the understorey.

3.4.1 Vegetation Communities of the Tamworth City Council Area

1 Yellow Box Dominant

- (1a) *Eucalyptus melliodora* Woodland with *Eucalyptus blakelyi* and *Angophora floribunda* association. With scattered *Eucalyptus moluccana* along the roadsides.
- (1b) *Eucalyptus melliodora* Woodland with *Eucalyptus blakelyi* and *Angophora floribunda* association. *Eucalyptus camaldulensis* scattered along the gullies.
- (1c) *Eucalyptus melliodora* woodland with *Eucalyptus blakelyi* and *Eucalyptus albens* association. Contains scattered *Angophora floribunda* with sections of shrubby understorey.

2 White Box Dominant

- (2a) *Eucalyptus albens* woodland
- (2b) *Eucalyptus albens* Open Forest with *Angophora floribunda* and *Eucalyptus blakelyi* association. White Cypress is scattered throughout the area with *Eucalyptus melliodora* present in the gullies. The majority of this area contained an extensive native shrub layer.
- (2c) *Eucalyptus albens* woodland with a *Eucalyptus melliodora* association.

2 Riparian Environment

- (3a) *Eucalyptus camaldulensis*
- (3b) *Eucalyptus camaldulensis* and *Eucalyptus melliodora* communities
- (3c) *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* community with scattered willows of varying densities.

4 Grey Box (*Eucalyptus moluccana*) woodland

3.4.2 *Grassy Box Woodlands*

Grassy Box Woodlands are landscapes of scattered eucalyptus trees with understoreys of native grasses and wildflowers (Elix & Lambert, unknown). The Tamworth City Council Area contains examples of both the Yellow Box grassy woodland and White Box grassy woodland, however their distribution has been substantially reduced since John Oxley first described the area. Grassy Box Woodlands once characterised a large proportion of the western slopes of the Great Dividing Range but their preference for the deeper, more fertile soils on the hill slopes and gently undulating country meant their communities were cleared for farming. The Grassy Box Woodland Community would have characterised much of the cleared land surrounding Tamworth. It is now limited to fragmented and isolated pockets often in a degraded state due to grazing pressure.

3.5 **Additional Issues**

Due to the large size of Tamworth and the time available to construct the Greening Plan it was decided by the committee to focus simply on improving the connectivity of remnant vegetation. It is recognised that there are additional environmental issues that affect Tamworth such as; environmental and noxious weeds, erosion, and rubbish in addition to several areas being identified as at risk of salinity. The committee did however identify what is believed to be the major environmental weeds in the Tamworth area; they are the Willow (*Salix sp.*), bridal creeper (*Asparagus asparagoides*), privet (*Ligustrum sp.*), green cestrum (*Cestrum parqui*), tiger pear (*Opuntia aurantiaca*), Johnson's grass (*Sorghum halepense*) and Coolatai Grass (*Hyparrhenia hirta*). Mistletoe can also be considered a weed in many urban areas. An expansion of these issues on council area level can be found in the State of the Environment Report (2000-2001).

4 The Vision

The proposed corridor system is designed to connect the areas of existing vegetation, different vegetation communities and landscape positions. It also aims to suggest 'green areas' in the regions into which the city is expanding to maintain the valuable network of vegetation to the east of the city.

For ease of interpretation the 'vision' was broken up into three categories to reflect the first three objectives of the plan. It is important to have a starting point and the areas of highest priority within each category represent that point. However it is important to note that assistance will be given to any individual or group planning environmental work in any of the designated areas.

The potential corridors identified within figure 6 are only designed to be a guide to the recommended direction corridors should take. It does not mean those entire areas must be planted with native vegetation; corridors/shelterbelts may run along fence lines in a zigzag pattern. It is the aim that conservation outcomes can be achieved in conjunction to maintaining the productivity of the area.

Funding to aid with the implementation of these recommendations can often be obtained. Local organisations such as Landcare and Greening Australia can provide a guide to the type of funding that is currently available in addition to helping with the application process.

4.1 Protection Areas

The protection of remnant bushland within the Tamworth area is vital. The protection of the integrity of the bushland extending along the hills to the northeast is important because of its high habitat and aesthetic value, some of this area is already protected under the Crown Lands Act. The protection of the isolated pockets to the southeast of the Peel River is also of equal importance, for the preservation of the different communities that exist there and the agricultural benefits.

The protection and regeneration of existing vegetation is a more efficient and cost effective process than attempting to recreate an environment. It is also the most environmentally beneficial approach as many ecological studies have shown "what we've got is all we've got" – it is very difficult to create the same system once the original vegetation disappears from a site (Williams, 2000). Additional benefits are those described in section 2.

The preservation of the native vegetation on the hills behind Tamworth and the Bolton's Creek area were given the highest priority because of their good health. Both of these areas contain healthy native canopy, groundcover and shrub layer. Therefore it will take substantially less effort to regenerate these areas than those that are more degraded.

Recommendation

1. In addition to the current level of environmental protection imposed on the hills area, Council investigates expanding this to incorporate 'Green Areas'. These areas will ensure the continuity of the native vegetation is maintained thus preserving its health.

2. The linkage between the hills and Peel River through Oxley Vale be maintained and enhanced, as it is the only linkage between these two areas. Further possible linkages should be investigated.
3. Private property owners be encouraged to protect and rehabilitate their land

4.2 Revegetation Areas

Revegetation is important because it increases the amount of native vegetation in the landscape. Providing connections through revegetation is important for reasons previously addressed.

In figure 6 the highest priority was given to the revegetation corridors on the north-eastern side of town because this will link up the areas of priority existing vegetation thus increasing their value. In addition considerable planting has already been undertaken in this area with more planned for the future. It is vital that the connectivity of the hilltop vegetation be maintained, if isolated the integrity and value of those areas may be lost.

Recommendation

Planting is encouraged on both public and private land in all priority areas, following the recommendations made in section 5.1.

4.3 Riparian Areas

It was decided to give the protection and revegetation of riparian areas, within figure 6, their own section because these areas often have a complex array of factors affecting them such as providing stock water, erosion from high water flows, recreation pressure and weeds. However riparian areas also often offer the best potential corridors.

The Peel River and its subsidiaries represent valuable corridor potential. Extending throughout the landscape their enhancement will not only benefit flora and fauna, it will provide erosion control and improved water quality. In addition these areas have a low potential for high-density development due to flooding.

The highest priority has been given to the Peel River and the Goonoo Goonoo Creek because these waterways contain the largest amount of remnant vegetation. However the regeneration of these areas is a delicate process. It is recommended that advice from one of the relevant environmental authorities be obtained before any work is commenced.

Recommendation

1. Staged removal of willows and other exotic vegetation.
2. Replacement planting of native vegetation, using where possible long-stem tube stock.
3. Riverbanks fenced off from stock and the establishment of off-stream watering points.

4.4 Urban Areas

Due to the scale of the map that has been used to display the potential vegetation corridors, areas within the urban area cannot be clearly shown. The planting of native endemic species within Tamworth will provide valuable linkages and habitat.

Many of the areas of native vegetation within town exist along drainage lines. Hence it is recommended that these areas be acknowledged within the town's planning and preserved as wildlife corridors. The Greening Plan also recommends that opportunistic native vegetation plantings be undertaken within large parkland area. These plantings must be planned to take into consideration the safety of property and the general public.

Wildlife attracting gardens can serve to broaden corridors by providing additional habitat. Appropriate native street trees also provide valuable habitat and food. Electricity easements present an opportunity to re-establish low shrubs and native ground cover. However, any revegetation must comply with the regulations imposed by Country Energy.

5 Recommendations

5.1 Revegetation

The purpose of this section of the Greening Plan is to provide some direction to property owners aiming to re-establish native communities on their land. As previously described the natural environment of Tamworth is characterised by woodlands. This classification means that the trees are between 10-30 metres tall and have a canopy cover of 10-30%. It is therefore this environment that should be encouraged.

There are many benefits to re-establishing the native communities in the landscape. Trees, deep-rooted perennial grasses and shrubs play a large role in controlling salinity in conjunction with stabilising the soil. Furthermore native grasses are often better able to withstand drought than the more season-dependent 'improved grasses' (Elix & Lambert, unknown). Corridors of native woodland also provide valuable shelter. Strong winds across a paddock can remove valuable soil moisture and cause erosion. Cattle also benefit from the shade and shelter offered by these areas. The conservation benefits of woodlands corridors are also substantial. They supply an important linkage role for the reasons explained in section 2.

This report will focus on re-establishing shrubby woodlands because these provide the widest range of habitat and the largest benefit to property owners. The restoration of grassy box woodlands is a more difficult and time-consuming process. Further information on this process can be provided through the organisations listed in appendix 1.

Recommendation

When planning to recreate a woodland environment trees should not be spaced any closer than 10 metres apart. This will allow them to develop large spreading crowns, providing valuable shade in summer. The recommended species mixture is 40% trees and 60% shrubs. Along rivers and creeks the vegetation can be planted closer together to provide a greater root density to guard against erosion.

Located in appendix 2 is series of lists for native species that are can be utilised to recreate certain communities. The reintroduction of native groundcover is a difficult process. Nurseries do not often propagate the required plants and seed collection is tedious. Three separate lists have been compiled covering the White Box woodland community (*Eucalyptus albens*), riparian

environments of River Red Gums (*Eucalyptus camaldulensis*), and the Yellow box (*Eucalyptus melliodora*) floodplain and gully areas. In determining what to plant in an area it is often useful to look at nearby remnants and observe what grows within them.

The committee used the trends identified from the 'Vegetation Community Map, figure 5' to determine the approximate locations of each of the communities.

- The White Box Woodland communities would be present on the ridges and the high drier areas on the western side of the Peel River.
- The River Red Gum riparian environment would exist along the Peel River and Goonoo Goonoo Creek.
- The Yellow Box Woodlands would have existed on the floodplains and the drainage gullies where there is more moisture.

5.2 Regeneration

Regeneration is the process in which an area of remnant bushland is protected and encouraged to fix itself. This involves the germination of native seeds within the bushland or the reintroduction from other areas. For this process to occur:

- Stock must be removed from the site (or only grazed for very short periods of time)
- Environmental weeds need to be removed or controlled

Once stock and environmental weeds have been controlled or removed regeneration should start to occur. For example small eucalypts and native shrubs should begin to emerge. However in some cases even though there is remaining native vegetation very little or no regeneration takes place. This most commonly occurs in attempting to re-establish a native understorey. In instances such as this planting will have to be undertaken. There are many theories on the length of time an area should be rested before planting; one example from the northern tableland describes resting the area for 4 years before planting (Morsley, 2002).

The preservation and management of the existing remnant bushland is vital especially on the western side of the Peel. It is important for both the council and private property owners who are looking towards preserving their areas of bushland to develop a simple management plan. Simply considering the points below will enable a better understanding of the issues affecting a piece of bushland.

The basic steps for adaptive management are:

- Identify management issues (eg weed infestation)
- Identify management goals (eg weeds managed, native seedling recruitment)
- Determine management strategies available (eg hand removal, targeted herbicide, spot spraying)
- Select appropriate management action (eg hand removal)
- Determine what will be monitored and how (eg establish a photo point)
- Determine how change and success will be evaluated (eg absence of living weeds one month/one year after removal)

(Elix & Lambert, date unknown)

5.3 Weeds

The control of weeds in a bushland environment is important to allow natives to regenerate or re-establish effectively. However, it should be recognised that even though weeds have an adverse effect on native bushland they may also provide some benefit. For example privet supplies low shelter for small birds where no native shrubs exist, and willows play a role in stabilising riverbanks. Therefore removal and replacement requires a staged and managed approach.

In areas of scattered weeds natural regeneration should occur after removal, however native regeneration in more densely infested areas will have to be monitored and planting undertaken if it does not occur. In relation to willows the smaller regrowth should be removed first and the larger willows retained. This will stabilise the bank while the planted native vegetation has a chance to re-establish itself. Permits from the Department of Land and Water Conservation are required for the removal of any riparian vegetation.

All sites of weed removal will require monitoring. This is undertaken because initial removal will often stimulate the germination of weed seeds from the soil seed bank. In the case of large-leaved privet the seed still experiences 100% viability after 1-2 years in the soil.

5.4 Green Areas

Tamworth is slowly spreading in both a northerly and southerly direction. This requires careful management as it involves the removal of the remaining pockets of bushland, as in the south, and the isolation of bushland within a valuable corridor, as in the north. Manicured lawns are gradually replacing native bushland. It is recognised that the city needs to expand but consideration should be given to incorporating native vegetation. A compromise should be reached.

One possibility for a compromise is for the council to investigate the concept of establishing 'Green Belts' or 'Green Areas' within the city. The concept of these areas is to break up the urban sprawl and maintain the integrity of bushland corridors. The dedication of a 'Green Area' connecting South Tamworth to Kingswood, and the planting out of this area would represent a valuable corridor. It would increase the value of the Kingswood plantings and provide bushland outlooks for surrounding houses. Another valuable 'Green Area' would be to increase the level of protection provide to the vegetation on the hills behind Tamworth.

The establishment of 'Green Areas' represent a valuable future investment.

5.5 Street Trees & Open Space

Street vegetation is a major contributor to the vegetation that exists within urban areas. In many areas there has been a tendency to focus purely on exotics. However there are many native species that provide attractive street vegetation. It is the suggestion of this committee that increased effort be given to establishing native street trees within the Tamworth area. A reference to appropriate species can be sourced from the Street Tree Master Plan produced for Tamworth City Council.

The committee recognised the hazard that having species such as large Eucalypts close to houses can cause, eg falling limbs. The species that are the worst offenders of this are largely the species native to the Tamworth area. Therefore it is recommended that the planting of these species is limited to open spaces and parkland. Appropriate native local species would be; *Eucalyptus albens* (White box), *Eucalyptus melliodora* (Yellow Box), *Brachychiton populneus* (Kurrajong) and *Eucalyptus sideroxylon* (Mugga Ironbark).

5.6 Education Program

The education of the wider community is vital in changing the attitudes of the Tamworth Community with regards to the positive value of their bushland. Education is traditionally undertaken in two fields, school education and the education of the wider public.

5.6.1 Schools / TAFE

Environmental education in schools represents the perfect opportunity to teach students the importance of their local environment and attach a value to it. Its importance is recognised by a wide variety of sources such as the National Conservation Strategy, which listed environmental education as a national priority (NSW Department of Education, 1989). Environmental education is best achieved in an external environment. Involving students directly in their local environment in a process where they can directly see the positive results of their labour. Activities that involve direct interaction are listed below.

- Plant Identification
- Surveying different aspects eg birds, insects, soil etc
- Propagation program involving students collecting seed from local species, propagating the seed then planting the seedlings in an adopted area.
- Adoption of particular areas by particular schools

Recommendation 1

The committee recognised that the schools in the Tamworth area do not possess the knowledge and resources to undertake this. As a result it was suggested that the council be encouraged to investigate establishing an education program to undertake these activities. The program could involve training students in seed collection, propagation and plant identification. It could incorporate the promotion of the objectives of the Tamworth Greening Plan as covered in the following section.

Recommendation 2

The involvement of Tamworth TAFE students in various community projects can make a valuable contribution. Depending on the course being undertaken specific community works can be worked into TAFE projects.

5.6.2 Wider Community

It is believed that increasing education in schools will gradually make the ideas and attitudes filter through into the wider community. However there is only so much that can be incorporated in school. The incorporation of the wider community in an education program would be of substantial benefit to the overall aims of this plan. Community pride and ownership of ideas and projects contributes a great deal to their long-term success. Encouragement and education regarding environmental issues will hopefully stimulate greater community involvement and interest in their local environment.

Recommendation 1

Some activities that could be investigated to be included in the education program are; a leaflet to be distributed to rural properties with the rates notice promoting the concepts raised in the Greening Plan, such as how and what to plant, and how to manage bushland remnants.

Recommendation 2

The establishment of an environmental link to the Tamworth City Council website could also be considered. This link could include relevant environmental information, and the promotion for the establishment of a seed bank of local provenance seed.

Recommendation 3

Another possibility for promoting a greater awareness in the local community is to encourage local businesses and authorities such as Country Energy to undertake sponsorship of particular environmental events, projects or areas. This way community groups are given support and encouragement, and the involved authority gets a valuable promotional opportunity.

Recommendation 4

The suggestion was also made that the possibility of compiling a planting kit be investigated. The kit could be loaned to groups and rural landholders involved with the plan and utilised for council community planting days. This could consist of several potti putkis and any additional planting material that is considered appropriate. This would increase the ease with which planting can be undertaken.

5.7 Wildlife Gardens

The creation of wildlife corridors is not always possible in urban areas because of large areas of residential development. However through encouraging residents to plant native species in their gardens they can create habitat for native wildlife to exist in or move through. Wildlife conservation is not just limited to the preservation of large areas.

There are many positives of using native plants in backyards and gardens. Firstly they have a higher survival rate because they are already adapted to the soil and climatic conditions in Tamworth. Secondly they have an inbuilt pest control system for example they attract ladybirds that prey on aphids, and thirdly they help maintain the 'natural character' of the Australian environment (Johnson & Don, 1990). But most importantly they provide habitat for native wildlife such as small birds.

When designing a garden to attract wildlife consideration must be given to recreating the natural layering effect of bushland. This provides a wide variety of habitat. Native trees, shrubs, groundcovers and natural mulch should all be incorporated. This can attract species like lizards and provide a variety of nesting opportunities for birds.

Some examples of beneficial plants are:

- Insect attracting plants eg acacias, eucalypts and leptospermums attract small birds such as the Fairy Wren and Tawny Frogmouth.
- Nectar-producing understory plants eg banksias, grevilleas and correas attract honeyeaters, lorikeets and possums. Having a variety of plants that produce nectar all year round will be a valuable resource for local wildlife.
- Seedeaters plants eg acacias, casuarinas and grasses attract finches and rosellas.
- Prickly dense shrubs provide protection for wrens and finches that prefer to nest in these protected areas.
- Provide hollows for nesting. One in five Australian bird species nest in hollows as do many arboreal mammals. Young trees take at least 70 years to develop hollows. (Johnson & Don, 1990). Nesting boxes can simulate hollows. Contact the local wildlife authorities regarding the size and placement of nesting boxes.

Information regarding this subject could be collected and distributed as part of a community education program. A brochure listing appropriate native species for planting in suburban gardens could be a possibility.

5.8 Seed Collection

With the practice of re-establishing natural bushland habitats gaining momentum the importance of local provenance seed must be taken into consideration. Local provenance seed describes seed that has been collected in the Tamworth local area, ideally as close as possible to the site which is to be planted out. The advantages of locally collected seed are;

- It is adapted to local conditions, thus will have the best survival and growth rate.
- The genetic integrity of the area will be maintained. Thus the characteristics that enable the plant to survive in this area are maintained.
- The propagated plants would be in harmony with the local wildlife, meaning that they would flower at the required times. For example a plant germinated from seed collected from another area may be adapted to flowering at a slightly different time than those endemic to this area, thus depriving species that may rely on its nectar at that time of the year.

(Mortlock, 1999)

There are many particulars involved in the process of collecting seed. Training and information can be provided through Greening Australia or Landcare.

It is the ideal of this plan that school and community groups can be involved in collecting and propagating local seed. The Greening Plan supports the aim of the Friends of Botanic Gardens and Australian Plant Society to develop a seed bank within the Gardens. The concept of collecting local provenance seed should also be promoted through local groups.

A list of organisations and groups that run seed collection and propagation programs is located in appendix 1.

5.9 Promotion of Recommendations

A plan must be promoted and its recommendations implemented for it to be of benefit. In addition to establishing a community education program the following suggestions were made by the committee to aid in the promotion of the Greening Plan;

- Distribution of the plan to Landcare and the Department of Land and Water Conservation so it can be utilised by their respective groups
- Information regarding the publication of the plan distributed to all rural property owners in the Rates Notice
- Distribution to all related functioning groups in the Tamworth area.
- Information flier circulated through all the schools outlining the plan and explaining how each school can be involved in its implementation.

References

- Banks, R. G. 2001, *Soil Landscapes of the Tamworth 1:100 000 Sheet*, Department of Land and Water Conservation, Sydney
- Elix, J. & Lambert, J. date unknown. *Grassy White Box Woodlands: Information Kit*. Community Solutions. Fairlight. NSW – Pamphlet.
- Farrier, D. Lyster, R. & Pearson, L. 1999. *The Environmental Law Handbook*. 3rd edn. Redfern Legal centre Publishing. Redfern. NSW.
- Johnston, P. & Don, A. 1990. *Grow Your Own Wildlife: How to Improve Your Local Environment*. Greening Australia Ltd. Canberra. ACT
- Morsley. R, Guidelines for Managing Remnant Bushland For Conservation. Greening Australia Fieldnote
- Mortlock. W. 1999. *Guidelines: Seed Collection from Woody Plants for Local Revegetation*. Florabank - pamphlet
- Namoi Catchment Management Board. 2001. *Draft: Namoi Catchment, a blueprint for the future*
- NSW Department of Education. 1989. *Environmental Education Curriculum Statement K-12*. NSW Department of Education
- Tamworth City Council. 1996. *Local Environmental Plan*
- Williams, J. 4/2000. *Managing the Bush: Recent research findings from the EA/LWRRDC National Remnant Vegetation R & D Program*. National Research and Development Program on Rehabilitation, Management and Conservation of Remnant Vegetation, Research Report4/00

Appendix

CONTENTS

- 1. Environmental Programs / Funding Opportunities / Contact Organisations**
- 2. Native Species List for the Tamworth Area**
 - a. Whitebox Woodland**
 - b. Riparian Community**
 - c. Floodplain and Drainage Lines**

Environmental Programs / Funding Opportunities / Contact Organisations

1. *Greening Australia*

Greening Australia runs a variety of programs and provides technical support to environmental projects.

- For technical enquiries or information on current projects contact Greening Australia, Armidale on 67 723 248.

2. *National Parks and Wildlife Service*

The NPWS can provide information regarding threatened species and communities. They also have an advisory role in relation to plant and animal identification and can provide information on the management of certain communities. The Walcha branch covers both the Parry and Tamworth council areas Phone: 67 771400, 188W North St, Walcha, 2354

3. *Bushcare*

Bushcare is an Environment Australia program that offers funding and technical support to individuals, groups and organisations that are involved in or interested in the protection, enhancement and/or extension of existing native vegetation.

- For information regarding funding contact the Regional Bushcare Facilitator, on 67 645 933
- For technical advise contact the Bushcare Support Project Manager, on 67 723248

4. *Landcare*

Landcare provide support to any individual group or organisation that is interested in undertaking any type of environmental work.

- For further information contact the Tamworth Landcare Coordinator on 67 645 984

5. *Land for Wildlife*

Is a voluntary property registration scheme, which aims to encourage and assist private landholders in managing areas for wildlife on their properties. Landholders receive newsletters, technical notes and a property sign. It cost nothing to join and is not legally binding.

- Further information (02) 9585 6040 or conservation.partners@npws.nsw.gov.au

6. *Grassy Ecosystem Grants*

Is concerned with the preservation and protection of high conservation value native grassland. The project supplies help with cost of fencing off high conservation areas, native plant identification and management option.

- For further information contact Heather Ranclaud Ph 67 471 793. email ranclaud@northnet.com.au

7. *Environmental Trust*

The Environmental Trust has grants for community groups, schools, Local and State Governments. Funding rounds normally begin in May each year with information on the years funding becoming available. Local workshops are usually held to provide information on preparing applications.

- For further information contact the trust on (02) 9995 5369 or visit their web site at <http://www.epa.nsw.gov.au/envtrust/index.htm>

8. *Grassy White Box Woodlands*

For information regarding this community please contact the Grassy Box Woodland Conservation Management Network this program is run through the National Parks and Wildlife Service. Lorraine Oliver, PO Box 2115, Queanbeyan, 2620. Ph (02) 62 989 709. email – lorraine.oliver@pws.nsw.gov.au

9. *Citizens Wildlife Corridors*

The CWC are a local community group that are working to improve specific sites of remnant bushland.

- Further information Ron Webster 67 664 296

10. *Existing Resources*

Preliminary Flora, Fauna & Threatened Species Assessment, Woolomol Hills, Tamworth, Prepared for the Department of Land and Water Conservation, 1996

Native Species Lists for Planting in the Tamworth Area

NB These lists are not an exhaustive list of the species that would occur in each environment especially for the groundcover.

White Box Woodland

Trees

Eucalyptus albens (White Box)
Angophora floribunda (Rough-barked Apple)
Eucalyptus melliodora (Yellow Box)
Brachychiton populneum (Kurrajong)

} In the moister areas

Shrubs

Acacia decora (Western Golden Wattle)
Bursaria spinosa (Blackthorn)
Dodonaea viscosa (Hop Bush)
Notolaea micorcarpa (Native Olive)
Olearia elliptica (Sticky Daisy Bush)
Myoporum montanum (Western Boobialla)
Cassinia laevis (Cough Bush)
Geijera pariflora (Wilga)

Groundcover

Dianella revolute (Blue Flax Lily)
Jasminum suavisimum (Native Jasmine)
Themeda australis (Kangaroo Grass)
Poa

Riparian Community

Trees

Eucalyptus camaldulensis (River Red Gum)
Casuarina cunninghamiana (River Sheoak)
Eucalyptus mellidora (Yellow Box)
Angophora floribunda (Rough-barked Apple)

Shrubs

Acacia salicina (River Cooba)
Acacia filicifolia (Fern Leaved Wattle)
Acacia implexa (Hickory Wattle)
Acacia dealbata (Silver Wattle)
Callistemon viminalis (Weeping Bottlebrush)
Leptospermum polygalifolium (Tea Tree)

} Upper bank

Groundcover

Dichanthium sericeum (Queensland Bluegrass)
Bothriochloa macra (Red Grass)
Danthonia sp. (Wallaby Grass)

Floodplains and Drainage lines

Trees

Eucalyptus camaldulensis (River Red Gum)
Eucalyptus mellidora (Yellow Box)
Eucalyptus blakelyi (Blakely's Red Gum)
Angophora floribunda (Rough-barked Apple)

Shrubs

Acacia decora (Western golden Wattle)
Acacia implexa (Hickory Wattle)
Acacia dealbata (Silver Wattle)
Notolaea micorcarpa (Native Olive)
Bursaria spinosa (Blackthorn)
Geijera pariflora (Wilga)

Groundcover

Dichanthium sericeum (Queensland Bluegrass)
Bothriochloa macra (Red Grass)
Danthonia sp. (Wallaby Grass)